



LE910 V2 SERIES AT COMMANDS REFERENCE GUIDE

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APPLICABILITY TABLE

PRODUCTS	SW RELEASE
  LE910-SV V2	20.00.007
  LE910-SV1	20.00.017
  LE910-SVL	20.00.037
  LE910-NA V2	20.00.507
  LE910-NA1	20.00.527
  LE910-EU V2	20.00.406
  LE910-EU1	20.00.416
  LE910-JN1	20.00.205
  LE910B4-NA	20.00.537
  LE910B1-NA	20.00.547
  LE910B1-SA	20.00.517

AVAILABILITY TABLE

The following table highlights which modules support or not the commands indicated in the first column of the table (Y = supported; N = not supported).

AT Commands not supported from all modules	LE910-SV V2 CAT 4 LTE only (Verizon)	LE910-SV1 CAT 1 LTE only (Verizon)	LE910-SVL CAT 1 LTE only (Verizon)	LE910NA V2 CAT 4 LTE, 3G (AT&T)	LE910NA V2 CAT 4 LTE, 3G (AT&T + Verizon)	LE910-NA1 CAT 1 LTE, 3G (AT&T)	LE910-NA1 CAT 1 LTE, 3G (AT&T + Verizon)	LE910B4-NA CAT 4 LTE, 3G (AT&T)	LE910B1-NA CAT 1 LTE, 3G (AT&T)	LE910B1-NA CAT 1 LTE, 3G (AT&T + Verizon)	LE910B1-SA CAT 1 LTE only (AT&T)	LE910-EU V2 CAT 4 LTE, 2G/3G (EU)	LE910-EU1 CAT 1 LTE, 2G (EU)	LE910-JN1 CAT 4 LTE only (Docomo)
Product Variant Customization	00	01	03	50	50 / 00	52	52 / 01	53	54	54 / 01	51	40	41	20
Generic Modem Control														
AT#CSFB	N	N	N	Y	Y/N	Y	Y	Y	Y	Y	N	Y	Y	N
AT#CQI	N	N	N	Y	Y/N	Y	Y	Y	Y	Y	N	Y	N	N
Call & DTMF														
AT+CBST	N	N	N	Y	Y/N	Y	Y	Y	Y	Y	N	Y	Y	N
AT+CRLP	N	N	N	Y	Y/N	Y	Y	Y	Y	Y	N	Y	Y	N
AT+VTS	N	N	N	Y	Y/N	Y	Y	Y	Y	Y	N	Y	Y	N
AT+VTD	N	N	N	Y	Y/N	Y	Y	Y	Y	Y	N	Y	Y	N
Network														
AT#CODEC	N	N	N	Y	Y/N	Y	Y	Y	Y	Y	N	Y	Y	N
AT#CODECINFO	N	N	N	Y	Y/N	Y	Y	Y	Y	Y	N	Y	Y	N
AT#CIPHIND	N	N	N	Y	Y/N	Y	Y	Y	Y	Y	N	Y	Y	N
AT#FDOR	N	N	N	Y	Y/N	Y	Y	Y	Y	Y	N	Y	Y	N
AT#ENCALG	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
Packet Domain														
AT+CGCLASS	N	N	N	Y	Y/N	Y	Y	Y	Y	Y	N	Y	Y	N
AT#MSCLASS	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	N	N
Audio Basic Configuration														
AT+CALM	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT+CRSL	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT+CLVL	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT+CMUT	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT+CSIL	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#SRP	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#SHFSD	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#SHSSD	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#SPKMUT	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
Tones configuration														
AT#TSVOL	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#TONE	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#TONEEXT	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#UDTSET	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N

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Product Variant Customization	00	01	03	50	50 / 00	52	52 / 01	53	54	54 / 01	51	40	41	20
AT#UDTSAV	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#UDTRST	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
Audio Profiles														
AT#PRST	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#PSAV	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#PSEL	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
Echo Canceller Configuration														
AT#SHSEC	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#SHFEC	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#SHSAGC	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#SHSNR	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#SHFNFR	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#SHSANA	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#SHSDLY	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
Embedded DTMF Decoder & TTY														
AT#DTMF	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
AT#TTY	N	N	N	Y	Y/N	Y	Y/N	Y	Y	Y/N	N	Y	Y	N
OMA-DM														
AT#ENAOMADM	Y	Y	Y	Y	Y/Y	Y	Y	Y	Y	Y/Y	Y	N	N	N
AT#OMACFG	N	N	N	Y	Y/N	Y	Y	Y	Y	Y/N	Y	N	N	N
AT#OMASENDPIN	N	N	N	Y	Y/N	Y	Y	Y	Y	Y/N	Y	N	N	N
AT#UNIQUEDEVID	N	N	N	Y	Y/N	Y	Y	Y	Y	Y/N	Y	N	N	N
AT#HOSTODIS	N	N	N	Y	Y/N	Y	Y	Y	Y	Y/N	Y	N	N	N

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1. INTRODUCTION

1.1. Scope

This document is aimed in providing a detailed specification and a comprehensive listing as a reference for the whole set of AT command.

1.2. Audience

Readers of this document should be familiar with Telit modules and their ease of controlling by means of AT Commands.

1.3. Contact Information, Support

For general contact, technical support services, technical questions and report documentation errors contact Telit Technical Support at:

- TS-EMEA@telit.com
- TS-AMERICAS@telit.com
- TS-APAC@telit.com

Alternatively, use:

<http://www.telit.com/support>

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

<http://www.telit.com>

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.

1.4. Icons and Text Conventions



SET section – This section provides all information related to SET functionality of involved AT command. If it has got strictly and relevant SET information, these are located at section end.



READ section – This section provides all information related to READ functionality of involved AT command. If it has got strictly and relevant READ information, these are located at section end.



TEST section – This section provides all information related to TEST functionality of involved AT command. If it has got strictly and relevant TEST information, these are located at section end.



Additional info – This section provides any kind of additional and useful information related to the AT command section as well as command exceptions or special behavior cases.



REFERENCE section – This section provides useful references (standards or normative) related to involved AT command.



EXAMPLE section – This section provides useful examples related to involved AT command.



NOTE section – This section provides all information related to involved AT commands. Each note can provide a different level of information: danger, caution/warning and tip/information.



Danger – This information **MUST** be followed or catastrophic equipment failure or bodily injury may occur.



Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.



Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

2. AT COMMANDS

The Telit wireless module family can be controlled via the serial interface using the standard AT commands.¹ The Telit wireless module family is compliant with:

1. Hayes standard AT command set, to maintain the compatibility with existing SW programs.
2. 3GPP TS 27.007 specific AT command and GPRS specific commands.
3. 3GPP TS 27.005 specific AT commands for SMS (Short Message Service) and CBS (Cell Broadcast Service)

Moreover, Telit wireless module family supports also Telit proprietary AT commands for special purposes. The following is a description of how to use the AT commands with the Telit wireless module family.

2.1. Definitions

The following syntactical definitions apply:

- <CR>** **Carriage return character**, is the command line and result code terminator character, which value, in decimal ASCII between 0 and 255, is specified within parameter **S3**. The default value is 13.
- <LF>** **Linefeed character**, is the character recognized as line feed character. Its value, in decimal ASCII between 0 and 255, is specified within parameter **S4**. The default value is 10. The line feed character is output after carriage return character if verbose result codes are used (**V1** option used) otherwise, if numeric format result codes are used (**V0** option used) it will not appear in the result codes.
- <...>** Name enclosed in angle brackets is a syntactical element. They do not appear in the command line.
- [...]** Optional sub parameter of a command or an optional part of TA information response is enclosed in square brackets. Brackets themselves do not appear in the command line. When sub parameter is not given in AT commands which have a Read command, new value equals to its previous value. In AT commands which do not store the values of any of their sub parameters, and so have not a Read command, which are called *action type* commands, action should be done based on the recommended default setting of the sub parameter.

2.2. AT Command Syntax

The syntax rules followed by Telit implementation of either Hayes AT commands, GSM commands are very similar to those of standard basic and extended AT commands

There are two types of extended command:

- **Parameter type commands.** This type of commands may be "set" (to store a value or values for later use), "read" (to determine the current value or values stored), or "tested" (to determine ranges of values supported). Each of them has a test command (trailing =?) to give information about the type of its sub parameters; they also have a Read command (trailing?) to check the current values of sub parameters.
- **Action type commands.** This type of command may be "executed" or "tested".
 - "executed" to invoke a function of the equipment, which generally involves more than the simple storage of a value for later use
 - "tested" to determine:
 - if sub parameters are associated with the action, the ranges of sub parameters values that are supported; if the command has no sub parameters, issuing the correspondent Test command (trailing =?) raises the result code **"ERROR"**.
Note: issuing the Read command (trailing?) causes the command to be executed.
 - whether or not the equipment implements the Action Command (in this case issuing the correspondent Test command - trailing =? - returns the **OK** result code), and, if sub

¹ The AT is an ATTENTION command and is used as a prefix to other parameters in a string. The AT command combined with other parameters can be set up in the communications package or typed in manually as a command line instruction combined with other parameters can be set up in the communications package or typed in manually as a command line instruction.

parameters are associated with the action, the ranges of sub parameters values that are supported.

Action commands don't store the values of any of their possible sub parameters.

Moreover:

The response to the Test Command (trailing =?) may be changed in the future by Telit to allow the description of new values/functionalities.

If all the sub parameters of a parameter type command **+CMD** are optional, issuing **AT+CMD=<CR>** causes the **OK** result code to be returned and the previous values of the omitted sub parameters to be retained.

2.2.1. String Type Parameters

A string, either enclosed between quotes or not, is a valid string type parameter input. According to V25.ter space characters are ignored on the command line and may be used freely for formatting purposes, unless they are embedded in numeric or quoted string constants; therefore a string containing a space character has to be enclosed between quotes to be considered a valid string type parameter (e.g. typing **AT+COPS=1,0,"A1"** is the same as typing **AT+COPS=1,0,A1**; typing **AT+COPS=1,0,"A BB"** is different from typing **AT+COPS=1,0,A BB**).

A string is always case sensitive.

A small set of commands requires always to write the input string parameters within quotes: this is explicitly reported in the specific descriptions.

2.2.2. Command Lines

A command line is made up of three elements: the **prefix**, the **body** and the **termination character**.

The **command line prefix** consists of the characters "**AT**" or "**at**", or, to repeat the execution of the previous command line, the characters "**A**" or "**a**" or **AT#** or **at#**.

The **termination character** may be selected by a user option (parameter S3), the default being **<CR>**.

The basic structures of the command line are:

- **ATCMD1<CR>** where **AT** is the command line prefix, **CMD1** is the body of a **basic command** (nb: the name of the command never begins with the character "+") and **<CR>** is the command line terminator character
- **ATCMD2=10<CR>** where 10 is a sub parameter
- **AT+CMD1;+CMD2=,10<CR>** These are two examples of **extended commands** (nb: the name of the command always begins with the character "+"). They are delimited with semicolon. In the second command the sub parameter is omitted.
- **+CMD1?<CR>** This is a Read command for checking current sub parameter values
- **+CMD1=?<CR>** This is a test command for checking possible sub parameter values

These commands might be performed in a single command line as shown below:

ATCMD1 CMD2=10+CMD1;+CMD2=,10;+CMD1?;+CMD1=?<CR>

anyway, it is always preferable to separate into different command lines the basic commands and the extended commands; furthermore, it is suggested to avoid placing several action commands in the same command line, because if one of them fails, then an error message is received but it is not possible to argue which one of them has failed the execution.

² The set of proprietary AT commands differentiates from the standard one because the name of each of them begins with either "@", "#", "\$" or "*". Proprietary AT commands follow the same syntax rules as extended commands

If command **V1** is enabled (verbose responses codes) and all commands in a command line has been performed successfully, result code **<CR><LF>OK<CR><LF>** is sent from the TA to the TE, if sub parameter values of a command are not accepted by the TA or command itself is invalid, or command cannot be performed for some reason, result code **<CR><LF>ERROR<CR><LF>** is sent and no subsequent commands in the command line are processed.

If command **V0** is enabled (numeric responses codes), and all commands in a command line has been performed successfully, result code **0<CR>** is sent from the TA to the TE, if sub-parameter values of a command are not accepted by the TA or command itself is invalid, or command cannot be performed for some reason, result code **4<CR>** and no subsequent commands in the command line are processed.

In case of errors depending on ME operation, **ERROR** (or **4**) response may be replaced by **+CME ERROR: <err>** or **+CMS ERROR: <err>**.



The command line buffer accepts a maximum of 400 characters. If this number is exceeded none of the commands will be executed and TA returns **ERROR**.

2.2.2.1. ME Error Result Code - +CME ERROR: <err>

This is NOT a command, it is the error response to +Cxxx 3GPP TS 27.007 commands.

Syntax: **+CME ERROR: <err>**

Parameter: **<err>** - error code can be either numeric or verbose (see +CMEE). The possible values of **<err>** are reported in the table:

Numeric Format ³	Verbose Format ⁴
0	phone failure
1	no connection to phone
2	phone adaptor link reserved
3	operation not allowed
4	operation not supported
5	PH-SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
10	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
15	SIM wrong
16	incorrect password
17	SIM PIN2 required
18	SIM PUK2 required
20	memory full
21	invalid index
22	not found
23	memory failure
24	text string too long
25	invalid characters in text string
26	dial string too long
27	invalid characters in dial string
30	no network service
31	network timeout
32	network not allowed - emergency calls only
34	numeric parameter instead of text parameter
35	text parameter instead of numeric parameter
36	numeric parameter out of bounds
37	text string too short

³ Not all modules support the error codes shown in the table.

⁴ There could be small variations in the message depending on the module in use.

Numeric Format ³	Verbose Format ⁴
38	The GPIO Pin is already used
40	network personalization PIN required
41	network personalization PUK required
42	network subset personalization PIN required
43	network subset personalization PUK required
44	service provider personalization PIN required
45	service provider personalization PUK required
46	corporate personalization PIN required
47	corporate personalization PUK required
49	EAP method not supported
50	Invalid EAP parameter
51	Parameter length error for all Auth commands
52	Temporary error for all Auth command
53	not verified hidden key
100	unknown
103	Illegal MESSAGE
106	Illegal ME
107	GPRS services not allowed
111	PLMN not allowed
112	Location area not allowed
113	Roaming not allowed in this location area
132	service option not supported
133	requested service option not subscribed
134	service option temporarily out of order
148	unspecified GPRS error
149	PDP authentication failure
150	invalid mobile class
257	network rejected request
258	retry operation
259	invalid deflected to number
260	deflected to own number
261	unknown subscriber
262	service not available
263	unknown class
264	unknown network message
273	Minimum TFT per PDP address error
274	Duplicate TFT eval prec index
275	Invalid TFT param combination
277	Invalid number of parameters
278	Invalid Parameter
320	Call index error
321	Call state error
322	Sys state error
323	Parameters error
550	generic undocumented error
551	wrong state
552	wrong mode
553	context already activated
554	stack already active
555	activation failed
556	context not opened
557	can not setup socket
558	can not resolve DN
559	time-out in opening socket
560	can not open socket
561	remote disconnected or time-out
562	connection failed
563	tx error
564	already listening
565	socket disconnection
566	can not resume socket
567	ip version type incompatible
568	ipv6 not enabled

Numeric Format ³	Verbose Format ⁴
569	
600	Generic undocumented error
601	wrong state
602	Can not activate
603	Can not resolve name
604	Can not allocate control socket
605	Can not connect control socket
606	Bad or no response from server
607	Not connected
608	Already connected
609	Context down
612	Resource used by other instance
613	Data socket yet opened in cmdmode
614	FTP CmdMode data socket closed
615	FTP not connected
616	FTP disconnected
617	FTP read command closed
618	FTP read command error
619	FTP write command closed
620	FTP write command error
621	FTP read data closed
622	FTP read data error
623	FTP write data closed
624	FTP write data error
625	FTP host not found
626	FTP accept failure
627	FTP listen failure
628	FTP bind failure
629	FTP file create failure
630	FTP file get failure
631	FTP file put failure
632	FTP file not found
633	FTP timed out
634	FTP login incorrect
635	FTP close error
636	FTP server not ready
637	FTP server shutdown
638	FTP unexpected reply
639	FTP user ID and password don't match
640	FTP user ID and password don't match
641	FTP user already logged in
642	FTP open channel timeout
643	FTP communication timeout
644	FTP unknown error
657	Network survey error (No Carrier)
658	Network survey error (Busy)
659	Network survey error (Wrong request)
660	Network survey error (Aborted)
680	LU processing
681	Network search aborted
682	PTM mode
683	Network search terminated
684	CSG Search processing
690	Active call state
691	RR connection established
770	SIM invalid
900	No Response for AT Command
1000	SSL not activated
1001	SSL certs and keys wrong or not stored
1002	SSL generic error
1003	SSL already activated
1004	SSL error during handshake
1005	SSL socket error
1006	SSL invalid state

Numeric Format ³	Verbose Format ⁴
1007	SSL cannot activate
1008	SSL not connected
1009	SSL already connected
1010	SSL error enc/dec data
1011	SSL disconnected
1100	Model not recognized
1101	Model information missing
1102	Unable to open the file
1103	Unable to close the file
1104	Unable to read the nv file
1105	Unable to write the nv file
1106	Input pattern is wrong
1113	Call establishment failed
1114	File name already exist

2.2.2.2. Message Service Failure Result Code - +CMS ERROR: <err>

This is NOT a command, it is the error response to +Cxxx 3GPP TS 27.005 commands.

Syntax: **+CMS ERROR: <err>**

Parameter: **<err>** - numeric error code.



The **<err>** values are reported in the table:

Numeric Format	Meaning
According to 3GPP TS 24.011 section 8.2.5.4	
0...127	
According to 3GPP TS 23.040 sub clause 9.2.3.22 values	
128...255	
According to 3GPP TS 27.005 section 3.2.5 - Message Service Failure Result Code +CMS ERROR	
300	ME failure
301	SMS service of ME reserved
302	operation not allowed
303	operation not supported
304	invalid PDU mode parameter
305	invalid text mode parameter
310	SIM not inserted
311	SIM PIN required
312	PH-SIM PIN required
313	SIM failure
314	SIM busy
315	SIM wrong
316	SIM PUK required
317	SIM PIN2 required
318	SIM PUK2 required
320	memory failure
321	invalid memory index
322	memory full
330	SMSC address unknown
331	no network service
332	network time-out
340	no +CNMA acknowledgement expected
500	unknown error
510	msg blocked
<err> 512 and on are manufacturer specific	
512	No SM resources
513	TR1M timeout
514	LL error
515	No response from network

2.2.2.3. Carriage Returns, Line Feeds and Log

Generally, the number of carriage returns <CR> and line feeds <LF> at the end of command responses may vary. This scenario may also vary from software version to software version. We do not have evidence of this behavior in URC lines.

Command responses examples:

```
AT#LWM2MMON?<CR>
<CR><LF>
#LWM2MMON: "4"<LF>#LWM2MMON: "3"  missing <CR>
<CR><LF>
<CR><LF>
OK
<CR><LF>
AT#LWM2MFYACKURI=0,2<CR>
<CR><LF>
#LWM2MNFYACKURI: "/3/0/9"<LF>#LWM2MNFYACKURI: "/3/0/8"  missing <CR>
<CR><LF>
<CR><LF>
OK
<CR><LF>
```

The user must be aware of this aspect before writing a script to parse the commands lines and the relative responses lines to generate a log.

2.2.3. Information Responses and Result Codes

The TA response, in case of verbose response format enabled, for the previous examples command line could be as shown below:

- information response to **+CMD1?**
<CR><LF>+CMD1:2,1,10<CR><LF>
- information response to **+CMD1=?**
<CR><LF>+CMD1(0-2),(0,1),(0-15)<CR><LF>
- result code <CR><LF>OK<CR><LF>

Moreover, there are other two types of result codes:

- *result codes* that inform about progress of TA operation (e.g. connection establishment **CONNECT**)
- *result codes* that indicate occurrence of an event not directly associated with issuance of a command from TE (e.g. ring indication **RING**).

Here the basic result codes according to ITU-T V25Ter recommendation

Numeric form	Verbose form
0	OK
1	CONNECT or CONNECT <text>3F3F5
2	RING
3	NO CARRIER
4	ERROR
6	NO DIALTONE
7	BUSY
8	NO ANSWER

⁵ <text> can be "300", "1200", "2400", "4800", "9600", "14400" or "1200/75"

10	CONNECT 24004
11	CONNECT 48004
12	CONNECT 96004
15	CONNECT 144004
23	CONNECT 1200/754

2.2.4. Command Response Time-Out

Every command issued to the Telit modules returns a result response, if response codes are enabled (default). The time needed to process the given command and return the response varies, depending on the command type. Commands that do not interact with the SIM or the network, and only involve internal setups or readings, have an immediate response. Commands that interact with the SIM or the network could take many seconds to send a response, depending on SIM configuration (e.g., number of contacts stored in the phonebook, number of stored SMS), or on the network the command may interact with.

2.2.5. Command Issuing Timing

The chain Command -> Response shall always be respected, and a new command must not be issued before the module has terminated all the sending of its response result code (whatever it may be).

This applies especially to applications that "sense" the **OK** text and therefore may send the next command before the complete code **<CR><LF>OK<CR><LF>** is sent by the module.

It is advisable anyway to wait for at least 20ms between the end of the reception of the response and the issue of the next AT command.

If the response codes are disabled and therefore the module does not report any response to the command, then at least the 20ms pause time shall be respected.

2.3. Storage

2.3.1. Factory Profile and User Profiles

The Telit wireless modules store the values, set by several commands, in the internal nonvolatile memory (NVM), allowing to remember this setting even after power off. In the NVM, these values are set either as factory profile or as user profiles. There are two customizable user profiles and one factory profile in the NVM of the device: by default, the device will start with user profile 0 equal to factory profile.

For backward compatibility, each profile is divided into two sections, one base section which was historically the one that was saved and restored in early releases of code, and the extended section which includes all the remaining values.

The **&W** command is used to save the current values of both sections of profiles into the NVM user profile.

Commands **&Y** and **&P** are both used to set the profile to be loaded at startup. **&Y** instructs the device to load at startup only the base section. **&P** instructs the device to load at startup the full profile: base + extended sections.

The **&F** command resets to factory profile values only the command of the base section of profile, while the **&F1** resets to factory profile values the full set of base + extended section commands.

The values set by other commands are stored in NVM outside the profile: some of them are stored always, without issuing any **&W**, some other are stored issuing specific commands (**+CSAS**, **#SLEDSAV**, **#SKTSAV**, **#ESAV**); all these values are read at power-up.

In this document, each AT command description begins with a "AT Command short overview table" having the following format:

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
/	see below	/	/	/

This chapter focus on the values that **Setting saved** field can assume and their meaning. The meaning of the other fields will be described in the next chapter. **Setting saved** field can have one of the value listed below

(to have information on the AT instance introduced hereafter, see the reference section of the **#PORTCFG** command):

- Specific profile** the parameters values set by the command are stored in the profile base section. The stored values set is associated to the specific AT instance used to enter the command. It is a profile used by the specific AT instances.
Examples of the AT commands: **+IPR, E, Q, V, X, &Y**, etc.
The parameters values set by the command are stored in the profile extended section. The stored values set is associated to the specific AT instance used to enter the command. It is a profile used by the specific AT instance.
Examples of the AT commands: **+FCLASS, +CREG, +CLIP, #STIA**, etc.
- Common profile** the parameters values set by the command are stored in the profile extended section. The stored values set is not associated to the specific AT instance used to enter the command. It is a profile shared between the AT instances.
Examples of the AT commands: **+CALM, #E2SLRI, #DVI**, etc.
- Auto** the parameters values set by the command are automatically stored in NVM, without issuing any storing AT command, and independently from the profile (unique values). The values are automatically restored at startup.
AT commands examples: **+COPS, +CGQREQ, #SCFG**, etc.
In some cases, the parameters values are store in the file system.
AT commands examples: **#TEMPCFG, #TEMPMON**, etc.
- Other** the parameters values set by the command are stored in NVM issuing a specific command and independently from the profile.
Examples of the AT commands: **#SLED** setting is saved by **#SLEDSAV**
#BIQUADINEX setting is saved by **#PSAV**
etc.

2.4. AT Command Short Overview Table

As stated before, each AT command description begins with a "AT Command short overview table" having the following format:

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	/	No	-	2

Here are the table fields meanings:

- SIM Presence** indicates if the AT command to be executed needs the SIM presence.
- Can be aborted** indicates if the AT command can be aborted during its execution.
- MAX timeout** indicates the time within which the command must be executed.
- SELINT** indicates on which AT interface type the AT command is available.

3. AT COMMANDS REFERENCES

3.1. General Control and Config

3.1.1. Command Line Prefixes

3.1.1.1. AT - Starting a Command Line

AT is the prefix used to start a command line.



ITU-T Recommendation V.25 ter
3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT

The prefix **AT** is a two-character abbreviation ("ATtention"), always used to start a command line to be sent from TE to TA, with the only exception of AT#/ prefix. As a command, it can be issued just to test if the device is responding to AT commands.

3.1.1.2. **A/** - Last Command Automatic Repetition

The command immediately executes the previously issued command or commands.



ITU-T Recommendation V.25 ter



SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



A/

If the prefix **A/** is issued, the device immediately executes once again the body of the preceding command line. No editing is possible, and no termination character is necessary. A command line may be repeated multiple times through this mechanism, if desired.

If **A/** is issued before any command line has been executed, the preceding command line is assumed to have been empty (that results in an **OK** result code).

-  This command works only at fixed IPR.
-  The custom prefix **AT#** has been defined: it causes the last command to be executed again too; but it does not need a fixed **+IPR**.

3.1.1.3. AT#/ - Repeat Last Command

The command immediately executes the previously issued command or commands.


SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#/

If **AT#/** is issued, the device immediately executes once again the body of the preceding command line. No editing is possible, and no termination character is necessary. A command line may be repeated multiple times through this mechanism, if desired.

If **AT#/** is issued before any command line has been executed, the preceding command line is assumed to have been empty (that results in an **OK** result code).

-  This command is the same as **A/** but does not need a fixed **+IPR**.

3.1.2. Generic Modem Control

3.1.2.1. AT#SELINT - Select Interface Style

This command sets the AT command interface style.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#SELINT=<v>

Set command sets the AT command interface style depending on parameter.

Parameter:

Name	Type	Default	Description
<v>	integer	2	AT command interface style

Value:

2 : standard AT parser



Issuing **AT#SELINT=<v>** when the multiplexing protocol control channel has been enabled with **+CMUX** (see 3GPP TS 27.010), returns an ERROR result code.



AT#SELINT?

Read command reports the current interface style in the format:

#SELINT: <v>



AT#SELINT=?

Test command reports the available range of values for parameter <v>.

3.1.2.2. AT&F - Set to Factory-Defined Configuration

Set configuration parameters to default values.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&F[<value>]

Execution command sets the configuration parameters to default values specified by manufacturer; it takes in consideration hardware configuration switches and other manufacturer-defined criteria.

Parameter:

Name	Type	Default	Description
<value>	integer	0	parameters to reset

Values:

- 0 : only the factory profile base section parameters are considered
- 1 : either the factory profile base section and the extended section are considered (full factory profile)



If parameter <value> is omitted, the command has the same behavior as **AT&F0**.

3.1.2.3. ATZ - Soft Reset

Soft Reset



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



ATZ[<n>]

Execution command loads the base section of the specified user profile and the extended section of the default factory profile

Parameter:

Name	Type	Default	Description
<n>	integer	N/A	user profile number

Value:

0,1 : user profile number

- i** If parameter <n> is omitted, the command has the same behavior as **ATZ0**
- i** Any active call is terminated.

3.1.2.4. AT&Y - Default Reset Basic Profile Designation

Basic profile on startup.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT&Y=[<n>]

Set command defines the basic profile that will be loaded on startup. The wireless module can store 2 complete configurations (see **&W**).

Parameter:

Name	Type	Default	Description
<n>	integer	0	basic profile that will be loaded on startup.

Value:

0,1 : profile index

- i** Differently from command **Z<n>**, which loads just once the desired profile, the one chosen through command **&Y** will be loaded on every startup.
- i** If parameter is omitted the command has the same behavior as **AT&Y0**.

3.1.2.5. AT&P - Default Reset Full Profile Designation

Define which full profile is loaded at startup.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT&P[<n>]



Execution command defines which full profile will be loaded at startup.

Parameter:

Name	Type	Default	Description
<n>	integer	0	Configuration parameter

Value:

0,1 : profile number: the wireless module can store 2 full configurations (see command &W).

-  Differently from command **Z<n>**, which loads just once the desired profile, the one chosen through command **&P** will be loaded at every startup.
-  If parameter is omitted, the command has the same behavior as **AT&P0**

3.1.2.6. AT&W - Store Current Configuration

Execution command stores on profile <n> the complete configuration of the device.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&W[<n>]

Parameter:

Name	Type	Default	Description
<n>	integer	0	profile identifier
Value:			
0,1 : profile identifiers			

- i** If parameter is omitted, the command has the same behavior of **AT&W0**.

3.1.2.7. AT&N - Display Internal Phonebook Stored Numbers

The command displays telephone numbers stored in the internal phonebook.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&N[<n>]

The module has a built in nonvolatile memory where 10 telephone numbers can be stored, each one having a maximum of 24 digits.

Execution command returns the telephone number stored at the <n> position in the internal memory.

Parameter:

Name	Type	Default	Description
<n>	integer	N/A	phonebook record number

Value:

0÷9 : phonebook record number

-  If parameter <n> is omitted then all the internal records are shown.

3.1.2.8. AT#Z - Extended Reset

Set command loads both base section and extended section of the specified user profile stored with **AT&W** and selected with **AT&P**.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#Z=<profile>

Parameter:

Name	Type	Default	Description
<profile>	integer	0	Parameter to select the user profile

Values:

- 0 : user profile 0
- 1 : user profile 1



AT#Z=?

Test command returns **OK** result code.

3.1.2.9. AT&V - Display some Configuration and Profile

The command displays some of the basic modem configuration settings and parameters

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&V

Execution command returns some of the basic modem configuration settings and parameters, one for each row, in the format:

setting/parameter : value

- i** The row of information about **CTS (C106) OPTIONS** is in the output of **&V** for compatibility reasons and represents only a dummy value.



Example of returned values.

- AT&V**
COMMAND ECHO : E1=YES
RESULT MESSAGES : Q0=YES
VERBOSE MESSAGES : V1=YES
EXTENDED MESSAGES : X1=YES
LINE SPEED : F0=autodetect
CONSTANT DTE SPEED : YES
FLOW CONTROL OPTIONS : &K3=HW bidirect.
ERROR CORRECTION MODE : RLP
CTS (C106) OPTIONS : &B2=OFF while disc.
DSR (C107) OPTIONS : &S3=PHONE ready->ON
DTR (C108) OPTIONS : &D0=ignored
DCD (C109) OPTIONS : &C1=follows carrier
RI (C125) OPTIONS : \R1=OFF dur. off-hk
C108/1 OPERATION : &D0=NO
POWER SAVING ON DTR : +CFUN:1=NO
DEFAULT PROFILE : &Y0=user profile 1
OK

3.1.2.10. ATV - Single Line Connect Message

This command sets single line connect message.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



ATV=<n>

Execution command sets single line connect message.

Parameter:

Name	Type	Default	Description
<n>	integer	0	set single line connect message

Values:

- 0 : set OFF
- 1 : set ON

3.1.2.11. AT+GCI - Country of Installation

Set command allows to select the installation country code according to ITU-T Annex A.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+GCI=<code>

Parameter:

Name	Type	Default	Description
<code>	integer	59	installation country code

Value:

59 : it currently supports only the Italy country code



AT+GCI?

Read command reports the currently selected country code.



AT+GCI=?

Test command reports the supported values of parameter <code>.

3.1.2.12. AT+GCAP - Capabilities List

This command returns the equipment supported command set list.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+GCAP

Execution command returns the equipment supported command set list:

+GCAP: +CGSM,+FCLASS,+MS,+ES

Additional info:

▶▶ Supported Command Set:

+CGSM: GSM ETSI command set

+FCLASS: Fax command set

+MS: Mobile Specific command set

+ES: WCDMA Data Service common modem command set

3.1.2.13. AT+GMI - Manufacturer Identification

This command returns the manufacturer identification.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+GMI

Execution command returns the manufacturer identification followed by an <OK> at newline.



AT+GMI=?

Test command returns **OK** result code.

3.1.2.14. AT+GMM - Model Identification

The command returns the model identification.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+GMM

The execution command returns the model identification followed by an <OK> at newline.



AT+GMM=?

Test command returns **OK** result code.

3.1.2.15. AT+GMR - Revision Identification

The command returns the software revision identification.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+GMR

Execution command returns the software revision identification followed by an <OK> at newline.



AT+GMR=?

Test command returns **OK** result code.

3.1.2.16. AT+GSN - Serial Number

The command reports the device board serial number.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+GSN

Execution command returns the device board serial number.



The number returned is not the IMSI, but it is the board number.



AT+GSN=?

Test command returns **OK** result code.

3.1.2.17. AT+CGMI - Request Manufacturer Identification

The command returns device manufacturer identification code.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CGMI

Execution command returns the device manufacturer identification code followed by an **OK** at newline.



AT+CGMI=?

Test command returns **OK** result code.

3.1.2.18. AT+CGMM - Request Model Identification

This command returns the device model identification.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT+CGMM

Execution command returns the device model identification code followed by an **OK** at newline.



AT+CGMM=?

Test command returns **OK** result code.

3.1.2.19. AT+CGMR - Request Revision Identification

The command returns device software revision number.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CGMR

Execution command returns device software revision number followed by an **OK** at newline.



AT+CGMR=?

Test command returns **OK** result code.

3.1.2.20. AT+CGSN - Request Product Serial Number Identification

This command allows to retrieve the product serial number in form of IMEI of the mobile.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CGSN

Execution command returns the product serial number in form of IMEI of the mobile followed by an **OK** at newline.



AT+CGSN=?

Test command returns **OK** result code.

3.1.2.21. AT#CGMI - Request Manufacturer Identification

The command returns device manufacturer identification code.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CGMI

Execution command returns the device manufacturer identification code, with command echo.

The response is as follows

#CGMI: <code>

OK



AT#CGMI=?

Test command returns **OK** result code.

3.1.2.22. AT#CGMR - Request Revision Identification

The command returns device software revision number.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CGMR

Execution command returns device software revision number, with command echo.

The response is as follows

#CGMR: <num>

OK



AT#CGMR=?

Test command returns **OK** result code.

3.1.2.23. AT#CGSN - Product Serial Number Identification

The execution command returns the product serial number, in form of IMEI of the mobile, with **#CGSN:** command echo.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CGSN

The command returns the following message:

```
AT#CGSN
#CGSN: <product serial number>
OK
```



AT#CGSN=?

The test command returns the **OK** result code.

3.1.2.24. AT+CPAS - Phone Activity Status

The command reports the device status in a numeric format.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CPAS

Execution command reports the device status in the format shown in Additional info section.

Additional info:

- ▶▶ Message format returned by the execution command:

+CPAS: <pas>

Name	Type	Default	Description
<pas>	integer	0	phone activity status.

Values:

- 0 : ready (device allows commands from TA/TE)
- 1 : unavailable (device does not allow commands from TA/TE)
- 2 : unknown (device is not guaranteed to respond to instructions)
- 3 : ringing (device is ready for commands from TA/TE, but the ringer is active)
- 4 : call in progress (device is ready for commands from TA/TE, but a call is in progress)



AT+CPAS=?

Test command reports the supported range of values for <pas>.

- ⓘ Although **+CPAS** is an execution command, 3GPP TS 27.007 requires the Test command to be defined.



```
ATD032x21y13z1;
OK
```

```
AT+CPAS
+CPAS: 4      The called phone has answered to your call
OK
```

```
ATH
OK
```

3.1.2.25. AT+CFUN - Set Phone Functionality

This command selects the level of functionality in the ME.



[1] 3GPP TS 27.007

[2] Telit Module Software User Guide 2G/3G/4G, 1vv0300784

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CFUN=[<fun>[,<rst>]]

Set command selects the level of functionality in the ME.

Parameters:

Name	Type	Default	Description
<fun>	integer	1	Power saving function mode.
Values:			
0	:	NON-CYCLIC SLEEP mode, see Additional info section	
1	:	mobile full functionality with power saving disabled.	
2	:	disable TX, see Additional info section	
4	:	disable both TX and RX	
5	:	mobile full functionality with power saving enabled	
7	:	CYCLIC SLEEP mode, see Additional info section	
9	:	just as <fun>=0 but with different wake-up events, see document [2]	
12	:	fast detach	
<rst>	integer	0	Reset flag.
Values:			
0	:	do not reset the ME before setting it to <fun> functionality level.	
1	:	reset the device. The device is fully functional after the reset. This value is available only for <fun> = 1.	

Additional info:

▶▶ <fun>=0

NON-CYCLIC SLEEP mode, minimum functionality: in this mode, the AT interface is not accessible. Consequently, once you have set <fun> level 0, do not send further characters. Otherwise these characters remain in the input buffer and may delay the output of an unsolicited result code. The first wake-up event, or rising RTS line, stops power saving and takes the ME back to full functionality level <fun>=1.

▶▶ <fun>=2

disable TX and the ME stays attached to the network.
<fun> level 2 cannot be set (an **ERROR** is returned) if:

- the current RAT is not LTE
- the current <fun> level is set to 4
- the SIM is not READY, see **+CPIN**
- the protocol stack is transmitting

<fun> level 2 is not stored on profile, see **&P**, **&W**.

▶▶ <fun>=7

CYCLIC SLEEP mode: in this mode, the serial interface is periodically enabled while CTS is active. If characters are recognized on the serial interface, the ME stays active for 2 seconds after the last character was sent or received.

ME exits SLEEP mode only, if **AT+CFUN=1** is entered.

- ❗ Issuing **AT+CFUN=4[,0]** causes the module to perform a network deregistration. The SIM is not deactivated.
- ❗ If power saving enabled, it reduces the power consumption during the idle time, thus allowing a longer standby time with a given battery capacity.
- ❗ To place the module in power saving mode, set the <fun> parameter at value = 5 and the line DTR must be set to OFF. Once in power saving, the CTS line switch to the OFF status to signal that the module is really in power saving condition.
During the power saving condition, before sending any AT command on the serial line, the DTR must be set to ON to exit from power saving and it must be waited for the CTS line to go in ON status.
Until the DTR line is ON, the module will not return in the power saving condition.
- ❗ The power saving function does not affect the network behavior of the module, even during the power save condition the module remains registered on the network and reachable for incoming calls or SMS. If a call comes during the power save, then the module will wake up and proceed normally with the unsolicited incoming call code.
- ❗ When the module detects USB port is connected, then the power saving mode is not allowed.
- ❗ If the current <fun> level is 2 the next accepted <fun> shall be equal to the <fun> level set before 2, see following example:

AT+CFUN=1-->AT+CFUN=2-->AT+CFUN=1 OK

AT+CFUN=1-->AT+CFUN=2-->AT+CFUN=5 ERROR

- ❗ If **AT#ENS=1** then **AT+CFUN=0** has the same functionality of **AT+CFUN=4**.
- ❗ In CYCLIC SLEEP mode (**AT+CFUN=7**):
 - CTS line toggles slowly, the toggle delay is about 2 seconds
 - during incoming voice call the CTS line continues to toggle



AT+CFUN?

Read command reports the current setting of **<fun>** in the format

+CFUN: <fun>



AT+CFUN=?

Test command returns the list of supported values for **<fun>** and **<rst>**.

3.1.2.26. AT+CIND - Indicator Control

This command is used to control the registration state of modem indicators.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CIND=[<state>[,<state>[,...]]]



Set command is used to control the registration state of ME indicators, in order to automatically send the **+CIEV** URC, whenever the value of the associated indicator changes. The supported indicators (<descr>) and their order appear from test command **AT+CIND=?**

Parameter:

Name	Type	Default	Description
<state>	integer	1	registration state

Values:

- 0 : the indicator is deregistered; there's no unsolicited result code (+CIEV URC) automatically sent by the modem to the application, whenever the value of the associated indicator changes; the value can be directly queried with +CIND?
- 1 : the indicator is registered: an unsolicited result code (+CIEV URC) is automatically sent by the modem to the application, whenever the value of the associated indicator changes; it is still possible to query the value through AT+CIND?

-  When the modem is switched on all of the indicators are in registered mode.
-  See also command **+CMER**



AT+CIND?


Read command returns the current value of ME indicators, in the format:

+CIND: <ind>[,<ind>[,...]]

Additional info:

- ▶▶ Read command response parameter

Name	Type	Default	Description
<ind>	integer	-	indicator value, which shall be in range of corresponding <descr>. See test command AT+CIND=?

 The order of the values **<ind>**s is the one returned by test command **AT+CIND=?**



AT+CIND=?

Test command returns pairs, where string value **<descr>** is a description of the indicator and compound value is the supported values for the indicator, in the format:

+CIND: ((**<descr>**, (list of supported **<ind>**s)),(**<descr>**, (list of supported **<ind>**s)))[,...]]

Additional info:

▶▶ Test command response parameters

Name	Type	Default	Description
<descr>	string	N/A	indicators names, maximum 16 chars long
Values:			
"battchg"	:	battery charge level; indicator <ind> in the range 0..5	
"signal"	:	signal quality; indicator <ind> in the range 0..7, or 99 (not measurable); same as bit error rate (<ber>) in +CSQ command	
"service"	:	service availability; indicator <ind> is 0 (not registered to any network) or 1 (registered)	
"sounder"	:	sounder activity; indicator <ind> is 0 (no sound activity) or 1 (sound activity)	
"message"	:	message received; indicator <ind> is 0 (no unread SMS in memory "SM") or 1 (unread SMS in memory "SM")	
"call"	:	call in progress; indicator <ind> is 0 (no calls in progress) or 1 (at least a call has been established)	
"roam"	:	roaming; indicator <ind> is 0 (registered to home network, or not registered) or 1 (registered to other network)	
"smsfull"	:	SMS memory status; indicator <ind> is 0 (memory locations available) or 1 (an SMS storage in the modem is full)	
"rssi"	:	received signal strength level; indicator <ind> values are 0 (signal strength under -112dBm), from 1 to 4 (signal strength from -97 to -66 dBm, in 15 dBm steps), 5 (signal strength greater than -51 dBm), or 99 (not measurable)	



Next command causes all the indicators to be registered

AT+CIND=1,1,1,1,1,1,1,1

Next command causes all the indicators to be de-registered

AT+CIND=0,0,0,0,0,0,0,0

Next command to query the current value of all indicators

AT+CIND?

CIND: 4,0,1,0,0,0,0,2

OK

3.1.2.27. AT+CMER - Mobile Equipment Event Reporting

This command configures sending of unsolicited result codes from TA to TE.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2






AT+CMER=[<mode>[,<keyp>[,<disp>[,<ind>[,<bfr>]]]]]

Set command enables/disables sending of unsolicited result codes from TA to TE in the case of indicator state changes.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	controls the processing of unsolicited result codes
Values:			
0	:	buffer +CIEV Unsolicited Result Codes	
1	:	discard +CIEV Unsolicited Result Codes when TA-TE link is reserved (e.g. on-line data mode); otherwise forward them directly to the TE	
2	:	buffer +CIEV Unsolicited Result Codes in the TA when TA-TE link is reserved (e.g. on-line data mode) and flush them to the TE after reservation; otherwise forward them directly to the TE	
3	:	forward +CIEV Unsolicited Result Codes directly to the TE; when TA is in on-line data mode each +CIEV URC is stored in a buffer; once the ME goes into command mode (after +++ was entered), all URCs stored in the buffer will be output	
<keyp>	integer	0	keypad event reporting
Value:			
0	:	No keypad event reporting	
<disp>	integer	0	display event reporting
Value:			
0	:	no display event reporting	
<ind>	integer	0	indicator event reporting
Values:			
0	:	no indicator event reporting	
2	:	indicator event reporting	
<bfr>	integer	0	TA buffer clearing
Values:			
0	:	TA buffer of unsolicited result codes is cleared when <mode> 1..3 is entered	

-
- 1 : TA buffer of unsolicited result codes is flushed to the TE when <mode> 1...3 is entered (OK response shall be given before flushing the codes)
-

-  Sending of URCs in the case of key pressings or display changes are currently not implemented.
 -  After **+CMER** has been switched on with e.g. **AT+CMER=2,0,0,2** command (i.e. <bfr> is 0), URCs for all registered indicators will be issued only first time, if previous <mode> was 0, for backward compatibility. Values shown by the indicators will be current indicators values, not buffered ones. Subsequent **+CMER** commands with <mode> different from 0 and <bfr> equal to 0 will not flush the codes, even if <mode> was set again to 0 before. To flush the codes, <bfr> must be set to 1.
 -  Although it is possible to issue the command when SIM PIN is pending, it will answer **ERROR** if "message" or "smsfull" indicators are enabled in **+CIND**, because with pending PIN it is not possible to give a correct indication about SMS status. To issue the command when SIM PIN is pending you have to disable "message" and "smsfull" indicators in **+CIND** first.
-



AT+CMER?

Read command returns the current setting of parameters, in the format:

+CMER: <mode>,<keyp>,<disp>,<ind>,<bfr>



AT+CMER=?

Test command returns the range of supported values for parameters <mode>, <keyp>, <disp>, <ind>, <bfr>, in the format:

+CMER: (list of supported <mode>s),(list of supported <keyp>s), (list of supported <disp>s),(list of supported <ind>s),(list of supported <bfr>s)

3.1.2.28. AT+CACM - Accumulated Call Meter

The command purpose is to reset the Advice of Charge accordingly to the Accumulated Call Meter stored in SIM (ACM): it contains the total number of home units for both the current and preceding calls.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CACM=[<pwd>]

The set command resets the Advice of Charge accordingly to the Accumulated Call Meter stored in SIM (ACM): it contains the total number of home units for both the current and preceding calls.

Parameter:

Name	Type	Default	Description
<pwd>	string	-	to access this command PIN2 is required, if after the startup the PIN2 has already been input, it is no longer required to issue the command.



AT+CACM?

Read command reports the current value of the SIM ACM in the format:

+CACM: <acm>

Additional info:

- ▶▶ Read command response parameter

Name	Type	Default	Description
<acm>	string	-	accumulated call meter in home units: three bytes of the ACM value in hexadecimal format (e.g. "00001E" indicates decimal value 30).



The value <acm> is in home units; price per unit and currency are defined with command **+CPUC**

3.1.2.29. AT+CAMM - Accumulated Call Meter Maximum

This command sets the Advice of Charge related to accumulated call meter maximum value in SIM file EFACMax.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2




AT+CAMM=<acmMax>[,<pwd>]

Set command sets the Advice of Charge related Accumulated Call Meter Maximum Value stored in SIM (ACMmax). This value represents the maximum number of home units allowed to be consumed by the subscriber. When ACM reaches <acmMax> value further calls are prohibited.

Parameters:

Name	Type	Default	Description
<acmMax>	string	-	ACMmax value, integer type: it is the maximum number of home units allowed to be consumed by the subscriber.
<pwd>	string	-	PIN2; notice that if PIN2 has been already input once after startup, it is no more required

 Setting <acmMax> to 0 disables the feature



AT+CAMM?


Read command reports the ACMmax value stored in SIM in the format:

+CAMM : <acmm>

Additional info:

▶▶ Read command response parameter

Name	Type	Default	Description
<acmm>	string	-	accumulated call meter in home units: three bytes of the ACMmax value in hexadecimal format (e.g. "00001E" indicates decimal value 30)

 <acmMax> = 0 value disables the feature.



AT+CAMM=?

Test command returns the **OK** result code.

3.1.2.30. AT+CCWE - Call Meter Maximum Event

This command is used to enable/disable sending of an unsolicited result code +CCWV.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CCWE=<mode>

Set command is used to enable/disable sending of an unsolicited result code **+CCWV** shortly before the ACM (Accumulated Call Meter) maximum value is reached. The warning is issued approximately when 30 seconds call time remains. It is also issued when starting a call if less than 30 seconds call time remains.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	Current enable mode of +CCWE URC

Values:

- 0 : Disable the call meter warning event
- 1 : Enable the call meter warning event



The set command will respond with an error if the Accumulated Call Meter service is not active in SIM.



AT+CCWE?

Read command reports the currently selected <mode> in the format:
+CCWE: <mode>



AT+CCWE=?

Test command reports the supported range of values for parameter <mode>.

3.1.2.31. AT+CSVM - Set Voice Mail Number

Command to set voice mail server number.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CSVM=<mode>[,<number>[,<type>]]

Set command is dummy. It only checks for parameters values validity; it does not send any actual write request to SIM to update voice mail number, nor sends any request to network to enable/disable voice mail.

Parameters:

Name	Type	Default	Description
<mode>	integer	1	enable/disable voice mail number
Values:			
0	:	disable the voice mail number	
1	:	enable the voice mail number	
<number>	string	-	string type phone number of format specified by <type>
<type>	integer	129	type of address octet in integer format
Values:			
129	:	unknown type of number and ISDN/Telephony numbering plan	
145	:	international type of number and ISDN/Telephony numbering plan (contains the character "+")	



AT+CSVM?

Read command returns the currently selected voice mail number and the status (i.e. enabled/disabled) in the format

+CSVM:<mode>,<number>,<type>



AT+CSVM=?

Test command reports the range for the parameters <mode> and <type>.

3.1.2.32. AT#MBN - Mailbox Numbers

This command returns the mailbox numbers stored on SIM.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#MBN

Execution command returns the mailbox numbers stored on SIM, if this service is provided by the SIM.


The response is in the format:

```
[#MBN: <index>,<number>,<type>[,<text>][,<mboxtype>][<CR><LF>
#MBN: <index>,<number>,<type>[,<text>][,<mboxtype>][...]]]
```

Additional info:

- ▶▶ The response has its fields described below.

Name	Type	Default	Description
<index>	integer	-	record number
<number>	string	-	string type mailbox number in the format <type>
<type>	integer	N/A	type of mailbox number octet in integer format
Values:			
	129	:	national numbering scheme
	145	:	international numbering scheme (contains the character "+")
<text>	string	-	the alphanumeric text associated to the number; used character set should be the one selected with command +CSCS
<mboxtype>	string	N/A	the message waiting group type of the mailbox, if available
Values:			
	VOICE	:	voice
	FAX	:	fax
	EMAIL	:	electronic mail
	OTHER	:	other

-  If all queried locations are empty (but available), no information text lines will be returned.



AT#MBN=?

Test command returns the **OK** result code.

3.1.2.33. AT#MWI - Message Waiting Indication

This command enables/disables the presentation of the Message Waiting Indicator (MWI) URC.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT#MWI=[<enable>]

Set command enables/disables the presentation of the Message Waiting Indicator URC, it can have two formats, as show in Additional info.

Parameter:

Name	Type	Default	Description
<enable>	integer	1	enables/disables the presentation of the #MWI: URC

Values:

- 0 : disables the presentation of the #MWI: URC
- 1 : enables the presentation of the #MWI: URC, see Additional info.

Additional info:

►► If **AT#MWI=1** has been entered, the **#MWI: URC** is displayed each time

- a new message waiting indicator is received from the network, the URC format is:

#MWI: <status>,<indicator>[,<count>]

- the module is powered on, the URC reports the status of the message waiting indicators, as they are currently stored on SIM, the format is:

#MWI: <status>[,<indicator>[,<count>]][<CR><LF>


#MWI: <status>,<indicator>[,<count>][...]]]

The parameters are described in the unsolicited fields section for each URC format.

Unsolicited fields:

Name	Type	Description
<status>	integer	indicates clear or set action when it is received from the network.
		Values:
	0	clear: has been deleted one of the messages related to the indicator <indicator>.
	1	set: there is a new waiting message related to the indicator <indicator>
<status>	integer	indicates the status when it is read from SIM.
		Values:
	0	no waiting message indicator is currently set. In this case no other information is reported.

		1 : there are waiting messages related to the message waiting indicator <indicator>
<indicator>	integer	message indicator has the same meaning regardless if it comes from network or it is read from SIM. Values: 1 : either Line 1 (CPHS context) or Voice (3GPP context) 2 : Line 2 (CPHS context only) 3 : Fax 4 : E-mail 5 : Other
<count>	integer	network information reporting the number of pending messages related to the message waiting indicator <indicator>.
<count>	integer	number of pending messages related to the message waiting indicator <indicator> as it is stored on SIM

 Entering **AT#MWI=** returns **OK** but has no effect.



AT#MWI?

Read command reports whether the presentation of the message waiting indicator URC is currently enabled or not, and the status of the message waiting indicators as they are currently stored on SIM. The format is:

```
#MWI: <enable>,<status>[,<indicator>[,<count>]][<CR><LF>
#MWI: <enable>,<status>,<indicator>[,<count>][...]]
```



AT#MWI=?

Test command returns the range of available values for parameter <enable>.

3.1.2.34. AT+CLAC - Available AT Commands

This command shows the available AT commands list.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CLAC

The execution command causes the ME to return one or more lines reporting the AT commands that are available to the user. The format is:

<ATcmd1>[<CR><LF><ATcmd2>[...]]

<ATcmdn> is the AT command.



AT+CLAC=?

Test command returns the OK result code.

3.1.2.35. AT#LANG - Select Language

Set command selects the currently used language for displaying different messages.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#LANG=<lan>

Parameter:

Name	Type	Default	Description
<lan>	string	en	Selected language

Values:

en : English
it : Italian



AT#LANG?

Read command reports the currently selected <lan> in the format:

#LANG: <lan>



AT#LANG=?

Test command reports the supported range of values for parameter <lan>.

3.1.2.36. AT+CMEE - Report Mobile Equipment Error

The command enables the use of result code.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CMEE=[<n>]



Set command disables/enables the use of result code **+CME ERROR: <err>** as an indication of an error relating to the **+Cxxx** command issued. When enabled, device related errors cause the **+CME ERROR: <err>** final result code instead of the default **ERROR** final result code. **ERROR** is returned normally when the error message is related to syntax, invalid parameters or DTE functionality.

Parameter:

Name	Type	Default	Description
<n>	integer	0	enables/disables +CME ERROR: <err> result code and selects the format

Values:

- 0 : disable
- 1 : enable and use numeric<err> values
- 2 : enable and use verbose <err> values

-  The detailed description of <err> is available in section "ME Error Result Code - +CME ERROR: <err>".
-  **+CMEE** has no effect on the final result code **+CMS**.



AT+CMEE?

Read command returns the current value of parameter <n> in the format:

+CMEE: <n>



AT+CMEE=?

Test command returns the supported values of parameter <n>.

3.1.2.37. AT+CEER - Extended Error Report

Reports extended error related to the last unsuccessful call.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT+CEER

Execution command returns one or more lines of information text **<report>** offering the TA user an extended error report, in the format:

+CEER: <report>

This report regards some error condition that may occur:

- the failure in the last unsuccessful call setup (originating or answering)
- the last call release



If no error condition has occurred since power up, then **"Normal, unspecified"** condition is reported



AT+CEER=?

Test command returns **OK** result code.

3.1.2.38. AT#CEER - Extended Numeric Error Report

The command is related to extended numeric error report.



- 3GPP TS 24.008

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#CEER

Execution command causes the TA to return a numeric code in the intermediate response format:

#CEER: <code>

which offers the user of the TA a report of the reason for

- the failure in the last unsuccessful call setup (originating or answering);
- the last call release;
- the last unsuccessful GPRS attach or unsuccessful PDP context activation;
- the last GPRS detach or PDP context deactivation.

Additional info:

- ▶▶ Intermediate response parameters:


Name	Type	Default	Description
<code>	integer	N/A	error code with the following meaning:

Values:

0	:	No error
1	:	Unassigned (unallocated) number
3	:	No route to destination
6	:	Channel unacceptable
8	:	Operator determined barring
16	:	Normal call clearing
17	:	User busy
18	:	No user responding
19	:	User alerting, no answer
21	:	Call rejected
22	:	Number changed
26	:	Non selected user clearing
27	:	Destination out of order
28	:	Invalid number format (incomplete number)
29	:	Facility rejected
30	:	Response to STATUS ENQUIRY
31	:	Normal, unspecified

34	:	No circuit/channel available
38	:	Network out of order
41	:	Temporary failure
42	:	Switching equipment congestion
43	:	Access information discarded
44	:	Requested circuit/channel not available
47	:	Resources unavailable, unspecified
49	:	Quality of service unavailable
50	:	Requested facility not subscribed
55	:	Incoming calls barred with in the CUG
57	:	Bearer capability not authorized
58	:	Bearer capability not presently available
63	:	Service or option not available, unspecified
65	:	Bearer service not implemented
68	:	ACM equal to or greater than ACMmax
69	:	Requested facility not implemented
70	:	Only restricted digital information bearer capability is available
79	:	Service or option not implemented, unspecified
81	:	Invalid transaction identifier value
87	:	User not member of CUG
88	:	Incompatible destination
91	:	Invalid transit network selection
95	:	Semantically incorrect message
96	:	Invalid mandatory information
97	:	Invalid mandatory information
98	:	Message type not compatible with protocol state
99	:	Information element non-existent or not implemented
100	:	Conditional IE error
101	:	Message not compatible with protocol state
102	:	Recovery on timer expiry
111	:	Protocol error, unspecified
127	:	Interworking, unspecified
224	:	MS requested detach
225	:	NWK requested detach
226	:	Unsuccessful attach cause NO SERVICE
227	:	Unsuccessful attach cause NO ACCESS
228	:	Unsuccessful attach cause GPRS SERVICE REFUSED
229	:	PDP deactivation requested by NWK
230	:	PDP deactivation cause LLC link activation Failed

231	:	PDP deactivation cause NWK reactivation with same TI
232	:	PDP deactivation cause GMM abort
233	:	PDP deactivation cause LLC or SMDCP failure
234	:	PDP unsuccessful activation cause GMM error
235	:	PDP unsuccessful activation cause NWK reject
236	:	PDP unsuccessful activation cause NO NSAPI available
237	:	PDP unsuccessful activation cause SM refuse
238	:	PDP unsuccessful activation cause MMI ignore
239	:	PDP unsuccessful activation cause Nb Max Session Reach
256	:	PDP unsuccessful activation cause wrong APN
257	:	PDP unsuccessful activation cause unknown PDP address or type
258	:	PDP unsuccessful activation cause service not supported
259	:	PDP unsuccessful activation cause QOS not accepted
260	:	PDP unsuccessful activation cause socket error
240	:	FDN is active and number is not in FDN
241	:	Call operation not allowed
252	:	Call barring on outgoing calls
253	:	Call barring on incoming calls
254	:	Call impossible
255	:	Lower layer failure

-  If none of the described conditions has occurred since power up then 0 is reported (i.e. No error).

**AT#CEER=?**

Test command returns **OK** result code.

3.1.2.39. AT#PSMRI - Power Saving Mode Ring Indicator

The command enables or disables the Ring Indicator pin response to an URC message while modem is in power saving mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Common profile	No	-	2



AT#PSMRI=<n>

Set command enables/disables the Ring Indicator pin response to an URC message while modem is in power saving mode.





If enabled, a negative pulse with a duration in ms specified by <n> is generated when URC message for specific event is invoked.

Parameter:

Name	Type	Default	Description
<n>	integer	0	Duration in ms of the generated pulse

Values:

- 0 : disables RI pin response for URC message
- 50÷100 : enables RI pin response for URC messages with a duration specified in ms

-  when RING signal from incoming call/SMS/socket listen is enabled, the behavior for #PSMRI will be ignored.
-  The behavior for #PSMRI is invoked, only when modem is in sleep mode (**AT+CFUN=5** and **AT+CFUN=9**).
-  In case of **AT+CFUN=9**, the pulse is generated also when a GPRS packet is received.
-  The value set by command is stored in the profile extended section and doesn't depend on the specific AT instance.



AT#PSMRI?

Read command reports the duration in ms of the pulse generated, in the format:

#PSMRI: <n>



AT#PSMRI=?

Test command reports the supported range of values for parameter <n>

3.1.2.40. AT+CSCS - Select TE Character Set

The command purpose is to set different character sets that are used by the device.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CSCS=[<chset>]

Set command sets the current character set used by the device.

Parameter:

Name	Type	Default	Description
<chset>	string	IRA	character set to be used by the device.

Values:

- GSM : GSM default alphabet (3GPP TS 23.038).
- IRA : international reference alphabet (ITU-T T.50).
- 8859-1 : ISO 8859 Latin 1 character set.
- PCCP437 : PC character set Code Page 437.
- UCS2 : 16-bit universal multiple-octet coded character set (ISO/IEC10646).
- HEX : Character strings consist only of hexadecimal numbers from 00 to FF; e.g. "032FE6" equals three 8-bit characters with decimal values 3, 47 and 230; no conversions to the original MT character set shall be done. If MT is using GSM 7 bit default alphabet, its characters shall be padded with 8th bit (zero) before converting them to hexadecimal numbers (i.e. no SMS style packing of 7 bit alphabet).



AT+CSCS?

Read command returns the current value of the active character set.



AT+CSCS=?

Test command returns the supported values for parameter <chset>.

3.1.2.41. AT+PACSP - Network Selection Menu Availability

This command displays the Network Selection Menu availability.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+PACSP?

Read command returns the current value of the **<mode>** parameter in the format:

+PACSP<mode>

Additional info:

- ▶▶ Read command response parameter

Name	Type	Default	Description
<mode>	integer	N/A	returns the PLMN mode bit (in CSP file on the SIM)

Values:

- 0 : restriction of menu option for manual PLMN selection
- 1 : no restriction of menu option for Manual PLMN selection



AT+PACSP=?

Test command returns the **OK** result code.

3.1.2.42. AT+CMUX - Multiplexing Mode

This command is used to enable/disable the multiplexing protocol control channel.



3GPP TS 27.007
3GPP TS 27.010

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CMUX=<mode>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>[,<T2>[,<T3>[,<k>]]]]]]]]]

Set command is used to enable/disable the multiplexing protocol control channel.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	Basic option is currently the only supported mode. Value: 0 : Basic option mode.
<subset>	integer	0	UIH is currently the only supported frame. Value: 0 : UIH frame
<port_speed>	integer	5	115200 bps is the only supported speed value. Value: 5 : 115200 bps speed
<N1>	integer	121	maximum frame size. Value: 1÷1509 : expressed in bytes
<T1>	integer	10	acknowledgement timer. Value: 1÷255 : expressed in units of ten milliseconds.
<N2>	integer	3	maximum number of re-transmissions. Value: 0÷100 : currently only the range 0-5 is supported.
<T2>	integer	30	response timer for the multiplexer control channel in units of ten milliseconds. T2 must be longer than T1. Value: 2÷255 : expressed in ms.

<T3>	integer	N/A	wake up response timer in seconds. It is a dummy parameter, ignored by the module.
Value:			
1÷255 : values ignored by the module.			
<k>	integer	N/A	window size, for Advanced operation with Error Recovery options. It is a dummy parameter, ignored by the module
Value:			
1÷7 : number of I frames. Values ignored by the module.			

**AT+CMUX?**

Read command returns the current value of the parameters, in the format:

+CMUX: <mode>,<subset>, <port_speed>, <N1>, <T1>, <N2>, <T2>, <T3>,<k>

The returned values of the dummy parameters are: <T3>=0, <k>=0

**AT+CMUX=?**

Test command returns the range of supported values for all parameters.



Enter test command

AT+CMUX=?

+CMUX: (0),(0),(5),(1-1509),(1-255),(0-100),(2-255),(1-255),(1-7)

OK

Enter read command

AT+CMUX?

+CMUX: 0,0,5,121,10,3,30,0,0

OK

Enable error report in verbose format

AT+CMEE=2

OK

Set right parameters. The first **OK** notifies that the session is activated. If the session is not used, after 5 sec is displayed the second **OK** indicating that the session is closed.

AT+CMUX=0,0,5,121

OK

OK

Set parameters, <port_speed> is wrong

AT+CMUX=0,0,4,121

+CME ERROR: operation not supported

AT+CMUX=0,0,6,121

+CME ERROR: operation not supported

Set <T3> dummy parameter, its value is in the range

AT+CMUX=0,0,5,121,10,5,200,255

OK

OK

Set <T3> dummy parameter, its value is out of the range

AT+CMUX=0,0,5,121,10,5,200,256

+CME ERROR: operation not supported

Set <k> dummy parameter, its value is in the range

AT+CMUX=0,0,5,121,10,5,200,250,1

OK

OK

Set <k> dummy parameter, its value is in the range

AT+CMUX=0,0,5,121,10,5,200,250,7

OK

OK

Set <k> dummy parameter, its value is out of the range

AT+CMUX=0,0,5,121,10,5,200,250,8

+CME ERROR: operation not supported

3.1.2.43. AT#CMUXMODE - CMUX Mode Set

The module is equipped with the CMUX standard protocol to provide multiplexing features. The #CMUXMODE command configures the CMUX behavior concerning the DTR control line, and the size of the internal output CMUX buffer.



3GPP TS 27.010

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CMUXMODE=<mode>[,<buffer_size>]

Set command sets the CMUX mode, and the buffer size.

Parameters:

Name	Type	Default	Description
<mode>	integer	5	defines the DCE behavior when a transition occurs on the physical DTR control line.
Values:			
1	:		disable the "Ignore DTR" feature. A transition of the physical DTR line instructs the DCE to disable the CMUX, and switches to the normal command mode and CFUN=1
5	:		enable the "Ignore DTR" feature, the DCE does not care the physical DTR control line transitions
13	:		enable the "Ignore DTR" feature, see info section
<buffer_size>	integer	0	define the size of the internal CMUX output buffer
Values:			
0	:		disable the buffer_size limitation. The output buffer size of the CMUX is about 32K bytes
28÷16384	:		resize the internal CMUX output buffer to the selected value, see info section

Additional info:

▶▶ **<mode>=13**





The DCE will continue the **CMUX** session, but the transition of the physical DTR will be broadcasted to all opened logical channel. The behavior of the particular channel depends on its own configuration, e.g. **AT&D[<n>]**.

▶▶ **<buffer_size>**

When a CMUX session will be started using **+CMUX** command, the **<buffer_size>** value might be increased: if it is less than $(N1 * 4)$, it becomes exactly $N1 * 4$, see **<N1>** parameter of the **+CMUX** command. The current **<buffer_size>** value can be read using the read command.

The CMUX output buffer contains the frames ready to be sent for every Data Link Connection Identifier (DLCI). If the module receives a Modem Status Command (MSC)

indicating a logical RTS state to lock the data flow, these frames (already in the buffer) will be sent.

-  Software or hardware reset restores the default **<buffer_size>** value.
-  During a CMUX session the set command will fail, only the read and test command can be used.
-  Reducing the **<buffer_size>** will change the CMUX behavior. Several tests have been performed using N1=122 (**<buffer_size>** = 488) at 115200 bps:
 - the bandwidth is decreased by 15%
 - the bandwidth is not equally distributed, the first channel has the max priority, then the second and the third
-  If the module is downloading a lot of data and the application processor locks the flow moving the logical RTS (with MSC), the module can send more than **<buffer_size>** data.



AT#CMUXMODE?

Read command reports the current parameters values in the format:

#CMUXMODE: <mode>,<buffer_size>



AT#CMUXMODE=?

Test command reports the range of parameters values in the format:

#CMUXMODE: (1,5,13),(0,28-16384)

3.1.2.44. AT#USBCFG - USB Configuration

This command specifies the USB configuration on the modem device.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#USBCFG=<mode>


Set command specifies USB configuration on the modem device.


Parameter:

Name	Type	Default	Description
<mode>	integer	0	USB configuration mode

Values:

- 0 : all the USB ports (Telit Mobile (USBx) are in ACM mode; Selective Suspend is disabled; NCM is enabled; VID 0x1BC7 PID 0x0036
- 1 : all the USB ports (Telit Mobile (USBx) are in ACM Data Only mode; Selective Suspend is disabled; NCM and MBIM are disabled; VID 0x1BC7 PID 0x0034
- 2 : all the USB ports (Telit Mobile (USBx) are in ACM mode; Selective Suspend is disabled; NCM and MBIM are disabled; VID 0x1BC7 PID 0x0035
- 3 : all the USB ports (Telit Mobile (USBx) are in ACM mode; Selective Suspend is disabled; NCM and MBIM are enabled; VID 0x1BC7 PID 0x0032
- 4 : all the USB ports (Telit Mobile (USBx) are in ACM mode; Selective Suspend is enabled; NCM is enabled; VID 0x1BC7 PID 0x0037
- 5 : all the USB ports (Telit Mobile (USBx) are in ACM mode; Selective Suspend is enabled; NCM and MBIM are enabled; VID 0x1BC7 PID 0x0033

-  New configuration mode will be applied at the next reboot, use **#REBOOT** or a complete power cycle.

-  The following table summarizes the mode supported by the command.

Mode	Ports	SS	MBIM	NCM	VID	PID
0	ACM	NO	NO	YES	0x1BC7	0x0036
1	ACM Data Only	NO	NO	NO	0x1BC7	0x0034
2	ACM	NO	NO	NO	0x1BC7	0x0035
3	ACM	NO	YES	YES	0x1BC7	0x0032
4	ACM	YES	NO	YES	0x1BC7	0x0037
5	ACM	YES	YES	YES	0x1BC7	0x0033



AT#USBCFG?

Read command returns the current **<mode>** in the following format:

#USBCFG: <mode>



AT#USBCFG=?

Test command returns the list of supported values.

3.1.2.45. AT#PORTCFG - Connect Physical Ports to Service Access Points

This command allows to connect Service Access Points (software anchorage points) to the external physical ports.



- [1] LE910 V2, LE910 Cat1 Ports Arrangements User Guide, 1v0301252
- [2] Hardware User's Guide of the used module

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#PORTCFG=<Variant>

Set command allows to connect Service Access Points to the external physical ports giving a great flexibility. Examples of Service Access Points: AT Parser Instance #1, #2, #3, etc., see document [1].

Parameter:

Name	Type	Default	Description
<Variant>	integer	1	set port configuration. A short description, for each <Variant> value, is reported in test command section.

Value:

0÷max : see test command section



To enable the set port configuration, the module must be rebooted.



AT#PORTCFG?

Read command returns the requested and the active port configuration in the format:

#PORTCFG: <requested>,<active>

Additional info:

- ▶▶ Parameters returned by the read command.

Name	Type	Default	Description
<requested>	integer	-	value showing the requested configuration that will be activated on the next power ON.
<active>	integer	-	value showing the actual configuration.



AT#PORTCFG=?

Test command reports a brief description of the supported ports arrangement solutions. For each <Variant> parameter value are displayed, on one row, the allowed couples formed by: a physical port and the logically connected internal software Access Point (AT, STT, ExtGNSS). On each row

are reported the couples concerning both configurations: USB cable plugged into USB port or not plugged in. To have information about the physical ports, refer to document [2].

3.1.2.46. AT#ATDELAY - AT Command Delay

Set command sets a delay in second for the execution of successive AT command.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#ATDELAY=<delay>

Parameter:

Name	Type	Default	Description
<delay>	integer	0	delay interval

Value:

0÷max : delay expressed in 100 milliseconds intervals; 0 means no delay. For max value refer to test command



<delay> is only applied to first command executed after #ATDELAY



AT#ATDELAY=?

Test command returns the supported range of values for parameter <delay>.



Set 5 seconds delay for "AT#GPIO=1,1,1" command

```
AT#GPIO=1,0,1;#ATDELAY=50;#GPIO=1,1,1
OK
```

3.1.2.47. AT#CMAR - Selective Master Reset

The command requests the MT to reset user data.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CMAR=<phoneLockCode>[,<resetType>]


Set command requests the MT to reset user data. The user data in the phone will be reset to default values.

Parameters:

Name	Type	Default	Description
<phoneLockCode>	string	-	string representing an 8 digits security code; it must be verified before performing the master reset
<resetType>	integer	0	the user can select which kind of format to perform; if omitted, the command performs a complete format

Values:

- 0 : format all
- 1 : format NVM dynamic
- 2 : format NVM static fixed
- 3 : format firmware and AppZone filesystem

-  Issuing the command will cause an NVM and filesystem formatting. After the formatting is completed the module will automatically reboot. To not interfere with the formatting process, it is strongly recommended to issue an **AT+CFUN=4** command before starting to format.



AT#CMAR=?

Test command returns length of <phoneLockCode> parameter string and <resetType> values.

3.1.2.48. AT+CMAR - Master Reset

The command requests the MT to reset user data.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2




AT+CMAR=<phoneLockCode>

Set command requests the MT to reset user data. The user data in the phone will be reset to default values.

Parameter:

Name	Type	Default	Description
<phoneLockCode>	string	-	string type representing an 8 digits security code; it must be verified before performing the master reset.

-  Issuing the command will cause an NVM and filesystem formatting. After the formatting is completed the module will automatically reboot. To not interfere with the formatting process, it is strongly recommended to issue an **AT+CFUN=4** command before starting to format.



AT+CMAR=?

Test command verifies command existence

3.1.2.49. AT&Z - Store Telephone Number in the Internal Phonebook

The command stores a telephone number in the internal phonebook.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2





AT&Z<n>=<nr>

The module has a built in non-volatile memory where 10 telephone numbers can be stored, each one having a maximum of 24 digits. Execution command stores the telephone number <nr> in the record <n>. The records cannot be overwritten; they must be cleared before rewriting.

Parameters:

Name	Type	Default	Description
<n>	integer	N/A	phonebook record
Value:			
	0÷9	:	record number
<nr>	string	-	telephone number (maximum length 24 digits)

-  To delete the record <n> issue the command **AT&Z<n>=<CR>**.
-  The records in the module memory can be viewed with the command **&N**.

3.1.2.50. AT+CPUC - Price per Unit and Currency Table

Set the values of Price per Unit and Currency Table.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CPUC=<currency>,<ppu>[,<pwd>]

Set command sets the values of Advice of Charge related Price per Unit and Currency Table stored in SIM (PUCT). The PUCT information can be used to convert the home units (as used in commands **+CAOC**, **+CACM** and **+CAMM**) into currency units.

Parameters:

Name	Type	Default	Description
<currency>	string	-	three characters currency code (e.g. "LIT", "L. ", "USD", "DEM" etc.); used character set should be the one selected with command +CSCS
<ppu>	string	-	price per unit (dot is used as decimal separator) e.g. "1989.27"
<pwd>	string	-	SIM PIN2; if PIN2 has been already input once after startup, it is required no more



AT+CPUC?

Read command reports the current values of <currency> and <ppu> parameters in the format:
+CPUC : <currency>,<ppu>



AT+CPUC=?

Test command returns **OK** result code.

3.1.2.51. AT&V2 - Display Last Connection Statistics

The command displays last connection statistics.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&V2

Execution command returns the last connection statistics and connection failure reason.



Example of connection statistics get with no connection and no error.

- **AT&V2**

```
TOTAL CONNECTION TIME      : 0:00:00
CONNECTION FAILURE REASON  : powered off
```

```
OK
```

3.1.2.52. AT+IMEISV - Request IMEI and Software Version

Execution command returns the International Mobile Station Equipment Identity and Software Version Number (IMEISV) of the module without **+IMEISV:** command echo.



3GPP TS 23.003

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+IMEISV

The command returns the following message:

```
AT+IMEISV
<IMEISV>
```

OK

Additional info:

- ▶▶ The IMEISV is composed of the following elements (each element shall consist of decimal digits only):
 - Type Allocation Code (TAC). Its length is 8 digits
 - Serial Number (SNR) is an individual serial number uniquely identifying each equipment within each TAC. Its length is 6 digits
 - Software Version Number (SVN) identifies the software version number of the mobile equipment. Its length is 2 digits



AT+IMEISV=?

Test command returns **OK** result code.

3.1.2.53. AT#CGMM - Request Model Identification

This command returns the device model identification.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CGMM

Execution command returns the device model identification code, with command echo.

```
AT#CGMM
#CGMM: <code>
OK
```



AT#CGMM=?

Test command returns **OK** result code.

3.1.2.54. AT&V0 - Display Current Configuration and Profile



The command displays current modem configuration and profile.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&V0

Execution command returns all the modem configuration parameters settings.

-  This command is the same as **&V**, it is included only for backwards compatibility.
-  The row of information about CTS (C106) OPTIONS is in the output of **&V0** only for compatibility reasons and represents only a dummy value.

3.1.2.55. AT#FWSWITCH - Set Active Firmware Image

Set command allows enabling a specific firmware image on products embedding 2 or more different firmware images.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#FWSWITCH=<imageNumber>[,<storageConf>]

Parameters:

Name	Type	Default	Description
<imageNumber>	integer	-	to know the <imageNumber> values range refer to the test command. For the relation between <imageNumber> value and the relative customization refer to the table in Additional info section where is also described the default values.
<storageConf>	integer	1	selects storage type

Value:

1 : save the <imageNumber> value in NVM, only this selection is available

Additional info:

- ▶▶ <imageNumber> identifies the image (customization) as shown in the following table.

Product	Customization	<imageNumber> default value
LE910-NA V2	0 = AT&T, 1 = Verizon	0
LE910-NA1	0 = AT&T, 1 = Verizon	0
LE910B1-NA	0 = AT&T, 1 = Verizon	0
All other	no customization	



This AT command performs a system reboot.



With the current AT command implementation <storageConf>=0 does not have any effect, i.e.: a system reboot is performed and the <imageNumber> value is not saved. Therefore, the enabled <imageNumber> can be saved using only <storageConf>=1, value saved in NVM.



AT#FWSWITCH?

Read command reports the current active firmware image:

#FWSWITCH: <imageNumber>

**AT#FWSWITCH=?**

Test command reports the range of supported values for parameters **<imageNumber>**, **<storageConf>**



Switch to Image 1

```
AT#FWSWITCH =1
OK
```

3.1.2.56. AT#MBIMCFG - MBIM Configuration

The command allows the user to set a list of CIDs which will be used by MBIM when one or more connection(s) will be established.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#MBIMCFG=<cid>[,<cid1>[,...[,<cidN>]]]

Parameters:

Name	Type	Default	Description
<cid>	integer	N/A	specifies a PDP context definition. To know its range use the test command. The default value depends on the used module, see <cid> default value Additional info section.

Value:

1÷max : max value is returned by test command

<cid1>...<cidN>	integer	-	specify PDP context definitions. To know the range, use the Test command. These <cid>s are optional and useful only when the user wants to establish more MBIM connections (using different APNs) simultaneously. The list of <cid>s cannot contain duplicates
-----------------	---------	---	--

Additional info:

▶▶ <cid> default value

Products	<cid> default value
LE910-SV V2, LE910-SV1 and LE910-SVL	3
All other	14

- i** After entering the command, the new setting is active. The next MBIM connection will use the new setting.
- i** MBIM and internal stack (+CGACT, #SGACT ...) are mutually exclusive. They can share the same APN on different or the same cid, but they cannot be both active at the same time.



AT#MBIMCFG?

Read command returns the current value of the MBIM <cid> list in the format:

#MBIMCFG: =<cid>[,<cid1>[,...[,<cidN>]]]

- i** Only the <cid>s in the list are displayed by the read command.



AT#MBIMCFG=?

Test command returns the supported values for <cid>.



AT# MBIMCFG=14
OK

AT#MBIMCFG?
#MBIMCFG: 14
OK

AT# MBIMCFG=?
#MBIMCFG: (1-15),(1-15),(1-15),(1-15),(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15)
OK

3.1.2.57. AT#NCM - NCM Configuration

This command sets up a Network Control Model (NCM) session.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#NCM=<mode>,<cid>[,<did>[,<userId>[,<pwd>[,<dhcpServerEnable>]]]]

Parameters:

Name	Type	Default	Description
<mode>	integer	1	NCM mode
Values:			
1 : manual PDP context activation using +CGACT			
2 : automatic PDP context and NCM activation (+CGACT and +CGDATA are managed internally). This mode activates a context, so all necessary setup must be done before its activation (registration, APN).			
<cid>	integer	-	PDP context identifier. To know its range, use the test command. The default value depends on the used module, see <cid> default value Additional info section.
<did>	integer	0	device id
Value:			
0 : only one device is supported			
<userId>	string	-	user identifier used only if context requires it
<pwd>	string	-	password used only if context requires it
<dhcpServerEnable>	integer	-	dhcp server habilitation, it is not supported.

Additional info:

▶▶ <cid> default value:

Products	<cid> default value
LE910-SV V2, LE910-SV1 and LE910-SVL	3
All other	14



AT#NCM?

Read command reports the session state in the following format:

#NCM: <mode>,<cid>,<did>,<state>

...

OK

Additional info:

▶▶ Here are the **<state>** parameter values returned by read command.

Name	Type	Default	Description
<state>	integer	N/A	session state

Values:

- 0 : disabled
- 1 : enabled



AT#NCM=?

Test command reports the supported range of values for all the parameters.

3.1.2.58. AT#NCMD - NCM Disable

This command ends the Network Control Model session (NCM), and deactivates the context.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#NCMD=[<did>]

Parameter:

Name	Type	Default	Description
<did>	integer	0	device id

Value:

0 : only one device is supported



AT#NCMD?

Read command reports the session state in the following format:

#NCMD: <did>,<state>

...

OK

Additional info:

▶▶ Here are the <state> parameter values returned by Read command.

Name	Type	Default	Description
<state>	integer	N/A	session state

Values:

0 : disable

1 : enable



AT#NCMD=?

Test command reports the supported range of values for all the parameters.

3.1.2.59. AT#CSFB - Circuit Switched Fallback

This command is available for modules supporting the 2G/3G fallback technologies

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#CSFB=<n>

Set command configures the mode of operation for Circuit Switched Fallback.

Parameter:

Name	Type	Default	Description
<n>	string	2	unsolicited and mode of operation for Circuit Switched Fallback

Values:

- 0 : disable reporting of CSFB related CS paging requests and disable automatic acceptance/rejection of CSFB calls
- 1 : enable reporting of CSFB related CS paging requests and disable automatic acceptance/rejection of CSFB calls
- 2 : enable reporting of CSFB related CS paging requests and enable automatic acceptance of CSFB calls. CSFB is always preferred over PS
- 3 : enable reporting of CSFB related CS paging requests and enable automatic rejection of CSFB calls
- 4 : accept CSFB call. This value can be used only after having received the unsolicited result code #CSFBI
- 5 : reject CSFB call. This value can be used only after having received the unsolicited result code #CSFBI

Additional info:


- ▶▶ The format of the enabled unsolicited is:

#CSFBI: <m>,<phNo>,<ssCode>,<LCSindicator>,<LCSclientIdentity>

Unsolicited fields:

Name	Type	Description
<m>	integer	notification parameter
		Values:
		0 : no user response required. This could be because of last user settings AT#CSFB=2 or 3
		1 : user response required. User must respond with AT#CSFB=4 or 5
		2 : CSFB operation failed due to some error
<phNo>	string	string with the identification of the calling line for the mobile terminating call in the CS domain, which triggered the paging via SGS

<ssCode>	integer	information on the supplementary service transaction in the CS domain, which triggered the paging via SGs
<LCSIndicator>	integer	indicates that the paging was triggered by a terminating LCS request in the CS domain.
<LCSclientIdentity>	string	string with the information related to the requestor of the terminating LCS request in the CS domain.

-  In case CSFB indication is reported and there is no answer before the timer expires, a timeout scenario is handled.

**AT#CSFB?**

Read command returns the currently configured values, in the format:

#CSFB: <mode>

-  <n>=4 or 5 are not reported by in **AT#CSFB?** command

**AT#CSFB=?**

Test command returns the supported range of values of parameter **<mode>**.

3.1.2.60. AT#CQI - HSDPA Channel Quality Indication

This command reports channel quality indication (CQI). The returned values are valid only if the module is registered on a WCDMA network with HSDPA/HSUPA established. There will be no CQI if HSDPA/HSUPA is not established.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CQI

Execution command reports channel quality indication in the form:

#CQI: <cqi>

Additional info:

▶▶ CQI values:

Name	Type	Default	Description
<cqi>	integer	N/A	cqi values

Values:

0-30 : values

31 : not known or not detectable



AT#CQI=?

Test command returns the supported range of values of the parameter <cqi>.

3.1.2.61. AT#IMSPDPSET - IMS PDP APN Number Set

This command sets IMS Pdp APN Name. This name should be one of the APN names set in **+CGDCONT** command and appropriated context will be opened for IMS.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#IMSPDPSET=<pdpApnName>

Parameter:

Name	Type	Default	Description
<pdpApnName>	string	-	from 1 to 255 symbols ANSI fixed string. It can be used with or without quotes



AT#IMSPDPSET?

Read command reports the current setting of string parameter <pdpApnName>, in the format:

#IMSPDPSET: <pdpApnName>



AT#IMSPDPSET=?

Test command returns the maximum length for string parameter <pdpApnName>.

3.1.2.62. AT#PDPAUTH - PDP Authentication Parameters

This set command specifies PDP authentication parameters values for a PDP context identified by the (local) context identification parameter <cid>.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#PDPAUTH=<cid>,<authType>[,<userName>[,<passWord>]]

Parameters:

Name	Type	Default	Description
<cid>	integer	N/A	specifies a PDP context definition
Value:			
1=max : max value is returned by Test command			
<authType>	integer	0	authentication type
Values:			
0 : no authentication			
1 : PAP authentication			
2 : CHAP authentication			
<userName>	string	-	supplied by network provider. Required for <auth_type> = 1 and 2
<passWord>	string	-	supplied by network provider. Required for <auth_type> = 1 and 2.



AT#PDPAUTH?

Read command returns the PDP authentication parameters, excluding <password>, set for every PDP, in the format:

#PDPAUTH: <cid1>,< auth_type1 >,<username1><CR><LF>

...

#PDPAUTH:<cidmax>,<auth_typemax >,<usernamemax><CR><LF>



AT#PDPAUTH=?

Test command reports the supported range of values for parameters <cid> and <authType> and the maximum allowed length of the string parameters <passWord> and <userName>.

3.1.2.63. AT#CHDIR - File System Change Current Directory

This command changes the current working directory of the file system running on the current drive.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#CHDIR=<pathName>

Parameter:

Name	Type	Default	Description
<pathName>	string	-	<p>the parameter is a case sensitive quoted string, that can be:</p> <ul style="list-style-type: none"> directory name: long up to 16 chars depending on current working directory relative path name: long up to 124 chars depending on current working directory absolute path name: long up to 124 chars

The <pathName> must be passed between quotes. If it is not used, the command returns an error code.

- i** Path separator can be either '\ ' or '/ '.

Directory and relative path name begin with a character different from path separator and are relative to the current working directory.

Absolute path name begins with path separator.

System max path name length (current directory name length + file name length) is 128. System reserves 2 characters for internal use.
- i** AT power ON, the current directory of the file system, running on drive 0, is '\ '.



AT#CHDIR?

Read command reports the current working directory of the file system, running on the used drive, in the format:

#CHDIR: <pathName>



AT#CHDIR=?

Test command returns **OK** result code.



```
AT#CHDIR?
#CHDIR: "\MOD"
OK
AT#CHDIR="dir1"
OK
```

3.1.2.64. AT#MKDIR - File System Make Directory

This command makes a new directory in the current working directory of the file system running on the current drive.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#MKDIR=<dirName>

Parameter:

Name	Type	Default	Description
<dirName>	string	-	directory name, a case sensitive quoted string long up to 16 chars depending on current working directory. It must be passed between quotes.



AT#MKDIR=?

Test command returns **OK** result code.



AT#MKDIR="dir1"
OK

3.1.2.65. AT#RMDIR - File System Remove directory

This command removes the directory from the current working directory in the file system running on the current drive.


SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#RMDIR=<dirName>

Parameter:

Name	Type	Default	Description
<dirName>	string	-	directory name, a case sensitive quoted string long up to 16 chars. The <dirName> must be passed between quotes. If it is not used, the command returns an error code.

-  If the directory <dirName> is not empty, it is not possible to remove it and an error code is reported.



AT#RMDIR=?

Test command returns **OK** result code.



AT#RMDIR="dir1"
OK

3.1.2.66. AT#TXCAL4G - Change Max TX Power Level for a Supported Band

Set command change the maximum power level for the band specified.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#TXCAL4G=<band>[,<txPwrLev>]

Parameters:

Name	Type	Default	Description
<band>	integer	-	number of the LTE band whose TX maximum power level must be changed. To know its range, use Test command.
<txPwrLev>	integer	-	maximum tx power level for the band specified expressed in 1/16dBm. Example: 368 = 23dBm. To know its range, use Test command. If <txPwrLev> is not specified, the default value for maximum TX power level is set for the band <band>



AT#TXCAL4G?

Read command returns the bands supported and the maximum power level set for each band in the format:

```
#TXCAL4G: <band>,<txPwrLev>
#TXCAL4G: <band>,<txPwrLev>
#TXCAL4G: <band>,<txPwrLev>
#TXCAL4G: <band>,<txPwrLev>
#TXCAL4G: <band>,<txPwrLev>
...
```



AT#TXCAL4G=?

Test command reports the supported range of parameters values.

3.1.2.67. AT#MTUSIZE - Configure the MTU Size

This command sets a fixed MTU size. It must be issued before activating a PDP context.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2




AT#MTUSIZE=<MTU>

Parameter:

Name	Type	Default	Description
<MTU>	integer	0	sets the MTU size

Values:

- 0 : MTU size used by the network operator
- 1÷1500 : possible values of MTU size

-  Values from 1 to 67 are accepted but are mapped onto value 0. Refer to RFC 791, §3.2, paragraph "Fragmentation and Reassembly", which reports the following:

"Every internet module must be able to forward a datagram of 68 octets without further fragmentation. This is because an internet header may be up to 60 octets, and the minimum fragment is 8 octets."



AT#MTUSIZE?

Read command returns the current settings for <MTU> in the format:

#MTUSIZE: <MTU>



AT#MTUSIZE=?

Test command returns the supported range of parameter <MTU>.

3.1.3. S Parameters

3.1.3.1. ATSO - Number of Rings to Auto Answer

The command controls the automatic answering feature of the DCE.



ITU-T Recommendation V.25 ter
3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATSO=[<n>]

Set command sets the number of rings required before device automatically answers an incoming call.

Parameter:

Name	Type	Default	Description
<n>	integer	0	Number of rings

Values:

- 0 : auto answer disabled
- 1÷255 : number of rings required before automatic answer. The DCE answers when the incoming call indication (ring) has occurred the number of times indicated by the value.



Data only products ignore command setting and auto answer is disabled if incoming call is a voice call.



ATSO?

Read command returns the current value of **S0** parameter.


3.1.3.2. **ATS1 - Ring Counter**

S1 is incremented each time the device detects the ring signal of an incoming call. **S1** is cleared as soon as no ring occur.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATS1

 The form **ATS1** has no effect, returns **OK** result code.



ATS1?

Read command returns **S1** value.

3.1.3.3. ATS2 - Escape Character

The command manages the ASCII character used as escape character.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATS2=<char>


Set command sets the ASCII character to be used as escape character.

Parameter:

Name	Type	Default	Description
<char>	integer	43	escape character decimal ASCII

Value:


0=255 : factory default value is '+'

-  The escape sequence consists of three escape characters preceded and followed by **n** ms of idle (see **S12** to set **n**).



ATS2?

Read command returns the current value of **S2** parameter.

-  The format of the numbers in output is always 3 digits, left-filled with 0s.

3.1.3.4. AT3 - Command Line Termination Character

The command manages the character configured as command line terminator.



ITU-T Recommendation V.25 ter
3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT3=<char>

Set command sets the value of the character either recognized by the device as command line terminator and generated by the device as part of the header, trailer, and terminator for result codes and information text, along with **S4** parameter.

Parameter:

Name	Type	Default	Description
<char>	integer	13	command line termination character (decimal ASCII)

Value:

0÷127 : command line termination character

- i** The "previous" value of **S3** is used to determine the command line termination character for entering the command line containing the **S3** setting command. However, the result code issued shall use the "new" value of **S3** (as set during the processing of the command line)



AT3?

Read command returns the current value of **S3** parameter.

- i** The format of the numbers in output is always 3 digits, left-filled with 0s

3.1.3.5. ATS4 - Response Formatting Character

The command manages the character generated by the device as part of the header, trailer, and terminator for result codes and information text.



ITU-T Recommendation V.25 ter
3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATS4=[<char>]

Set command sets the value of the character generated by the device as part of the header, trailer, and terminator for result codes and information text, along with the **S3** parameter.

Parameter:

Name	Type	Default	Description
<char>	integer	10	response formatting character (decimal ASCII)

Value:

0÷127 : response formatting character

- i** If the value of **S4** is changed in a command line the result code issued in response of that command line will use the new value of **S4**.



ATS4?

Read command returns the current value of **S4** parameter.

- i** The format of the numbers in output is always 3 digits, left-filled with 0s.

3.1.3.6. ATS5 - Command Line Editing Character

The command manages the value of the character recognized by the DCE as a request to delete from the command line the immediately preceding character.



ITU-T Recommendation V.25 ter
3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATS5=<char>

Set command sets the value of the character recognized by the device as a request to delete from the command line the immediately preceding character.

Parameter:

Name	Type	Default	Description
<char>	integer	8	command line editing character (decimal ASCII)

Value:

0÷127 : command line editing character



ATS5?

Read command returns the current value of **S5** parameter.

-  The format of the numbers in output is always 3 digits, left-filled with 0s.

3.1.3.7. AT57 - Connection Completion Time-Out

This set command specifies the amount of time that the DCE shall allow between either answering a call (automatically or by the **ATA** command) or completion of signaling of call addressing information to network (dialing), and establishment of a connection with the remote DCE. If no connection is established during this time, the DCE disconnects from the line and returns a result code indicating the cause of the disconnection.



ITU-T Recommendation V.25 ter
3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT57=<tout>

Parameter:

Name	Type	Default	Description
<tout>	integer	60	defines time interval expressed in seconds

Value:

1÷255 : available range



AT57?

Read command returns the current value of **S7** parameter.

-  The format of the numbers in output is always 3 digits, left-filled with 0s.

3.1.3.8. ATS12 - Escaper Prompt Delay

The command manages the prompt delay between two different escape characters.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATS12=<time>

Set command sets:

- the minimum period, before receipt of the first character of the three escape character sequence, during which no other character has to be detected in order to accept it as valid first character;
- the maximum period allowed between receipt of first or second character of the three escape character sequence and receipt of the next;
- the minimum period, after receipt of the last character of the three escape character sequence, during which no other character has to be detected in order to accept the escape sequence as a valid one.

Parameter:

Name	Type	Default	Description
<time>	integer	50	delay expressed in fiftieth of a second

Value:

2÷255 : expressed in fiftieth of a second

- i** The minimum period **S12** has to pass after **CONNECT** result code too, before a received character is accepted as valid first character of the three escape character sequence.



ATS12?

Read command returns the current value of **S12** parameter.

- i** The format of the numbers in output is always 3 digits, left-filled with 0s

3.1.3.9. ATS25 - Delay to DTR Off

The command manages the amount of time that the device will ignore the **DTR**.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATS25=<time>

Set command defines the amount of time, in hundredths of second, that the device will ignore the **DTR** for taking the action specified by command **&D**.

Parameter:

Name	Type	Default	Description
<time>	integer	5	expressed in hundredths of a second

Value:

0-255 : expressed in hundredths of a second

- i** The delay is effective only if its value is greater than 5. To be recognized as valid, the **DTR** transition must be greater than **S25**. Low values could require a transition increased of a factor 1.5 to be correctly handled (e.g., to be sure that **S25=5** works, use a **DTR** toggle of 75ms to be detected).
- i** In power saving (e.g. **+CFUN=5** with **DTR** low) **DTR** must be off at least 3 seconds for taking the action specified by command **&D**, independently of **S25** parameter.



ATS25?

Read command returns the current value of **S25** parameter.

- i** The format of the numbers in output is always 3 digits, left-filled with 0s.

3.1.3.10. AT&V1 - S Registers Display

The command displays the S registers values.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&V1

Execution command returns the S registers values in both decimal and hexadecimal format. The response is in the form:

REG (S register)	DEC (value in dec. notation)	HEX (value in hex notation)
<reg0>	<dec>	<hex>
<reg1>	<dec>	<hex>
...
<regN>	<dec>	<hex>



Here is a generic example showing the format.

AT&V1

```

REG DEC HEX
000 000 000
001 000 000
002 043 02B
003 013 00D
004 010 00A
005 008 008
007 060 03C
012 050 032
...  ...  ...
...  ...  ...

OK

```


3.1.3.11. AT\$10 - Carrier Off with Firm Time

The command is available only for backward compatibility

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT\$10=<n>

Execution command has no effect and is available only for backward compatibility with landline modems.

Parameter:

Name	Type	Default	Description
<n>	integer	N/A	dummy

Value:

1÷255 : dummy parameter

3.1.3.12. AT&V3 - Extended S Registers Display

The command displays the extended S registers values.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&V3

Execution command returns the extended S registers values in both decimal and hexadecimal format. The response is in the form as shown in **AT&V1** command.



Here is a generic example showing the format.

AT&V3

```
REG  DEC  HEX
000  000  000
001  000  000
002  043  02B
003  013  00D
004  010  00A
005  008  008
007  060  03C
012  050  032
025  005  005
```

```
...  ...  ...
...  ...  ...
```

OK

3.1.4. DTE - Modem Interface Control

3.1.4.1. ATE - Command Echo

This command allows to enable or disable the command echo.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATE[<n>]

The execution command allows to enable/disable the command echo.

Parameter:

Name	Type	Default	Description
<n>	integer	1	Configuration value

Values:

- 0 : disables command echo
- 1 : enables command echo, hence command sent to the device are echoed back to the DTE before the response is given.



If parameter is omitted, the command has the same behavior of **ATE0**

3.1.4.2. ATQ - Quiet Result Codes

This command allows to enable or disable the result code.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATQ[<n>]

Set command enables or disables the result codes.

Parameter:

Name	Type	Default	Description
<n>	integer	0	enables/disables result codes

Values:

- 0 : enables result codes
- 1 : disables result codes. The commands entered after ATQ1 do not return the result code.
- 2 : disables result codes (only for backward compatibility). The commands entered after ATQ2 do not return the result code.



If parameter is omitted, the command has the same behavior of **ATQ0**.



After issuing **ATQ0** the **OK** result code is returned
AT+CGACT=?
+CGACT: (0-1)
OK

After issuing **ATQ1** or **ATQ2** the **OK** result code is not returned.
AT+CGACT=?
+CGACT: (0-1)

3.1.4.3. ATV - Response Format

Set command determines the contents of the header and trailer transmitted with result codes and information responses. It also determines if result codes are transmitted in a numeric form or an alphanumeric form (according to [1]).



[1] ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



ATV[<n>]

Parameter:

Name	Type	Default	Description
<n>	integer	1	format of information responses and result codes. See Additional info section.

Values:

- 0 : limited headers and trailers and numeric format of result codes
- 1 : full headers and trailers and verbose format of result codes

Additional info:

<n>=0	
information responses	<text><CR><LF>
result codes	<numericCode><CR>
<n>=1	
information responses	<CR><LF> <text><CR><LF>
result codes	<CR><LF> <verboseCode><CR><LF>

- i** the <text> portion of information responses is not affected by this setting.
- i** if parameter is omitted, the command has the same behavior of **ATV0**

3.1.4.4. ATI - Identification Information

This command returns identification information.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



ATI[<n>]

Execution command returns one or more lines of information text followed by a result code.

Parameter:

Name	Type	Default	Description
<n>	integer	0	information request

Values:

- 0 : numerical identifier
- 1 : module checksum
- 2 : checksum check result
- 3 : manufacturer
- 4 : product name
- 5 : DOB version



If parameter is omitted, the command has the same behavior of **ATI0**

3.1.4.5. AT&C - Data Carrier Detect (DCD) Control

This set command controls the DCD output behavior of the AT commands serial port.



ITU-T Recommendation V25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT&C[<n>]

Parameter:

Name	Type	Default	Description
<n>	integer	1	DCD output behavior

Values:

- 0 : DCD remains always High
- 1 : DCD follows the Carrier detect status: if carrier is detected DCD goes High, otherwise DCD is Low
- 2 : DCD OFF while disconnecting



If parameter is omitted, the command has the same behavior of **AT&C0**

3.1.4.6. AT&D - Data Terminal Ready (DTR) Control

This set command configures the behavior of the module according to the DTR control line transitions (RS232).

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT&D[<n>]

Parameter:

Name	Type	Default	Description
<n>	integer	0	defines the module behavior according to the DTR control line transitions

Values:

- 0 : module ignores DTR transitions; if +CVHU current setting is different from 2 then every setting &D0 is equivalent to &D5
- 1 : when the module is connected, the high to low transition of DTR line sets the module in command mode, the current connection is not closed; if +CVHU current setting is different from 2 then issuing AT&D1 is equivalent to AT&D5
- 2 : when the module is connected, the high to low transition of DTR line sets the module in command mode and the current connection is closed; if +CVHU current setting is different from 2 then issuing AT&D2 is equivalent to AT&D5
- 3 : module ignores DTR transitions; if +CVHU current setting is different from 2 then issuing &D3 is equivalent to &D5
- 4 : C108/1 operation is disabled; if +CVHU current setting is different from 2 then issuing &D4 is equivalent to &D5
- 5 : C108/1 operation is enabled; same behavior as for <n>=2

- i** If **&D2** has been issued and the DTR has been tied Low, auto answering is inhibited and it is possible to answer only issuing command **ATA**.
- i** If parameter is omitted, the command has the same behavior of **&D0**.
- i** If **&D2** has been issued the call is drop on falling DTR edge and **NO CARRIER** is displayed on rising DTR edge.

3.1.4.7. AT&K - Flow Control

Flow Control settings.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT&K[<n>]

Set command controls the serial port flow control behavior.

Parameter:

Name	Type	Default	Description
<n>	integer	3	flow control behavior

Values:

- 0 : no flow control
- 3 : hardware bi-directional flow control (both RTS/CTS active)

- i** If parameter is omitted, the command has the same behavior as **AT&K0**
- i** **&K** has no Read Command. To verify the current setting of **&K**, simply check the settings of the active profile issuing **AT&V**.
- i** Hardware flow control (**AT&K3**) is not active in command mode.

3.1.4.8. AT&S - Data Set Ready (DSR) Control

Set DSR pin behavior.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT&S[<n>]

Set command controls the RS232 DSR pin behavior.

Parameter:

Name	Type	Default	Description
<n>	integer	3	Configuration parameter

Values:

- 0 : always High
- 1 : DSR is tied High when the device receives from the network the GSM traffic channel indication
- 2 : High when connected
- 3 : High when device is ready to receive commands

- i** If parameter is omitted, the command has the same behavior of **AT&S0**
- i** In power saving mode the **DSR** pin is always tied Low.

3.1.4.9. AT+IPR - UART DCE Interface Data Rate Speed

This set command specifies the DTE speed at which the device accepts commands during command mode operations; it may be used to fix the **DTE-DCE** interface speed, see document [1].



[1] Hardware User's Guide of the used module

[2] ITU-T Recommendation V25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+IPR=<rate>

Parameter:

Name	Type	Default	Description
<rate>	integer	115200	speed of the serial port expressed in bit per second.

Values:

300	:	bps
1200	:	bps
2400	:	bps
4800	:	bps
9600	:	bps
19200	:	bps
38400	:	bps
57600	:	bps
115200	:	bps
230400	:	bps
460800	:	bps
921600	:	bps
3000000	:	bps



This command has no effect if it is sent on **USB** interface or **CMUX** instances: the DCE sends the **OK** result but the settings are ignored.



AT+IPR?

Read command returns the current value of <rate> parameter.



AT+IPR=?

Test command returns the list of fixed-only <rate> values in the format:

+IPR: (list of fixed-only **<rate>** values)

3.1.4.10. AT+IFC - DTE-Modem Local Flow Control

This set command selects the flow control of the serial port in both directions.



ITU-T Recommendation V25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+IFC=<byDTE>,<byDCE>

Parameters:

Name	Type	Default	Description
<byDTE>	integer	2	specifies the method used by the DTE to control the flow of data received from the device (DCE)

Values:

- 0 : no flow control
- 2 : flow control by RTS control line (C105, Request to Send)

<byDCE>	integer	2	specifies the method used by the device (DCE) to control the flow of data received from the DTE
---------	---------	---	---

Values:

- 0 : no flow control
- 2 : flow control by CTS control line (C105, Clear to Send)

i The only possible commands are **AT+IFC=0,0** and **AT+IFC=2,2**.



AT+IFC?

Read command returns active flow control settings.



AT+IFC=?

Test command returns all supported values of the parameters <byDTE> and <byDCE>.

3.1.4.11. AT+ICF - DTE-Modem Character Framing

This set command defines the asynchronous character framing to be used when autobauding is disabled. To know if autobauding is disabled or if the product is not supporting it, refer to **+IPR** command.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+ICF=<format>[,<parity>]

Parameters:

Name	Type	Default	Description
<format>	string	1	sets the number of Data bits, the presence of a Parity bit and the number of Stop bits in the start-stop frame.

Values:

- 1 : 8 Data, 2 Stop
- 2 : 8 Data, 1 Parity, 1 Stop
- 3 : 8 Data, 1 Stop
- 5 : 7 Data, 1 Parity, 1 Stop

<parity>	string	0	sets the type of parity. This setting is mandatory only if <format> is either 2 or 5 otherwise it is not allowed.
----------	--------	---	---

Values:

- 0 : odd
- 1 : even



AT+ICF?

Read command returns current settings for parameters <format> and <parity>. If current setting of parameter <format> is neither 2 nor 5, the current setting of parameter <parity> will always be represented as 0.



AT+ICF=?

Test command returns the ranges of values for the parameters <format> and <parity>.



```
8N2  
AT+ICF = 1  
OK
```

```
8O1  
AT+ICF = 2,0  
OK
```

```
8E1  
AT+ICF = 2,1  
OK
```

```
8N1  
AT+ICF = 3  
OK
```

```
7O1  
AT+ICF = 5,0  
OK
```

```
7E1  
AT+ICF = 5,1  
OK
```

3.1.4.12. AT#CFLO - Command Flow Control

This set command enables/disables the hardware flow control in command mode. If enabled, the flow control is applied to both data mode and command mode

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT#CFLO=<enable>

Parameter:

Name	Type	Default	Description
<enable>	integer	0	enable/disable hardware flow control

Values:

- 0 : disable flow control in command mode
- 1 : enable flow control in command mode



AT#CFLO?

Read command returns current setting value in the format:

#CFLO: <enable>



AT#CFLO=?

Test command returns the range of supported values for parameter <enable>

3.1.4.13. AT#SKIPESC - Skip Escape Sequence

This set command enables/disables skipping the escape sequence (+++) while transmitting during a data connection.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT#SKIPESC=[<mode>]

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enable/disable skipping the escape sequence (+++)

Values:

- 0 : does not skip the escape sequence; its transmission is enabled.
- 1 : skips the escape sequence; its transmission is not enabled.
- 2 : skips the escape sequence; its transmission is not enabled. If there are data pending in the receiving buffer from the serial port driver, they are deleted.



In FTP connection the escape sequence is not transmitted, regardless of the command setting.



AT#SKIPESC?

Read command returns the current value of the parameter <mode> in the format:

#SKIPESC: <mode>



AT#SKIPESC=?

Test command returns the supported values of parameter <mode>.

3.1.4.14. AT#E2ESC - Escape Sequence Guard Time

This set command sets a guard time in seconds for the escape sequence in PS to be considered a valid one, and return to on-line command mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#E2ESC=[<gt;]

Parameter:

Name	Type	Default	Description
<gt;	string	0	sets a guard time in seconds

Values:

- 0 : guard time is defined by S12 command
- 1÷10 : guard time in seconds. It overrides the one set with S12 command



AT#E2ESC?

Read command returns current value of the escape sequence guard time, in the format:

#E2ESC: <gt;



AT#E2ESC=?

Test command returns the range of supported values for parameter <gt;.

3.1.4.15. ATX - Extended Result Codes

Set command selects the subset of result code messages the modem uses to reply to the DTE upon AT commands execution.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



ATX[<n>]

Parameter:

Name	Type	Default	Description
<n>	integer	1	configuration value

Values:

- 0 : when entering in dial mode a **CONNECT** result code is relayed; see Additional info.
- 1÷4 : when entering in dial mode a **CONNECT <text>** result code is relayed, see Additional info.

Additional info:

- ▶▶ <n>=0
OK, CONNECT, RING, NO CARRIER, ERROR, NO ANSWER result codes are enabled.
Dial tone and busy detection (**NO DIALTONE** and **BUSY** result codes) are disabled.

<n>=1÷4
all the remaining result codes are enabled.

- ❗ When the <n> parameter is omitted, the command acts like **ATX0**.

3.1.5. Call (Voice and Data) Control

3.1.5.1. ATD - Dialup Connection

This command establishes a Mobile Originated call to the destination phone number. If ";" character is present in the command, a voice call is performed regardless of the current value of the connection mode set by **+FCLASS** command.



ITU-T Recommendation V.25 ter
3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	Yes	-	2



ATD

The **ATD** execution command can assume different formats, which are described in the following Additional info section.

Additional info:

▶▶ ATD<number>[:;]

The call can be a voice or data call according to the last setting performed with the **+FCLASS** command.

Name	Type	Default	Description
<number>	string	-	phone number to be dialed Accepted characters are 0-9 and *,#,"A", "B", "C", "D", "+". For backwards compatibility with landline modems, modifiers "T", "P", "R", ",", "W", "!", "@" are accepted, but have no effect.
<;>	string	-	if ";" character is present, a voice call is performed, regardless of the current mode value set by +FCLASS command

▶▶ ATD<<str>>[:;]

Issues a call to the phone number identified by an alphanumeric field. All available memories are scanned to find out the field.

Name	Type	Default	Description
<str>	string	-	is an alphanumeric field identifying the phone number. The characters must be enclosed in quotation marks. The parameter is case sensitive. Use +CSCS command to select the character set.
<;>	string	-	if ";" character is present, a voice call is performed, regardless of the current mode value set by +FCLASS command

▶▶ ATD<<mem>><n>[:;]

Issues a call to the phone number stored in the selected phonebook memory storage and in the selected entry location. Use **+CPBS=?** command to get all the available memories.

Name	Type	Default	Description
<mem>	string	N/A	identifies the phonebook memory storage
Values:			
SM	:	SIM phonebook	
FD	:	SIM fixed dialing-phonebook	
LD	:	SIM last-dialing-phonebook	
MC	:	device missed (unanswered received) calls list	
RC	:	ME received calls list	
MB	:	Mailbox numbers stored on SIM, if this service is provided by the SIM (see #MBN)	
...	:	use the AT+CPBS=? test command to get all the available memory storage	
<n>	integer	-	entry location. It must be in the range of the available locations in the used memory.
<;>	string	-	if ";" character is present, a voice call is performed, regardless of the current mode value set by +FCLASS command

►► **ATD<n>[;]**

Issues a call to the phone number stored in the selected entry location of the active phonebook.

Name	Type	Default	Description
<n>	integer	-	entry location of the active phonebook
<;>	string	-	if ";" character is present, a voice call is performed, regardless of the current mode value set by +FCLASS command

►► **ATDL**

Issues a call to the last number dialed.

►► **ATDS=<nr>[;]**

Issues a call to the number stored in the internal phonebook of the module. For internal phonebook position refer to **&N** and **&Z** commands.

Name	Type	Default	Description
<nr>	integer	-	identifies the internal phonebook position of the module where is stored the phone number to be dialed

<;>	string	-	if ";" character is present, a voice call is performed, regardless of the current mode value set by +FCLASS command
-----	--------	---	--

►► **ATD<number><modifier>[;]**

Issues a call overriding the CLIR supplementary service subscription default value, or checking the CUG supplementary service information according to the modifier.

Name	Type	Default	Description
<number>	integer	-	phone number to be dialed
<modifier>	string	N/A	causes the call overrides the CLIR supplementary service subscription default value, or checks the CUG supplementary service information

Values:

- l : restrict CLI presentation
- i : allow CLI presentation
- G : refer to +CCUG command
- g : refer to +CCUG command

<;>	string	-	if ";" character is present, a voice call is performed, regardless of the current mode value set by +FCLASS command
-----	--------	---	--

►► **ATD*<gprs_sc>[*<addr>][*<L2P>][*<cid>]]#**

This command is specific for GPRS functionality, and causes the MT to perform whatever actions are necessary to establish communication between the TE and the external PDN.

Name	Type	Default	Description
<gprs_sc>	integer	N/A	is the GPRS Service Code, which identifies a request to use the GPRS communication
Value:			
99	:	GPRS Service Code	
<addr>	string	-	identifies the called party in the address space applicable to the PDP.
<L2P>	string	-	indicates the layer 2 protocol to be used. For communications software that does not support arbitrary characters in the dial string, the following numeric equivalents shall be used: 1 is equivalent to PPP.
<cid>	integer	-	PDP context definition, see +CGDCONT command

- i** Data only modules do not support a voice call. If you try a voice call, the command returns an **ERROR** message.
- i** The escape sequence (+++) causes a closure of the link.



- Dial the phone number stored in the SIM phonebook at entry 6. The call is a data or voice call according to the mode set by **+FCLASS** command.
ATD>SM6
OK
- Dial the phone number stored in the active phonebook at entry 6. The ";" character is used, therefore the call is a voice call.
ATD>6;
OK
- Dial the phone number corresponding to the alphanumeric field "Name". The alphanumeric field is searched in all available memories. The ";" character is used, therefore the call is a voice call.
ATD>"Name";
OK

3.1.5.2. ATP - Pulse Dial

This command has no effect is included only for backward compatibility.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



ATP

Set command has no effect is included only for backward compatibility with landline modems.

3.1.5.3. ATA - Answer Incoming call

The command is used to answer to an incoming call if automatic answer is disabled.



ITU-T Recommendation V.25 ter
3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



ATA

Execution command informs the DCE that answer sequence must be started if automatic answer is disabled.

- i** This command must be the last in the command line and must be followed immediately by a <CR> character.
- i** Data only products do not start the call and command answer is **ERROR** if a voice call is requested.

3.1.5.4. ATH - Hang Up/Disconnect the Current Call

This execution command hangs up/disconnects the current voice/data call or dial-up.




ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



ATH

-  When a data call or a dial-up is active the device is in on-line mode hence, to execute **ATH** command the device must be previously turned in command mode using the escape sequence or, if **&D1** option is active, tying Low the DTR pin. See also **+CVHU** command to control a voice hang up.

3.1.5.5. ATO - Return to ON-Line Mode

This execution command is used, during a suspended data conversation, to return in on-line mode from command mode. If there is no suspended conversation, it returns **NO CARRIER**.



ITU-T Recommendation V. 25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



ATO



After issuing **ATO** command, the device returns in on-line mode. To enter again command-mode you must issue the escape sequence, see register **S2**.

3.1.5.6. ATT - Tone Dial

This command has no effect is included only for backward compatibility.



ITU-T Recommendation V.25 ter

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



ATT

Set command has no effect is included only for backward compatibility with landline modems.

3.1.5.7. AT#DIALMODE - Set Dialing Mode

This command sets dialing modality.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#DIALMODE=<mode>

Set command sets dialing modality.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	sets dialing modality

Values:

- 0 : voice call only, see Additional info
- 1 : voice call only, see Additional info
- 2 : voice call and data call, see Additional info

Additional info:

▶▶ <mode>=0

Voice call only, **OK** result code is received as soon as it starts remotely ringing.

▶▶ <mode>=1

Voice call only, **OK** result code is received only after the called party answers. Any character typed aborts the call and **OK** result code is received.

▶▶ <mode>=2

Voice call and data call, the following custom result codes are received, monitoring step by step the call status:

DIALING (MO in progress)
RINGING (remote ring)
CONNECTED (remote call accepted)
RELEASED (after **ATH**)
DISCONNECTED (remote hang-up).

Any character typed before the **CONNECTED** message aborts the call.

- i** In case a BUSY tone is received and at the same time **ATX0** is enabled **ATD** will return **NO CARRIER** instead of **DISCONNECTED**.
- i** The setting is saved in **NVM** and available on following reboot.

**AT#DIALMODE?**

Read command returns current **ATD** dialling mode in the format:

#DIALMODE: <mode>

**AT#DIALMODE=?**

Test command returns the supported range of values for parameter **<mode>**.

3.1.6. Modulation & Compression Control

3.1.6.1. AT%E - Line Quality and Auto Retrain

This command is used for line quality monitoring and auto retrain or fall back/fall forward.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT%E[<n>]

Execution command has no effect and is included only for backward compatibility with landline modems.

Parameter:

Name	Type	Default	Description
<n>	integer	-	this parameter is not really used, and it is present only for backward compatibility

-  If <n> parameter is not specified, the default value is considered

3.2. Network

3.2.1. AT+CNUM - Subscriber Number

Execution command returns the MSISDN (if the phone number of the device has been stored in the SIM card)



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CNUM

Execution command returns the MSISDN (if the phone number of the device has been stored in the SIM card) using the following format:

+CNUM: <alpha>,<number>,<type>[<CR><LF>

+CNUM: <alpha>,<number>,<type>[...]

The parameters are described in the Additional info section.

Additional info:

- ▶▶ List of the parameters meaning.

Name	Type	Default	Description
<alpha>	string	-	alphanumeric string associated to <number>; the character set depends on the value set with +CSCS .
<number>	string	-	numeric string containing the phone number in the format <type>.
<type>	integer	N/A	type of number.

Values:

129 : national numbering scheme

145 : international numbering scheme (contains the character "+")



AT+CNUM=?

Test command returns the **OK** result code.

3.2.2. AT+COPN - Read Operator Names

This command read operator names.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+COPN

Execution command returns the list of operator names from the ME in the format:

+COPN: <numeric1>,<alpha1>[<CR>

+COPN: <numeric2>,<alpha2>[...]]

The parameters are described in the Additional info section.

Additional info:

- ▶▶ List of the parameters meaning.

Name	Type	Default	Description
<numeric>	string	-	operator in numeric format, see +COPS .
<alphan>	string	-	operator in long alphanumeric format, see +COPS .

- i** Each operator code <numeric> that has an alphanumeric equivalent <alphan> in the ME memory is returned.



AT+COPN=?

Test command returns the **OK** result code.

3.2.3. AT+CREG - Network Registration Status

The command enables/disables the network registration unsolicited result code (URC) and selects its presentation format.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CREG=[<mode>]

Set command enables/disables the network registration unsolicited result code and selects one of the two available formats:

short format: **+CREG: <stat>**

long format: **+CREG: <stat>[,<lac>,<ci>[,<AcT>]]**

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enables/disables the network registration unsolicited result code and selects one of the two formats.

- The URC short format is displayed every time there is a change in the network registration status.
- The URC long format is displayed every time there is a change of the network cell

Values:

- 0 : disable the network registration unsolicited result code
- 1 : enable the network registration unsolicited result code, and selects the short format
- 2 : enable the network registration unsolicited result code, and selects the long format (includes the network cell identification data)


Unsolicited fields:

Name	Type	Description
<stat>	integer	network registration status of the module

Values:

- 0 : not registered, terminal is not currently searching a new operator to register to
- 1 : registered, home network
- 2 : not registered, but terminal is currently searching a new operator to register to
- 3 : registration denied
- 4 : unknown
- 5 : registered, roaming

<lac>	string	the parameter reports: <ul style="list-style-type: none"> Local Area Code when <AcT> value ranges from 0 to 6 Tracking Area Code when <AcT>=7
<ci>	string	cell ID in hexadecimal format
<AcT>	integer	access technology of the registered network. The module supports only E-UTRAN access technology: <AcT> =7 Values: <ul style="list-style-type: none"> 0 : GSM 2 : UTRAN 3 : GSM w/EGPR 4 : UTRAN w/HSDPA 5 : UTRAN w/HSUPA 6 : UTRAN w/HSDPA and HSUPA 7 : E-UTRAN, the module supports only E-UTRAN access technology

-  **<lac>**, **<ci>** and **<AcT>** network information is reported by URC only if **<mode>**=2, and the module is registered on some network cell.



AT+CREG?

Read command returns the current value of **<mode>**, the registration status **<stat>**, and the network information (**<lac>**, **<ci>** and **<AcT>**) according to the used **<mode>** parameter value.

+CREG: <mode>,<stat>[,<lac>,<ci>[,<AcT>]]

<lac>, **<ci>**, and **<AcT>** network information is reported only if **<mode>**=2 and the module is registered on some network cell.



AT+CREG=?

Test command returns supported values for parameter **<mode>**.



Check the registration status of the module.

AT+CREG?

+CREG: 0,2

OK

The module is in network searching state

...

...

Check again module status

AT+CREG?

+CREG: 0,1

OK

The module is registered

3.2.4. AT+COPS - Operator Selection

The command selects a network operator, and registers the module.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+COPS=[<mode>[,<format>[,<oper>[,<act>]]]]



The set command attempts to select a network operator, and registers the module on the just chosen operator; the selection can be automatic or manual.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	defines the operator selection: automatic or manual.
Values:			
0	:	automatic selection, the parameter <oper> is ignored	
1	:	manual selection, the parameter <oper> must be present	
2	:	deregister from network. The module is unregistered until a +COPS with <mode>=0, 1 or 4 is issued	
3	:	set only <format> parameter, the parameter <oper> is ignored	
4	:	manual/automatic, <oper> parameter must be present. If manual selection fails, the module will tray automatic mode (<mode>=0)	
<format>	integer	0	specifies the operator name format, see <oper> parameter
Values:			
0	:	alphanumeric long form (max length 16 digits)	
2	:	numeric 5 or 6 digits [country code (3) + network code (2 or 3)]	
<oper>	mixed	-	network operator in format defined by <format> parameter
<act>	integer	0	selects access technology. The module supports only E-UTRAN access technology: <Act>=7
Values:			
0	:	GSM	
2	:	UTRAN	
7	:	E-UTRAN, the module supports only E-UTRAN access technology	

i <mode> parameter setting is stored in NVM and available at next reboot. <mode>=3 is not saved.

If <mode>=1 or 4, the selected network is stored in NVM too and is available at next reboot (this will happen also after inserting another SIM).

-  **<format>** parameter setting is never stored in NVM.
-  If **AT+COPS=0** is issued after the switch-on, it causes a new attempt to select a network operator and registers the module on the selected operator.

**AT+COPS?**

Read command returns current value of **<mode>**, **<format>**, **<oper>** and **<AcT>** in format **<format>**. If no operator is selected, **<format>**, **<oper>** and **<AcT>** are omitted

+COPS: <mode>[, <format>, <oper>,< act>]

If the module is deregistered, **<format>**, **<oper>**, and **<act>** parameters are omitted.

**AT+COPS=?**

Test command returns a list of quadruplets, each representing an operator present in the network. The quadruplets list is ended with the range values of the **<mode>** and **<formats>** parameters.

The quadruplets in the list are closed between round brackets, separated by commas, the **<oper>** parameter is returned in both formats.

+COPS: [quadruplets list (<stat>,<oper (in <format>=0)>,,<oper (in <format>=2)>,< act>), (<stat>,<oper (in <format>=0)>,,<oper (in <format>=2)>,< act>), ...] [, (range of <mode>), (range of <format>)]

<stat> parameter is described in the Additional info section.


Additional info:

- ▶▶ Meaning of the **<stat>** parameter.

Name	Type	Default	Description
<stat>	integer	N/A	operator availability

Values:

- 0 : unknown
- 1 : available
- 2 : current
- 3 : forbidden

-  Since with this command a network scan is done, this command may require some seconds before the output is given.

3.2.5. AT+CLCK - Facility Lock/Unlock

Set command is used to lock, unlock or interrogate a modem or a network lock facility. Password is normally needed to do such actions



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CLCK=<fac>,<mode>[,<password>[,<class>]]

Parameters:

Name	Type	Default	Description
<fac>	string	N/A	facility to lock, unlock or interrogate

Values:

- "PS" : PH-SIM (lock Phone to SIM card) MT asks password when other than current SIM card inserted; MT may remember certain amount of previously used cards thus not requiring password when they are inserted
- "PF" : lock Phone to the very first inserted SIM card (MT asks password when other than the first SIM card is inserted)
- "SC" : SIM (PIN request) (device asks SIM password at power-up and when this lock command issued)
- "AO" : BAO (Barr All Outgoing Calls)
- "OI" : BOIC (Barr Outgoing International Calls)
- "OX" : BOIC-exHC (Barr Outgoing International Calls except to Home Country)
- "AI" : BAIC (Barr All Incoming Calls)
- "IR" : BIC-Roam (Barr Incoming Calls when Roaming outside the home country)
- "AB" : all Barring services (applicable only for <mode>=0)
- "AG" : all outGoing barring services (applicable only for <mode>=0) (not yet supported)
- "AC" : all inComing barring services (applicable only for <mode>=0)
- "FD" : SIM fixed dialing memory feature (if PIN2 authentication has not been done during the current session, PIN2 is required as <passwd>)
- "PN" : network personalization
- "PU" : network subset personalization
- "PP" : service provider personalization
- "PC" : corporate personalization

<mode>	integer	N/A	defines the operation to be done on the facility
--------	---------	-----	--

Values:

- 0 : unlock facility
- 1 : lock facility
- 2 : query status

<password>	string	-	password needed to lock or unlock a facility
<class>	integer	7	is a sum of integers, each representing a class of information which the command refers to; default is 7 (voice + data + fax)

Value:

- 1÷255 : 1..255 - as sum of: 1 - voice(telephony) 2 - data 4 - fax (facsimile services) 8 - short message service 16 - data circuit sync 32 - data circuit async 64 - dedicated packet access 128 - dedicated PAD access

Additional info:


- ▶▶ When **<mode>=2** and command is successful, it returns:

```
+CLCK: <status>[,<class1>[<CR><LF>
+CLCK: <status>,<class2>[...]]
```

Name	Type	Default	Description
<status>	integer	N/A	the current status of the facility

Values:

- 0 : not active
- 1 : active

-  The command will return ERROR if executed using SMSATRUN digest mode or TCPATRUN server mode.



AT+CLCK=?

Test command reports all the facilities supported by the device.



Querying such a facility returns an output on three rows, the first for voice, the second for data, the third for fax:

```
AT+CLCK="AO",2
+CLCK: <status>,1
+CLCK: <status>,2
+CLCK: <status>,4
```


3.2.6. AT+CPWD - Change Facility Password

This command changes the password for the facility lock function defined by command Facility Lock **+CLCK** command.



- 3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	Yes	180 s	2



AT+CPWD=<fac>,<oldpwd>,<newpwd>

Execution command changes the password for the facility lock function defined by command Facility Lock **+CLCK** command.

Parameters:

Name	Type	Default	Description
<fac>	string	N/A	facility lock function.
Values:			
"SC"	:	SIM (PIN request)	
"AB"	:	All barring services	
"P2"	:	SIM PIN2	
"PS"	:	SIM Personalization (lock Phone to SIM card)	
<oldpwd>	string	-	old password. It shall be the same password as specified for the facility from the ME user interface or with +CLCK command.
<newpwd>	string	-	new password.



AT+CPWD=?

Test command returns a list of pairs (<fac>,<pwdlength>) which represents the available facilities and the maximum length of their password (<pwdlength>).



- AT+CPWD=?
+CPWD: ("SC",8),("AB",4),("P2",8),("PS",8)
OK

3.2.7. AT+CLIP - Calling Line Identification Presentation

This command enables/disables the presentation of the CLI (Calling Line Identity).



3GPP TS 27.007
3GPP TS 22.081

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CLIP=[<enable>]

Set command refers to the supplementary service CLIP (Calling Line Identification Presentation) that enables a called subscriber to get the calling line identity (CLI) of the calling party when receiving a mobile terminated call. If enabled the device reports after each **RING** the response:

+CLIP: <number>,<type>,"",128,<alpha>,<CLI_validity>

Parameter:

Name	Type	Default	Description
<enable>	integer	0	enables/disables CLI indication. The command changes only the report behavior of the device, it does not change CLI supplementary service setting on the network.


Values:

0 : disable
1 : enable

Unsolicited fields:

Name	Type	Description
<number>	string	phone number of format specified by <type>
<type>	integer	type of address octet
		Values:
		128 : both the type of number and the numbering plan are unknown
		129 : unknown type of number and ISDN/Telephony numbering plan
		145 : international type of number and ISDN/Telephony numbering plan (contains the character "+")
<alpha>	string	alphanumeric representation of <number> corresponding to the entry found in phonebook; used character set should be the one selected with command +CSCS
<CLI_validity>	integer	validity of CLIP
		Values:
		0 : CLI valid
		1 : CLI has been withheld by the originator

2 : CLI is not available due to interworking problems or limitation or originating network

-  in the **+CLIP:** response they are currently not reported either the *subaddress* information (it's always "" after the 2nd comma) and the *subaddress type* information (it's always 128 after the 3rd comma)
-



AT+CLIP?


Read command returns the presentation status of the CLI in the format:

+CLIP: <enable>,<status>

Additional info:

▶▶ Parameters:

Name	Type	Default	Description
<enable>	integer	N/A	status of the local setting
Values:			
0	:	CLI presentation disabled	
1	:	CLI presentation enabled	
<status>	integer	N/A	status of the CLIP service on the network
Values:			
0	:	CLIP not provisioned	
1	:	CLIP provisioned	
2	:	unknown (e.g. no network is present)	

-  Read command issues a status request to the network, hence it may take a few seconds to give the answer due to the time needed to exchange data with it.
-



AT+CLIP=?

Test command returns the supported values of parameter **<enable>**

3.2.8. AT+CLIR - Calling Line Identification Restriction

The command manages the CLIR service.



3GPP TS 27.007
3GPP TS 22.081

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CLIR=[<n>]

Set command overrides the CLIR subscription when temporary mode is provisioned as a default adjustment for all following outgoing calls. This adjustment can be revoked by using the opposite command. This command refers to CLIR service (see 3GPP TS 22.081), that allows a calling subscriber to enable or disable the presentation of the Calling Line Identification (CLI, i.e., the phone number of the caller) to the called party when originating a call.

This command sets the default behavior of the device in all outgoing calls.

Parameter:

Name	Type	Default	Description
<n>	integer	0	setting of CLIR service

Values:

- 0 : CLIR facility according to CLIR service network status
- 1 : CLIR facility active (CLI not sent)
- 2 : CLIR facility not active (CLI sent)



AT+CLIR?

Read command gives the default adjustment for all outgoing calls (<n>) and also triggers an interrogation of the provision status of the CLIR service (<m>), in the form

+CLIR: <n>,<m>

Additional info:



Name	Type	Default	Description
<n>	integer	0	facility status in the Mobile
Values:			
0 : CLIR facility according to CLIR service network status			
1 : CLIR facility active (CLI not sent)			
2 : CLIR facility not active (CLI sent)			
<m>	integer	0	facility status in the Network

Values:

- 0 : CLIR service not provisioned
 - 1 : CLIR service provisioned permanently
 - 2 : unknown (e.g. no network present)
 - 3 : CLI temporary mode presentation restricted
 - 4 : CLI temporary mode presentation allowed
-



AT+CLIR=?

Test command reports the supported values of parameter <n>

3.2.9. AT+COLP - Connected Line Identification Presentation

This command enables/disables the presentation of the COL at the TE.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+COLP=[<n>]

Set command enables/disables the presentation of the COL at the TE.

When enabled (and called subscriber allows), the following intermediate result code is returned from TA to TE before any +CR or ITU T Recommendation V.250 responses:

+COLP: <number>,<type>

Parameter:

Name	Type	Default	Description
<n>	integer	0	enable/disable COL indication

Values:

- 0 : disable COL indication
- 1 : enable COL indication

Additional info:

- ▶▶ This command refers to the GSM/UMTS supplementary service COLP (Connected Line Identification Presentation) that enables a calling subscriber to get the connected line identity (COL) of the called party after setting up a mobile originated call.

It has no effect on the execution of the supplementary service COLR in the network.

Unsolicited fields:

Name	Type	Description
<number>	string	string type phone number of format specified by <type>
<type>	integer	type of address octet in integer format

Values:

- 129 : unknown type of number and ISDN/Telephony numbering plan
- 145 : international type of number and ISDN/Telephony numbering plan (contains the character "+")



If COL information is needed, it is recommended to set <mode> to 1 in #DIALMODE command, in order to have network information available for display before returning to command mode.



AT+COLP?


Read command gives the status of **<n>**, and also triggers an interrogation of the provision status of the COLP service according 3GPP TS 22.081 (given in **<m>**) in the format:

+COLP: <n>,<m>

Additional info:

►► where

Name	Type	Default	Description
<n>	integer	N/A	COL presentation enabled/disabled
Values:			
	0	:	COL presentation disabled
	1	:	COL presentation enabled
<m>	integer	N/A	status of the COLP service on the GSM network
Values:			
	0	:	COLP not provisioned
	1	:	COLP provisioned
	2	:	unknown (e.g. no network is present)

-  This command issues a status request to the network, hence it may take a few seconds to give the answer due to the time needed to exchange data with it.



AT+COLP=?

Test command returns the range for the parameter **<n>**.

3.2.10. AT+COLR - Connected Line Identification Restriction status

This command refers to the GSM/UMTS supplementary service COLR (Connected Line Identification Restriction) that enables a called subscriber to restrict the possibility of presentation of connected line identity (COL) to the calling party after receiving a mobile terminated call



[1] 3GPP TS 22.081

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+COLR

The command displays the status of the COL presentation in the network. It has no effect on the execution of the supplementary service COLR in the network.

Execution command triggers an interrogation of the activation status of the COLR service according to standard [1]. The command returns the COLR service status in the format:

+COLR: <m>

The <m> parameter is described in Additional info section.

Additional info:

- ▶▶ Here is the meaning of the <m> parameter returned by the command.

Name	Type	Default	Description
<m>	integer	0	subscriber COLR service status.

Values:

- 0 : COLR not provisioned
- 1 : COLR provisioned
- 2 : unknown (example: no network, etc.)



Activation, deactivation, registration and erasure of the supplementary service COLR are not applicable.



AT+COLR=?

Test command tests for command existence

3.2.11. AT+CCFC - Call Forwarding Number And Condition

This command controls the call forwarding supplementary service.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CCFC=<reason>,<cmd>[,<number>[,<type>[,<class>[,<time>]]]]

The execution command controls the call forwarding supplementary service. Registration, erasure, activation, deactivation, and status query are supported.

Parameters:

Name	Type	Default	Description
<reason>	integer	0	reason of call forwarding
	Values:		
	0	:	unconditional
	1	:	mobile busy
	2	:	no reply
	3	:	not reachable
	4	:	all calls (not with query command)
	5	:	all conditional calls (not with query command)
<cmd>	integer	0	command parameter
	Values:		
	0	:	disable
	1	:	enable
	2	:	query status
	3	:	registration
	4	:	erasure
<number>	string	-	string type phone number of forwarding address in format specified by <type> parameter
<type>	integer	129	type of address octet in integer format
	Values:		
	129	:	National numbering scheme
	145	:	International numbering scheme (contains the character "+")
<class>	integer	7	sum of integers each representing a class of information which the command refers to; default 7 (voice + data + fax)
	<ul style="list-style-type: none"> • 1 voice(telephony) • 2 data • 4 fax (facsimile services) • 8 short message service • 16 data circuit sync 		

- **32** data circuit async
- **64** dedicated packet access
- **128** dedicated PAD access

Value:

0÷255 : class of information

<time>	integer	20	time in seconds to wait before call is forwarded; it is valid only when <reason> "no reply" is enabled (<cmd>=1) or queried (<cmd>=2)
---------------------	---------	----	--

Value:

1÷30 : automatically rounded to a multiple of 5 seconds

Additional info:

- ▶▶ when **<cmd>=2** and command successful, it returns:

```
+CCFC: <status>,<class>,<number>,<type>[,,,<time>]][<CR><LF>
+CCFC: <status>,<class>,<number>,<type>[,,,<time>]][ ... ]]
```

Name	Type	Default	Description
<status>	integer	0	status of the network service
Values:			
	0	:	not active
	1	:	active
<time>	string	-	it is returned only when <reason>=2 ("no reply") and <cmd>=2 .

- i** When querying the status of a network service (**<cmd>=2**) the response line for 'not active' case (**<status>=0**) should be returned only if service is not active for any **<class>**.



AT+CCFC=?

Test command reports supported values for the parameter **<reason>**.

3.2.12. AT+CCWA - Call Waiting

This command allows control of the supplementary service Call Waiting. Activation, deactivation and status query are supported.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CCWA=[<n>[,<cmd>[,<class>]]]

Set command allows to enable/disable of the presentation of the URC to the TE when call waiting service is enabled; it also permits to activate, deactivate and query the status of the call waiting service.

The URC has the following format:

+CCWA: <number>,<type>,<class>[,<alpha>][,<cli_validity>]

Parameters:

Name	Type	Default	Description
<n>	integer	0	Enables/disables the presentation of an unsolicited result code
Values:			
0	:	disable	
1	:	enable	
<cmd>	integer	0	Enables/disables or queries the service at network level
Values:			
0	:	disable	
1	:	enable	
2	:	query status	
<class>	integer	7	sum of integers each representing a class of information which the command refers to; default is 7 (voice + data + fax)
<ul style="list-style-type: none"> • 1 voice(telephony) • 2 data • 4 fax (facsimile services) • 8 short message service • 16 data circuit sync • 32 data circuit async • 64 dedicated packet access • 128 dedicated PAD access 			
Value:			
1÷255	:	class of information	

Unsolicited fields:

Name	Type	Description
------	------	-------------

<number>	string	Phone number of calling address in format specified by <type>
<type>	integer	Type of address in integer format
<class>	integer	See before
<alpha>	string	Alphanumeric representation of <number> corresponding to the entry found in phonebook; used character set should be the one selected with +CSCS .
<cli_validity>	integer	This parameter can provide details why <number> does not contain a calling party BCD number. Values: 0 : CLI valid 1 : CLI has been withheld by the originator 2 : CLI is not available due to interworking problems or limitations of originating network

- i** The response to the query command is in the format:

```
+CCWA: <status>,<class>[<CR><LF>
+CCWA: <status>,<class>[ ... ]]
```

where

<status> represents the status of the service:

0 - inactive
1 - active

<class_n> - same as **<class>**

- i** If parameter **<cmd>** is omitted then network is not interrogated.
- i** In the query command the class parameter must not be issued.
- i** The difference between call waiting report disabling (**AT+CCWA = 0,1,7**) and call waiting service disabling (**AT+CCWA = 0,0,7**) is that in the first case the call waiting indication is sent to the device by network but this last one does not report it to the modem; instead in the second case the call waiting indication is not generated by the network. Hence the device results busy to the third party in the second case, while in the first case a ringing indication is sent to the third party.
- i** The command **AT+CCWA=1,0** has no effect and is a non sense, then must not be issued.



AT+CCWA?

Read command reports the current value of the parameter **<n>** in the format

```
+CCWA: <n>
```



AT+CCWA=?

Test command reports the supported values for the parameter **<n>**.

3.2.13. AT+CHLD - Call Holding Services

The command controls the network call hold service.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CHLD=[<n>]




Set command controls the network call hold service. With this service it is e.g. possible to disconnect temporarily a call and keep it suspended while it is retained by the network, or make a multiparty connection.

Parameter:

Name	Type	Default	Description
<n>	integer	N/A	the parameter is used to release, activate or add an held call

Values:

- 0 : releases all held calls, or sets the UDUB (User Determined User Busy) indication for a waiting call.
- 1 : releases all active calls (if any exist), and accepts the other (held or waiting) call
- 1X : releases a specific active call X
- 2 : places all active calls (if any exist) on hold and accepts the other (held or waiting) call.
- 2X : places all active calls on hold except call X with which communication shall be supported
- 3 : adds an held call to the conversation
- 4 : connects the two calls and disconnects the subscriber from both calls (Explicit Call Transfer (ECT))

-  "X" is the numbering (starting with 1) of the call given by the sequence of setting up or receiving the calls (active, held or waiting) as seen by the served subscriber. Calls hold their number until they are released. New calls take the lowest available number.
-  Where both a held and a waiting call exist, the above procedures apply to the waiting call (i.e. not to the held call) in conflicting situation.
-  The command is only applicable to voice calls.



AT+CHLD=?

Test command returns the list of supported values of parameter <n>.

3.2.14. AT+CTFR - Call Deflection

This command is used to request a service that causes an incoming alerting call to be forwarded to a specified number.



3GPP TS 22.072

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CTFR=<number>[,<type>]

Set command is used to request a service that causes an incoming alerting call to be forwarded to a specified number. This is based on the GSM/UMTS supplementary service CD (Call Deflection, refer 3GPP TS 22.072).

Parameters:

Name	Type	Default	Description
<number>	string	-	string type phone number of format specified by <type>
<type>	integer	145	type of address octet in integer format

Values:

- 145 : default value when dialing string includes international access code character "+"
- 129 : default value when dialing string doesn't include international access code character "+"



Call Deflection is only applicable to an incoming voice call



AT+CTFR=?

Test command tests for command existence

3.2.15. AT+CUSD - Unstructured Supplementary Service Data

Set command allows control of the Unstructured Supplementary Service Data (USSD 3GPP TS 22.090).



3GPP TS 27.007
3GPP TS 22.090
3GPP TS 23.038

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CUSD=[<n>[,<str>[,<dc>]]]

The unsolicited result code enabled by parameter <n> is in the format:

+CUSD: <m>[,<str>,<dc>]

Parameters:

Name	Type	Default	Description
<n>	integer	0	disable/enable the presentation of an unsolicited result code
Values:			
0	:	disable the result code presentation	
1	:	enable the result code presentation	
2	:	cancel an ongoing USSD session (not applicable to read command response)	
<str>	string	-	USSD-string (when <str> parameter is not given, network is not interrogated)
<ul style="list-style-type: none"> If <dc> indicates that GSM338 default alphabet is used ME/TA converts GSM alphabet into current TE character set (see +CSCS). If <dc> indicates that 8-bit data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number; e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65). 			
<dc>	integer	-	3GPP TS 23.038 Cell Broadcast Data Coding Scheme in integer format (default is 0).

Unsolicited field:

Name	Type	Description
<m>	integer	Status service value
Values:		
0	:	no further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation)

-
- | | | |
|---|---|---|
| 1 | : | further user action required (network initiated USSD-Request, or further information needed after mobile initiated operation) |
| 2 | : | USSD terminated by the network |
| 3 | : | other local client has responded |
| 4 | : | operation not supported |
| 5 | : | network time out |
-

**AT+CUSD?**

Read command reports the current value of the parameter <n>

**AT+CUSD=?**

Test command reports the supported values for the parameter <n>

3.2.16. AT+CAOC - Advice of Charge

This command allows the user to get information about the cost of calls and to enable an unsolicited event reporting of the Current Call Meter (CCM) information.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CAOC=<mode>

Set command refers to the Advice of Charge supplementary services that enable subscriber to get information about the cost of calls; the command also includes the possibility to enable an unsolicited event reporting of the Current Call Meter (CCM) information.

Parameter:

Name	Type	Default	Description
<mode>	integer	N/A	mode of presentation of CCM information

Values:

- 0 : query CCM value
- 1 : disables unsolicited CCM reporting
- 2 : enables unsolicited CCM reporting

Additional info:

- ▶▶ If **AT+CAOC=0** is issued, the current CCM value is shown in the format:

+CAOC: <ccm>

where:

<ccm> - current call meter in home units, string type: three bytes of the CCM value in hexadecimal format (e.g. "00001E" indicates decimal value 30)

Unsolicited field:

Name	Type	Description
<ccm>	hex	The unsolicited result code enabled by parameter <mode> is in the format: +CCCM: <ccm> where: <ccm> - current call meter in home units, string type: three bytes of the CCM value in hexadecimal format (e.g. "00001E" indicates decimal value 30)



The unsolicited result code **+CCCM** is sent when the CCM value changes, but not more than every 10 seconds.

**AT+CAOC?**

Read command reports the value of parameter <mode> in the format:
+CAOC: <mode>

**AT+CAOC=?**

Test command reports the supported values for <mode> parameter.



+CAOC command returns an estimate of the cost of the current call only, produced by the MS and based on the information provided by either AoCI or AOCC supplementary services; it is not stored in the SIM.

3.2.17. AT+CLCC - List Current Calls

This command returns the list of current calls and their characteristics



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CLCC

Execution command returns the list of current calls and their characteristics in the format:

```
[+CLCC:<id1>,<dir>,<stat>,<mode>,<mpy>,<number>,<type>,<alpha>[<CR><LF>
+CLCC:<id2>,<dir>,<stat>,<mode>,<mpy>,<number>,<type>,<alpha>[...]]]
```

The parameters are described in the Additional info section.

Additional info:

- ▶▶ List of the parameters meaning.

Name	Type	Default	Description
<idn>	integer	-	call identification number
<dir>	integer	N/A	call direction
Values:			
	0	:	mobile originated call
	1	:	mobile terminated call
<stat>	integer	N/A	state of the call
Values:			
	0	:	active
	1	:	held
	2	:	dialing (MO call)
	3	:	alerting (MO call)
	4	:	incoming (MT call)
	5	:	waiting (MT call)
<mode>	integer	N/A	call type
Values:			
	0	:	voice
	1	:	data
	9	:	unknown
<mpy>	integer	N/A	multiparty call flag

Values:


- 0 : call is not one of multiparty (conference) call parties
- 1 : call is one of multiparty (conference) call parties

<number>	string	-	phone number in format specified by <type>
<type>	integer	N/A	type of phone number octet in integer format

Values:

- 129 : national numbering scheme
- 145 : international numbering scheme (contains the character "+")

<alpha>	string	-	alphanumeric representation of <number> corresponding to the entry found in phonebook; used character set should be the one selected with +CSCS
----------------------	--------	---	---

-  If no call is active then only **OK** message is sent. This command is useful in conjunction with command **+CHLD** to know the various call status for call holding



AT+CLCC=?

Test command returns **OK** result code

3.2.18. AT+CSSN - SS Notification

The command refers to supplementary service related network initiated notifications.



- 3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CSSN=[<n>[,<m>]]

Set command enables/disables the presentation of notification result codes from **TA** to **TE**.

Parameters:

Name	Type	Default	Description
<n>	integer	0	Set +CSSI result code presentation status When <n>=1 and a supplementary service notification is received after a mobile originated call setup, an unsolicited code is sent to TE before any other MO call setup result codes +CSSI: <code1>

Values:

- 0 : disable
- 1 : enable

<m>	integer	0	Sets the +CSSU result code presentation status When <m>=1 and a supplementary service notification is received during a mobile terminated call setup or during a call, an unsolicited result code is sent to TE +CSSU: <code2>
-----	---------	---	---

Values:

- 0 : disable
- 1 : enable

Unsolicited fields:

Name	Type	Description
<code1>	integer	+CSSI supplementary service notification.
		Values:
		0 : unconditional call forwarding is active
		1 : some of the conditional call forwardings are active
		2 : call has been forwarded
		3 : call is waiting
		5 : outgoing calls are barred
		6 : incoming calls are barred
<code2>	integer	+CSSU supplementary service notification.

Values:

- 0 : this is a forwarded call (MT call setup)
 - 2 : call has been put on hold (during a voice call)
 - 3 : call has been retrieved (during a voice call)
-

**AT+CSSN?**

Read command reports the current value of the parameters.

**AT+CSSN=?**

Test command reports the supported range of values for parameters <n>, <m>.

3.2.19. AT+CCUG - Closed User Group

This command allows control of the Closed User Group supplementary service.



3GPP TS 27.007
3GPP TS 22.085

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CCUG=[<n>[,<index>[,<info>]]]

Set command enables the served subscriber to select a CUG index, to suppress the Outgoing Access (OA), and to suppress the preferential CUG.

Parameters:

Name	Type	Default	Description
<n>	integer	0	enables/disables the CUG temporary mode
Values:			
0	:	disable CUG temporary mode	
1	:	enable CUG temporary mode	
<index>	integer	10	Closed Used Group index
Values:			
0-9	:	CUG index	
10	:	no index (preferred CUG taken from subscriber data)	
<info>	integer	0	information added to the CUG
Values:			
0	:	no information	
1	:	suppress Outgoing Access (OA)	
2	:	suppress preferential CUG	
3	:	suppress OA and preferential CUG	



AT+CCUG?

Read command reports the current value of the parameters in the format

+CCUG: <n>,<index>,<info>



AT+CCUG=?

Test command returns the **OK** result code

3.2.20. AT+CPOL - Preferred Operator List

The command is used to edit or update the SIM preferred list of networks. The list is read in the SIM file selected by the command **+CPLS**.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CPOL=[<index>] [,<format>[,<oper>[,<GSM_Act>,<GSM_Compact_Act>,<UTRAN_Act>,<E_UTRAN_ActN>]]]




Execution command writes an entry in the SIM list of preferred operators.

Parameters:

Name	Type	Default	Description
<index>	integer	N/A	the order number of operator in the SIM preferred operator list.
Value:			
1÷n : order number in the list			
<format>	integer	2	format for <oper> parameter.
Value:			
2 : numeric. Only 2 is allowed up to now			
<oper>	string	-	Operator Identifier.
<GSM_Act>	integer	N/A	GSM access technology. It is not supported, the parameter must be set to 0.
Values:			
0 : access technology not selected			
1 : access technology selected			
<GSM_Compact_Act>	integer	N/A	GSM compact access technology. It is not supported, the parameter must be set to 0.
Values:			
0 : access technology not selected			
1 : access technology selected			
<UTRAN_Act>	integer	N/A	UTRAN access technology. It is not supported, the parameter must be set to 0.
Values:			
0 : access technology not selected			
1 : access technology selected			
<E_UTRAN_ActN>	integer	0	E-UTRAN access technology. It is the only access technology supported.

Values:

0 : access technology not selected
1 : access technology selected

-  If **<index>** is used, and **<oper>** is not entered, the entry is deleted from the list of preferred operators.
 -  If **<oper>** is used, and **<index>** is not used, **<oper>** is put in the next free location.
 -  If only **<format>** is entered, the format of the **<oper>** in the read command is changed.
-



AT+CPOL?

Read command returns all used entries from the SIM list of preferred operators.



AT+CPOL=?

Test command returns the **<index>** range supported by the SIM and the range for the **<format>** parameter.

3.2.21. AT+CPLS - Selection of Preferred PLMN List

The command is used to select a list of preferred PLMNs in the SIM/USIM card.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CPLS=<list>

The set command is used to select a list of preferred PLMNs in the SIM/USIM card.

Parameter:

Name	Type	Default	Description
<list>	integer	0	PLMNs list selector

Values:

- 0 : User controlled PLMN selector with Access Technology EFPLMNwAcT, if not found in the SIM/UICC then PLMN preferred list EFPLMNsel (this file is only available in SIM card or GSM application selected in UICC)
- 1 : Operator controlled PLMN selector with Access Technology EFOPLMNwAcT
- 2 : HPLMN selector with Access Technology EFHPLMNwAcT



The value set by command is directly stored in NVM and doesn't depend on the specific CMUX instance.



AT+CPLS?

Read command returns the selected PLMN selector <list> from the SIM/USIM.



AT+CPLS=?

Test command returns the whole index range supported <list>s by the SIM/USIM.

3.2.22. AT+CSQ - Signal Quality

Execution command reports the signal quality indicators according to the network (2G, 3G, 4G) on which the module is registered. See Additional info section.



- [1] 3GPP TS 27.007
- [2] 3GPP TS 07.07
- [3] 3GPP TS 25.133

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CSQ

Additional info:

▶▶ [2G Networks](#)

The command returns the Received Signal Strength Indicator and the Bit Error Rate. RSSI is the average of the received signal level measurement samples in dBm, taken on a channel within the reporting period of length one SACCH multi frame. RSSI and BER are measured and respectively mapped to **<rssi>** and **<ber>** parameters.
+CSQ: <rssi>,<ber>

Name	Type	Default	Description
<rssi>	integer	N/A	rssi parameter is mapped to the Received Signal Strength Indication measure, expressed in dBm, as shown below
Values:			
0	:	-113 (or less) dBm	
1	:	-111 dBm	
2-30	:	-109 ... -53 ; 2 dBm per step	
31	:	-51 (or greater) dBm	
99	:	not known or not detectable	
<ber>	integer	N/A	ber parameter is mapped to channel Bit Error Rate measure as shown below
Values:			
0	:	less than 0.2%	
1	:	0.2% to 0.4%	
2	:	0.4% to 0.8%	
3	:	0.8% to 1.6%	
4	:	1.6% to 3.2%	
5	:	3.2% to 6.4%	
6	:	6.4% to 12.8%	

7 : more than 12.8%
99 : not known or not detectable

►► 3G Networks

The command returns the Received Signal Code Power and the ratio of the Energy per Chip in CPICH channel to the total received power density.

RSCP and Ec/Io are measured and respectively mapped to **<rscp>** and **<Ec/Io>** levels according to the specification [3].

+CSQ: <rscp>,<Ec/Io>

Name	Type	Default	Description
<rscp>	integer	N/A	<rscp> parameter is mapped to RSCP measure. The command displays the <rscp> level according to standard [1]. Refer to the table shown in the Additional info section.
Values:			
0	:	-115 (or less) ÷ -112 dBm	
1÷31	:	-111 ÷ -51 dBm	
31	:	-50 ÷ -25 (or grater) dBm	
99	:	not known or not detectable	
<Ec/Io>	integer	N/A	Ec/Io parameter is mapped to the ratio of the Energy per Chip in CPICH channel to the total received power density as shown below.
Values:			
8	:	-24 (or less) dB	
7	:	-23,5 ... -21 dB	
6	:	-20,5 ... -18 dB	
5	:	-17,5 ... -15 dB	
4	:	-14,5 ... -12 dB	
3	:	-11,5 ... -9 dB	
2	:	-8,5 ... -6 dB	
0	:	-5,5 ... 0 dB	

►► 4G Networks

The command returns received signal quality indicators in the form:

+CSQ: <RSSI>,<RSRQ>

Name	Type	Default	Description
<RSSI>	integer	0	Received Signal Strength Indication

Values:

0 : -113 (or less) dBm
 1 : -111 dBm
 2÷30 : -109 ... -53 dBm
 31 : -51 (or greater) dBm

<RSRQ> integer 0 Reference Signal Received Quality. RSRQ values are mapped to range: 0-7

Values:

0 : -4 ... -3 dB
 1 : -6 ... -5 dB
 2 : -8 ... -7 dB
 3 : -10 ... -9 dB
 4 : -13 ... -11 dB
 5 : -15 ... -14 dB
 6 : -17 ... -16 dB
 7 : -19 ... -18 dB
 99 : not known or not detectable

►► 3G Networks

<rscp> parameter is mapped to RSCP measure, expressed in dBm, as shown in the table. The command displays the **<rscp>** level according to standard [1].

RSCP measure in dBm	Level_A according to standard [3]	Level_B according to standard [1]
-115 (or less) ÷ -112	0 ÷ 3	0
-111 ÷ -51	4 ÷ 64	(Level_A / 2) - 1
- 50 ÷ -25 (or greater)	65 ÷ 90	31
not known or not detectable	99	99



AT+CSQ=?

Test command returns the supported range of parameters values according to the network (2G, 3G, 4G) on which the module is registered.

Although **+CSQ** is an execution command without parameters, specification [2] requires the Test command to be defined.

3.2.23. AT#MONIZIP - Compressed Cell Monitor

This command is both a set and an execution command.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#MONIZIP=[<number>]

#MONIZIP set command sets one cell out of seven which are contained in the neighbor list of the serving cell. The serving cell is one of the seven. It operates like **#MONI** set command.

From the selected cell, the execution command - **AT#MONIZIP<CR>** - extracts the network information. It operates like **#MONI** execution command.

The output formats returned by the **#MONIZIP** execution command are as the output formats returned by the **#MONI** execution command, but the parameters names are not displayed, are displayed only their values separated by a comma.

Parameter:

Name	Type	Default	Description
<number>	integer	-	the parameter meaning depends on the network, see Additional info section.

Additional info:

▶▶ GSM network

Name	Type	Default	Description
<number>	integer	0	GSM network

Values:

- 0÷6 : it is the ordinal number of the cell, in the neighbor list of the serving cell.
- 7 : it is a special request to obtain GSM-related information from the whole set of seven cells in the neighbor list of the serving cell

▶▶ UMTS network

Name	Type	Default	Description
<number>	string	0	UMTS network

Values:

- 0 : it is the serving cell in idle; Active set cells are also reported in CELL_DCH state, i.e. during a call (default)
- 1 : it is the candidate set (cells that belong to the Active set, only reported in CELL_DCH state, i.e. during a call)
- 2 : it is the synchronized neighbor set (cells that belong to the Virtual Active set, only reported in CELL_DCH state, i.e. during a call)

- 3 : it is the asynchronized neighbor set (cells which are not suitable cells to camp on)
- 4 : it is the ranked neighbor set (cells which are suitable cells to camp on)
- 5,6 : it is not available
- 7 : it is a special request to obtain information from the whole set of detected cells in the neighbor list of the serving cell.

►► LTE network

Name	Type	Default	Description
<number>	integer	0	LTE network

Values:

- 0 : it is the serving cell
- 1 : it is the intra-frequency cells
- 2 : it is the inter-frequency cells
- 3 : it is the W-CDMA neighbor cells, the report message is empty.
- 4 : it is the GSM neighbor cells
- 5,6 : it is not available
- 7 : it is a special request to obtain LTE-related information from the all available neighbor cells.

- If the last setting is done with **#MONIZIP** not equal to 7, the next execution command returns one of the following output formats according to the current network.

a) When extracting data for the serving cell the format is:

GSM network

#MONIZIP: <cc><nc>,<bsic>,<qual>,<lac>,<id>,<arfcn>,<dBm>,<timadv>

UMTS network

#MONIZIP: <cc><nc>,<psc>,<rscp>,<lac>,<id>,<ecio>,<uarfcn>,<dBm>,<drx>,<scr>

LTE network

#MONIZIP: <netname>,<rsrp>,<rsrq>,<tac>,<id>,<earfcn>,<dBm>,<drx>,<physicalCellId>,<QRxLevMin>

b) When extracting data for an adjacent cell (or active set call), the format is:

GSM network

#MONIZIP: <lac>,<id>,<arfcn>,<dBm>

UMTS network

#MONIZIP: <psc>,<rscp>,<ecio>,<uarfcn>,<scr>

LTE network

LTE intra-frequency and inter-frequency cells

#MONIZIP: <rsrp>,<rsrq>,<id>,<earfcn>,<dBm>,<physicalCellId>,<QRxLevMin>

LTE WCDMA neighbor cells

#MONIZIP: <psc>,<rscp>,<ecio>,<uarfcn>,<scr>

LTE GSM neighbor cells

#MONIZIP: <n>,<bsic>,<arfcn>,<dBm>

Name	Type	Default	Description
<netname>	string	-	name of network operator
<cc>	string	-	country code
<nc>	string	-	network operator code
<n>	integer	-	progressive number of adjacent cell
<bsic>	string	-	base station identification code
<qual>	integer	-	quality of reception: 0..7
<lac>	string	-	localization area code
<id>	integer	-	cell identifier
<arfcn>	integer	-	assigned radio channel
<dBm>	integer	-	received signal strength in dBm.
<timadv>	integer	-	timing advance
<psc>	integer	-	primary scrambling code
<rscp>	integer	-	Received Signal Code Power in dBm.
<ecio>	integer	-	chip energy per total wideband power in dBm; for serving cell this is not available during a call, and is displayed as 255.
<uarfcn>	integer	-	UMTS assigned radio channel
<drx>	string	-	Discontinuous reception cycle length
<scr>	integer	-	scrambling code
<physicalCellId>	integer	-	physical cell identifier
<rsrp>	integer	-	Reference Signal Received Power
<rsrq>	integer	-	Reference Signal Received Quality
<tac>	integer	-	Tracking Area Code
<earfcn>	integer	-	E-UTRA Assigned Radio Channel
<QRxLevMin>	integer	-	minimum required RX level in the cell

- If the last setting is done with **#MONIZIP=7**, the next execution command returns a table-like formatted output:

GSM network

First row reports a complete set of GSM-related information for the serving cell:

#MONIZIP: <bsic>,<lac>,<id>,<arfcn>,<dBm>,<C1value>,<C2value>,<timadv>,<qual>,<cc>,<nc><CR><LF>

2nd to 7th rows report a reduced set of GSM-related information for the cells in the neighbors:

#MONIZIP: <bsic>,<lac>,<id>,<arfcn>,<dBm>,<C1value>,<C2value>[<CR><LF>]

where:

<C1value> is C1 reselection parameter

<C2value> is C2 reselection parameter





UMTS network

First row reports a set of information for the serving cell:

#MONIZIP: <netname>,<psc>,<rscp>,<lac>,<id>,<ecio>,<uarfcn>,<dBm>,<drx>,<scr>

The other rows report a set of information for all detected neighbor cells:

#MONIZIP: <psc>,<rscp>,<ecio>,<uarfcn>,<scr>

-  The refresh time of the measures is preset to 3 sec.
-  The timing advance value is meaningful only during calls or GPRS transfers active.
-  The serving cell is the current serving cell or the last available serving cell, if the module loses coverage.
-  <timadv> is reported only for the serving cell.



AT#MONIZIP=?

Test command reports the maximum number of cells, in a neighbor list of the serving cell excluding it, from which we can extract GSM/UMTS related information, along with the ordinal number of the current selected cell, in the format:

#MONIZIP: <MaxCellNo>,<CellSet>

Additional info:

- ▶▶ Parameters meaning.

Name	Type	Default	Description
<MaxCellNo>	integer	-	maximum number of cells in a neighbor of the serving cell and excluding it from which we can extract GSM related information. This value is always 6.
<CellSet>	integer	-	last setting done with command #MONIZIP.

3.2.24. AT#SERVINFO - Serving Cell Information

This command reports information about the serving cell.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SERVINFO

Execution command reports information about serving cell, in the format:

GSM network

#SERVINFO:<bARFCN>,<dBm>,<NetNameAsc>,<NetCode>,<BSIC>,<LAC>,<TA>,<GPRS>[,<pbARFCN>],[<NOM>],<RAC>,[<PAT>]]

UMTS network

#SERVINFO:<uARFCN>,<dBm>,<NetNameAsc>,<NetCode>,<PSC>,<LAC>,<DRX>,<SD>,<RSCP>,<NOM>,<RAC>

LTE network

#SERVINFO:<earfcn>,<dBm>,[<NetNameAsc>],<NetCode>,<PhysicalCellId>,<tac>,<DRX>,<SD>,<rsrp>

The parameters are described in the Additional info sections.

Additional info:

- ▶▶ Information available in GSM, UMTS and LTE networks.

Name	Type	Default	Description
<dBm>	integer	-	received signal strength in dBm.
<NetNameAsc>	string	-	operator name
<NetCode>	string	-	string representing the network operator in numeric format: 5 or 6 digits [country code (3) + network code (2 or 3)].

- ▶▶ Information available in GSM and UMTS networks

Name	Type	Default	Description
<LAC>	integer	-	Localization Area code

- ▶▶ Information available when in the cell is present the GPRS or in UMTS network.

Name	Type	Default	Description
<NOM>	string	N/A	Network Operator Mode. During a call, a SMS sending/receiving or a location update the <NOM> value has no meaning.

Values:

- I : Network Mode I
- II : Network Mode II
- III : Network Mode III

<RAC> integer - Routing Area Color Code.
During a call, a SMS sending/receiving or a location update the **<RAC>** value has no meaning.

►► Information available in UMTS network.

Name	Type	Default	Description
<uARFCN>	integer	-	UMTS ARFCN of the serving cell.
<PSC>	integer	-	Primary Synchronization Code.
<RSCP>	integer	-	Received Signal Code Power in dBm.

►► Information available in UMTS and LTE networks.

Name	Type	Default	Description
<DRX>	integer	-	Discontinuous reception cycle length.
<SD>	integer	N/A	Service Domain

Values:

- 0 : No Service
- 1 : CS only
- 2 : PS only
- 3 : CS & PS

►► Information available in GSM network.

Name	Type	Default	Description
<bARFCN>	string	-	BCCH ARFCN of the serving cell.
<BSIC>	integer	-	Base Station Identification Code
<TA>	integer	-	Time Advance.
<GPRS>	integer	N/A	GPRS availability in the cell. During a call, a SMS sending/receiving or a local update the <GPRS> value has no meaning.

Values:

- 0 : not supported
- 1 : supported

<pbARFCN> integer - GPRS must be present in the cell, **<GPRS>= 1**.

- if PBCCH is supported by the cell

			<ul style="list-style-type: none"> • if its content is the PBCCH ARFCN of the serving cell, then <pbARFCN> is available • else the label "hopping" will be printed <p>- else <pbARFCN> is not available</p> <p>During a call, a SMS sending/receiving or a location update the <pbARFCN> value has no meaning.</p>
<PAT>	integer	N/A	<p>Priority Access Threshold. GPRS must be present in the cell, <GPRS>= 1.</p> <p>During a call, a SMS sending/receiving or a location update the <PAT> value has no meaning.</p> <p>Values:</p> <p>0 : Priority Access Threshold</p> <p>3÷6 : Priority Access Threshold</p>

►► Information available in LTE network.

Name	Type	Default	Description
<earfcn>	integer	-	E-UTRA Assigned Radio Channel
<PhysicalCellId>	integer	-	physical cell identifier
<tac>	integer	-	Tracking Area Code
<rsrp>	integer	-	Reference Signal Received Power



AT#SERVINFO=?

Test command tests for command existence.

3.2.25. AT#NWEN - Network Emergency Number Update

This command enables the unsolicited result code of emergency number update.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT#NWEN=[<en>]

Set command enables/disables the URC for emergency number update. The URC format is:

#NWEN: <type>

The parameter is described in the Unsolicited field section.

Parameter:

Name	Type	Default	Description
<en>	integer	0	enables/disables unsolicited indication of emergency number update

Values:


- 0 : disable
- 1 : enable

Unsolicited field:

Name	Type	Description
<type>	integer	unsolicited indication of emergency number update

Values:

- 1 : number list update from internal ME
- 2 : number list update from SIM
- 3 : number list update from network

 Entering **AT#NWEN=** returns **OK** but has no effect.



AT#NWEN?

Read command reports whether the unsolicited indication of network emergency number update is currently enabled or not, in the format:

#NWEN: <en>



AT#NWEN=?

Test command reports the range for the parameter <en>

3.2.26. AT#PLMNUPDATE - Update PLMN List

This set command adds a new entry or updates one already presents in the module PLMN list.



SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#PLMNUPDATE[<action>,<MCC>,<MNC>[,<PLMNname>]]

Parameters:

Name	Type	Default	Description
<action>	integer	0	remove/update PLMN list items
Values:			
0	:		remove the entry with selected <MCC> and <MNC>. Parameter <PLMNname> is ignored
1	:		update the entry with selected <MCC> and <MNC> if it is already present, otherwise add it
2	:		remove all entries. Parameters <MCC> and <MNC> are not used in this case
<MCC>	string	-	Mobile Country Code. String value, length 3 digits.
<MNC>	string	-	Mobile Network Code. String value, min length 2 digits, max length 3 digits.
<PLMNname>	string	-	name of the PLMN; string value, max length 30 characters.

-  This command supports up to 30 entries.
-  Entries added or updated with **#PLMNUPDATE** command are effective only if **#PLMNMODE** is set to 2.



AT#PLMNUPDATE?

Read command returns the list of entries added or updated with set command, in the format:

```
#PLMNUPDATE: <MCC>,<MNC>,<PLMNname>
#PLMNUPDATE: <MCC>,<MNC>,<PLMNname>
...
OK
```

The entries are listed in increasing order by MCC and MNC.



AT#PLMNUPDATE=?

Test command returns the range of <action> parameter and the maximum length of <MCC>, <MNC> and <PLMNname> parameters.

3.2.27. AT#PLMNMODE - PLMN List Selection

This set command selects the list of PLMN names to be used currently.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#PLMNMODE=<mode>

Parameter:

Name	Type	Default	Description
<mode>	integer	1	list of PLMN names selection mode

Values:

- 1 : disables PLMN list updates set with #PLMNUPDATE command
- 2 : enables PLMN list updates set with #PLMNUPDATE command



AT#PLMNMODE?

Read command reports whether the currently used list of PLMN names is fixed or not, in the format:
#PLMNMODE: <mode>



AT#PLMNMODE=?

Test command returns the supported range of values for parameter <mode>.

3.2.28. AT#FPLMN - Periodical FPLMN Cleaning

Periodically delete the Forbidden PLMN list stored inside the SIM card, clear it or list it.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#FPLMN=<action>[,<period>]

The set command is used to manage the Forbidden PLMN List file (FPLMN) stored in the SIM card.

Parameters:

Name	Type	Default	Description
<action>	integer	0	kind of action for FPLMN file
Values:			
0	:	disable periodic FPLMN cleaning	
1	:	enable periodic FPLMN cleaning with period <period>	
2	:	clear FPLMN file contents (one shot)	
3	:	list contents of FPLMN file	
<period>	integer	60	interval in minutes for FPLMN clearing
Value:			
1÷60	:	interval in minutes	



AT#FPLMN?

Read command reports whether the periodic deletion is currently enabled or not, and the deletion period, in the format:

#FPLMN: <action>,<period>



AT#FPLMN=?

Test command reports available values for parameters <action> and <period>

3.2.29. AT#CODEC - GSM and UMTS Audio Codec

GSM and UMTS audio codec mode settings



3GPP TS 24.008

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#CODEC=[<codec>]

Set command sets the GSM and UMTS audio codec mode.

Parameter:

Name	Type	Default	Description
<codec>	integer	-	<p>0 = all the codec modes are enabled</p> <p>1-255: sum of integers each representing a specific codec mode as follows</p> <ul style="list-style-type: none"> • 1 = FR, full rate mode enabled • 2 = EFR, enhanced full rate mode enabled • 4 = HR, half rate mode enabled • 8 = AMR-FR, AMR full rate mode enabled • 16 = AMR-HR, AMR half rate mode enabled • 32 = FAWB, full rate AMR wide band • 64 = UAMR2, UMTS AMR version 2 • 128 = UAWB, UMTS AMR wide band

Refer to additional info section for range and default value of <codec> parameter.

Additional info:

- The range and the default value of <codec> parameter depends on the product as shown in the following table.

Products	<codec> range	<codec> default value
NA products that support 4G/3G	0 ÷ 192	65
All other	0 ÷ 255	0

- i** Full rate mode is added by default to any setting in the SETUP message (as specified in 3GPP TS 24.008), but the call drops if the network assigned codec mode has not been selected by the user.
- i** **AT#CODEC=4** and **AT#CODEC=16** are not recommended; better using **AT#CODEC=5** and **AT#CODEC=24** respectively



Products	note
NA products that support 4G/3G	<codec>=0 equivalent to <codec>=192

All other	<codec>=0 equivalent to <codec>=255
-----------	-------------------------------------

**AT#CODEC?**

Read command returns current audio codec mode in the format:

#CODEC: <codec>

**AT#CODEC=?**

Test command returns the range of available values for parameter <codec>. The range of available values depends on product variant.



Refer to #STGI example for bit meaning



- **AT#CODEC=14**
OK

sets the codec modes HR (4), EFR (2) and AMR-FR (8)

3.2.30. AT#BND - Select Band

This set command selects the current GSM, UMTS and LTE bands.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#BND=<band>[,<UMTSband>[,<LTEband>]]

Parameters:

Name	Type	Default	Description
------	------	---------	-------------

<band> integer 0 GSM band selection.

Values:

- 0 : GSM 900MHz + DCS 1800MHz
- 1 : GSM 900MHz + PCS 1900MHz; this value is not available if the ENS functionality has been activated (see #ENS)
- 2 : GSM 850MHz + DCS 1800MHz (available only on quadri-band modules); this value is not available if the ENS functionality has been activated (see #ENS)
- 3 : GSM 850MHz + PCS 1900MHz (available only on quadri-band modules)

<UMTSband> integer N/A this parameter is used for backward compatibility.

Values:

- 0 : 1900 / 2100MHz (FDD I)
- 1 : 1900MHz (FDD II) (default value depending on product)
- 2 : 850MHz (FDD V)
- 3 : 2100MHz (FDD I) + 1900MHz (FDD II) + 850MHz (FDD V)
- 4 : 1900MHz (FDD II) + 850MHz (FDD V)
- 5 : 900MHz (FDD VIII) (default value, depending on the product)
- 6 : 2100MHz (FDD I) + 900MHz (FDD VIII)
- 7 : 1700/ 2100MHz (FDD IV, AWS)

<LTEband> integer N/A indicates the LTE supported bands expressed as the sum of Band number (1+2+8 ...) calculated as shown in the table (mask of 32 bits):

Band number	Band i
1	B1
2	B2
4	B3
8	B4
...	...
(2 ^{exp(i-1)})	Bi
...	...
2147483648	B32

Value:

1÷4294967295 : range of the sum of Band number (1+2+8 ...)

i If the automatic band selection is enabled (**AT#AUTOBND=2**) then you can issue **AT#BND=<band>,<UMTSband>,<LTEband>** but it will have no functional effect; nevertheless every following read command **AT#BND?** will report that setting.

i Not all products support all the values of parameter:

- **<band>**
- **<UMTSband>**
- **<LTEband>**

Refer to test command to find the supported range of values (maximum value is the sum representation of supported bands).

- i**
- 4G only products use fixed unused value 0 for **<band>** and **<UMTSband>** parameters.
 - 4G/3G only products use fixed unused value 0 for **<band>** parameter.
 - 4G/2G only products use fixed unused value 0 for **<UMTSband>** parameter.



AT#BND?

Read command returns the current selected bands in the format:

#BND: <band>,<UMTSband>,<LTEband>



AT#BND=?

Test command returns the supported range of values of parameters **<band>**, **<UMTSband>** and **<LTEband>**.



```
Test command
AT#BND=?
#BND: (0-5),(0),(4-524420)
OK
```

```
Read command
AT#BND?
#BND: 5,0,524420
OK
```

Read command shows that the supported LTE bands are: B3, B8, and B20

3.2.31. AT#AUTOBND - Automatic Band Selection

This set command enables/disables the automatic band selection at power-on.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#AUTOBND=[<value>]

Parameter:

Name	Type	Default	Description
<value>	integer	2	enables/disables the automatic band selection

Values:

- 0 : disables automatic band selection at the next power-up
- 1 : value not supported
- 2 : enables automatic band selection in all supported bands at next power-up

i Assume that **#AUTOBND=0** and **#ENS=0**, now enter **AT#ENS=1**. Only at the next first power up, the following action will happen:

- Automatic Band Selection is enabled (**AT#AUTOBND=2**)



AT#AUTOBND?

Read command returns the current value of the parameter <value> in the format:

#AUTOBND: <value>



AT#AUTOBND=?

Test command returns the supported values for parameter <value>.

3.2.32. AT#SNUM - Subscriber Number

This set command writes the MSISDN information related to the subscriber (own number) in the EFmsisdn SIM file.



3GPP TS 51.011

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SNUM=<index>[,<number>[,<alpha>]]

Parameters:

Name	Type	Default	Description
<index>	integer	-	the number of the record in the EFmsisdn file in SIM where the number must be stored; its range goes from 1 to a maximum value that varies from SIM to SIM. If only <index> value is given, then the EFmsisdn record in location <index> is deleted.
<number>	string	-	string containing the phone number
<alpha>	string	-	alphanumeric string associated to <number> ; its maximum length varies from SIM to SIM. Default value is empty string (""), otherwise the used character set should be the one selected with +CSCS . The string could be written between quotes; the number of characters depends on the SIM. If empty string is given (""), the corresponding <alpha> will be an empty string.

- i** The command returns **ERROR** if EFmsisdn file is not present in the SIM, or if MSISDN service is not allocated and activated in the SIM Service Table, see 3GPP TS 51.011.



AT#SNUM=?

Test command returns the **OK** result code

3.2.33. AT#CODECINFO - Codec Information

This command returns information about the channels codecs.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CODECINFO[=<format>[,<mode>]]

This command is a set or an execution command. It enables/disables unsolicited channel codec information reports, or returns the channel codec info, in both case according to the specified format.

Set command format:

AT#CODECINFO=<format>,<mode>

Execution command format:

AT#CODECINFO

Parameters:

Name	Type	Default	Description
<format>	integer	0	select the return information format: numeric or textual
Values:			
0	:	numeric format, see info section	
1	:	textual format, see info section	
<mode>	integer	0	enable/disable unsolicited channels codecs information
Values:			
0	:	disable the URC of the channels codecs information, see info section	
1	:	enable the URC of the channels codecs information only if the codec changes, see info section	
2	:	enable the short URC of the channels codecs information only if the codec changes, see info section	

Additional info:

- ▶▶ **<mode>=1**, the URC of the channels codecs information is displayed according to the **<format>** parameter value:

if **<format>=0**, the URC is:

#CODECINFO: <codec_used>,<codec_set>

if **<format>=1**, the URC is:

#CODECINFO: <codec_used>,<codec_set1>[,<codec_set2>[.],[,codec_setn]]]

- ▶▶ **<mode>=2** the short URC of the channels codecs information is displayed as shown below:

#CODECINFO: <codec_used>

The **<codec_used>** format depends on the **<format>** parameter value.

- Execution command (**AT#CODECINFO<CR>**) returns immediately channels codecs information according to the previous setting of **<format>** parameter.

if **<format>=0**, the return message is:

#CODECINFO: <codec_used>,<codec_set>

if **<format>=1**, the return message is:

#CODECINFO: <codec_used>,<codec_set1>[,<codec_set2>[.],[codec_setn]]]

The parameters and their format is described in the Unsolicited code values section.

Unsolicited fields:

Name	Type	Description																																													
<codec_used>	string	<p><format>=0, <codec_used> is displayed in numeric format</p> <p>Values:</p> <table border="0"> <tr><td>0</td><td>:</td><td>no TCH</td></tr> <tr><td>1</td><td>:</td><td>full rate speech 1 on TCH</td></tr> <tr><td>2</td><td>:</td><td>full rate speech 2 on TCH</td></tr> <tr><td>4</td><td>:</td><td>half rate speech 1 on TCH</td></tr> <tr><td>8</td><td>:</td><td>full rate speech 3 – AMR on TCH</td></tr> <tr><td>16</td><td>:</td><td>half rate speech 3 – AMR on TCH</td></tr> <tr><td>128</td><td>:</td><td>full data 9.6</td></tr> <tr><td>129</td><td>:</td><td>full data 4.8</td></tr> <tr><td>130</td><td>:</td><td>full data 2.4</td></tr> <tr><td>131</td><td>:</td><td>half data 4.8</td></tr> <tr><td>132</td><td>:</td><td>half data 2.4</td></tr> <tr><td>133</td><td>:</td><td>full data 14.4</td></tr> <tr><td>134</td><td>:</td><td>full rate AMR wide band</td></tr> <tr><td>135</td><td>:</td><td>UMTS AMR version 2</td></tr> <tr><td>136</td><td>:</td><td>UMTS AMR wide band</td></tr> </table>	0	:	no TCH	1	:	full rate speech 1 on TCH	2	:	full rate speech 2 on TCH	4	:	half rate speech 1 on TCH	8	:	full rate speech 3 – AMR on TCH	16	:	half rate speech 3 – AMR on TCH	128	:	full data 9.6	129	:	full data 4.8	130	:	full data 2.4	131	:	half data 4.8	132	:	half data 2.4	133	:	full data 14.4	134	:	full rate AMR wide band	135	:	UMTS AMR version 2	136	:	UMTS AMR wide band
0	:	no TCH																																													
1	:	full rate speech 1 on TCH																																													
2	:	full rate speech 2 on TCH																																													
4	:	half rate speech 1 on TCH																																													
8	:	full rate speech 3 – AMR on TCH																																													
16	:	half rate speech 3 – AMR on TCH																																													
128	:	full data 9.6																																													
129	:	full data 4.8																																													
130	:	full data 2.4																																													
131	:	half data 4.8																																													
132	:	half data 2.4																																													
133	:	full data 14.4																																													
134	:	full rate AMR wide band																																													
135	:	UMTS AMR version 2																																													
136	:	UMTS AMR wide band																																													
<codec_set>	string	<p><format>=0, <codec_set> is displayed in numeric format. It is the sum of integers each representing a specific channel codec.</p> <p>channel codec:</p> <table border="0"> <tr><td>1</td><td>-</td><td>FR, full rate mode enabled</td></tr> <tr><td>2</td><td>-</td><td>EFR, enhanced full rate mode enabled</td></tr> <tr><td>4</td><td>-</td><td>HR, half rate mode enabled</td></tr> <tr><td>8</td><td>-</td><td>FAMR, AMR full rate mode enabled</td></tr> <tr><td>16</td><td>-</td><td>HAMR, AMR half rate mode enabled</td></tr> <tr><td>32</td><td>-</td><td>FR-AMR-WB, full rate AMR wide band</td></tr> <tr><td>64</td><td>-</td><td>UMTS-AMR-V2, UMTS AMR version 2</td></tr> <tr><td>128</td><td>-</td><td>UMTS-AMR-WB, UMTS AMR wide band</td></tr> </table> <p>Value:</p> <table border="0"> <tr><td>1..255</td><td>:</td><td>sum of integers each representing a specific channel codec</td></tr> </table>	1	-	FR, full rate mode enabled	2	-	EFR, enhanced full rate mode enabled	4	-	HR, half rate mode enabled	8	-	FAMR, AMR full rate mode enabled	16	-	HAMR, AMR half rate mode enabled	32	-	FR-AMR-WB, full rate AMR wide band	64	-	UMTS-AMR-V2, UMTS AMR version 2	128	-	UMTS-AMR-WB, UMTS AMR wide band	1..255	:	sum of integers each representing a specific channel codec																		
1	-	FR, full rate mode enabled																																													
2	-	EFR, enhanced full rate mode enabled																																													
4	-	HR, half rate mode enabled																																													
8	-	FAMR, AMR full rate mode enabled																																													
16	-	HAMR, AMR half rate mode enabled																																													
32	-	FR-AMR-WB, full rate AMR wide band																																													
64	-	UMTS-AMR-V2, UMTS AMR version 2																																													
128	-	UMTS-AMR-WB, UMTS AMR wide band																																													
1..255	:	sum of integers each representing a specific channel codec																																													

<codec_used> string **<format>=1**, **<codec_used>** is displayed in textual format



Values:

None	:	no TCH
FR	:	full rate speech 1 on TCH
EFR	:	full rate speech 2 on TCH
HR	:	half rate speech 1 on TCH
FAMR	:	full rate speech 3 – AMR on TCH
HAMR	:	half rate speech 3 – AMR on TCH
FD96	:	full data 9.6
FD48	:	full data 4.8
FD24	:	full data 2.4
HD48	:	half data 4.8
HD24	:	half data 2.4
FD144	:	full data 14.4
FAWB	:	full rate AMR wide band
UAMR2	:	UMTS AMR version 2
UAWB	:	UMTS AMR wide band

<codec_setn> string **<format>=1**, **<codec_setn>** are displayed in textual format

Values:

FR	:	full rate mode enabled
EFR	:	enhanced full rate mode enabled
HR	:	half rate mode enabled
FAMR	:	AMR full rate mode enabled
HAMR	:	AMR half rate mode enabled
FAWB	:	full rate AMR wide band
UAMR2	:	UMTS AMR version 2
UAWB	:	UMTS AMR wide band

-  The command refers to codec information in speech call, and to channel mode in data call.
-  If **AT#CODEC=0**, the reported channels codecs set, for **<format>=0**, is 255 (all codecs).



AT#CODECINFO?

Read command reports **<format>** and **<mode>** parameter values in the format:

#CODECINFO: <format>,<mode>

**AT#CODECINFO=?**

Test command returns the range of supported **<format>** and **<mode>** parameters values.

3.2.34. AT#CEERNET - Extended Numeric Error Report for Network Reject Cause

The command is related to extended numeric error report.



3GPP TS 24.008
3GPP TS 24.301

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#CEERNET

Execution command causes the TA to return a numeric code in the intermediate response format:

#CEERNET: <code>

which should offer the user of the TA a report for the last mobility management (MM/GMM/EMM) or session management (SM/ESM) procedure not accepted by the network.

Additional info:

- ▶▶ • The following error codes are valid for mobility management (MM/GMM) or session management (SM), i.e. for 2G and 3G networks.
- In 4G network the <code>s meanings are included in tables 9.9.4.4.1 (for ESM causes) and 9.9.3.9.1 (for EMM cause) of 3GPP TS 24.301 Release 9.


Name	Type	Default	Description
<code>	integer	N/A	error code

Values:

2	:	IMSI unknown in HLR
3	:	illegal MS
4	:	IMSI unknown in VISITOR LR
5	:	IMEI not accepted
6	:	illegal ME
7	:	GPRS not allowed
8	:	Operator determined barring (SM cause failure)/ GPRS and not GPRS not allowed (GMM cause failure)
9	:	MS identity cannot be derived by network
10	:	implicitly detached
11	:	PLMN not allowed
12	:	LA not allowed
13	:	roaming not allowed
14	:	GPRS not allowed in this PLMN

15	:	no suitable cells in LA
16	:	MSC TEMP not reachable
17	:	network failure
20	:	MAC failure
21	:	SYNCH failure
22	:	congestion
23	:	GSM authentication unacceptable
24	:	MBMS bearer capabilities insufficient for the service
25	:	LLC or SMDCP failure
26	:	insufficient resources
27	:	missing or unknown APN
28	:	unknown PDP address or PDP type
29	:	user authentication failed
30	:	activation rejected by GGSN
31	:	activation rejected unspecified
32	:	service option not supported
33	:	req. service option not subscribed
34	:	serv. option temporarily out of order
35	:	NSAPI already used
36	:	regular deactivation
37	:	QOS not accepted
38	:	call cannot be identified (MM cause failure) / SMN network failure (SM cause failure)
39	:	reactivation required
40	:	no PDP context activated (GMM cause failure) / feature not supported (SM cause failure)
41	:	semantic error in TFT operation
42	:	syntactical error in TFT operation
43	:	unknown PDP context
44	:	semantic err in PKT filter
45	:	syntactical err in PKT filter
46	:	PDP context without TFT activated
47	:	multicast group membership timeout
48	:	retry on new cell begin (if MM cause failure) / activation rejected BCM violation (if SM cause failure)
50	:	PDP type IPV4 only allowed
51	:	PDP type IPV6 only allowed
52	:	single address bearers only allowed
63	:	retry on new cell end
81	:	invalid transaction identifier

95	:	semantically incorrect message
96	:	invalid mandatory information
97	:	MSG type non-existent or not implemented
98	:	MSG type not compatible with protocol state
99	:	IE non-existent or not implemented
100	:	conditional IE error
101	:	MSG not compatible with protocol state
111	:	protocol error unspecified
112	:	APN restriction value incompatible with active PDP context

-  Telit recommends that the host controlling the modem defines the proper retry/reboot scheme for reject causes.

**AT#CEERNET=?**

Test command returns **OK** result code.

3.2.35. AT#CEERNETEXT - Extended Error Report for Network Reject Cause

This command is both a set and an execution command.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CEERNETEXT[=[<func>]]

Set command enables/disables the URC presentation or deletes the last network information. The execution command (**AT#CEERNETEXT<CR><LF>**) gets the last reject error information from the network and returns the following message:

#CEERNETEXT: <code>,<AcT>,<MCC>,<MNC>

If no error information is present, the execution command returns **OK**

When URC is enabled, it will occur every time a mobility management (MM/GMM/EMM) or session management (SM/ESM) procedure is not accepted by the network.

The URC message is equal to the message returned by the execution command.

Parameter:

Name	Type	Default	Description
<func>	integer	0	enable/disable the URC or delete the last network info

Values:

- 0 : disable the #CEERNETEXT URC
- 1 : enable the #CEERNETEXT URC
- 2 : delete last info of <code>, <AcT>, <MCC> and <MNC>

Unsolicited fields:

Name	Type	Description
<code>	integer	last numeric Network Reject Cause from network, see <code> in #CEERNET
<AcT>	integer	access technology of the registered network
		Values:
	0	: GSM
	2	: UTRAN
	7	: E-UTRAN
<MCC>	string	Mobile Country Code of the used network when last numeric code was received
<MNC>	string	Mobile Network Code of the used network when last numeric code was received



AT#CEERNETEXT?

The read command returns the current value of parameter <func> in the format:

#CEERNETEXT: <func>

Additional info:

- ▶▶ Parameters returned by the read command.

Name	Type	Default	Description
<func>	integer	N/A	can assume the following values:

Values:

- 0 : #CEERTEXT URC is disabled
- 1 : #CEERTEXT URC is enabled



AT#CEERTEXT=?

Test command reports the supported range of values for the <func> parameter.



The values 0, 1 of <func> parameter are saved in the NVM issuing **AT&W** command. The value 2 is not stored and does not change the current <func> value.

3.2.36. AT#CIPHIND - Ciphering Indication

This command enables/disables unsolicited result code for cipher indication.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#CIPHIND=[<mode>]

Set command enables/disables unsolicited result code for cipher indication. The ciphering indicator feature allows to detect that ciphering is not switched on and to indicate this to the user. The ciphering indicator feature may be disabled by the home network operator setting data in the SIM/USIM. If this feature is not disabled by the SIM/USIM, then whenever a connection is in place, which is unenciphered, or changes from ciphered to unenciphered or vice versa, an unsolicited indication shall be given to the user. The format is:

#CIPHIND: <mode>

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enable/disable #CIPHIND: unsolicited result code

Values:

- 0 : disable
- 1 : enable



AT#CIPHIND?

Read command reports the <mode>,<cipher> and <SIM/USIM flag>:

#CIPHIND: <mode>,<cipher>,<SIM/USIM flag>

Additional info:

- ▶▶ Here is the list of the parameters meaning returned by the read command.

Name	Type	Default	Description
<cipher>	integer	0	shows cipher status

Values:

- 0 : cipher off
- 1 : cipher on
- 2 : unknown (missing network information)

<SIM/USIM flag>	integer	0	SIM/USIM cipher status indication
-----------------	---------	---	-----------------------------------

Values:

- 0 : disabled
- 1 : enabled

2 : unknown (flag not read yet)



AT#CIPHIND=?

Test command reports the range for the parameter <mode>

3.2.37. AT#FDOR - Fast Dormancy

This command triggers fast dormancy; if all conditions are passed successful SCRI will be send towards the network.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#FDOR=<mode>[,<FDDelayTimer>[,<SCRITimer>]]

This command triggers fast dormancy; if all conditions are passed successful SCRI will be send towards the network. SCRI will be sent as a one shot or for every delay timer expiry, depending on the mode specified.



Parameters:

Name	Type	Default	Description
<mode>	integer	3	Selection for the supported configurations for Fast Dormancy.
Values:			
1	:	indicate application driven (1 shot) Fast Dormancy to modem.	
2	:	switch ON autonomous Fast Dormancy (AFD).	
3	:	switch OFF autonomous Fast Dormancy (AFD).	
<FDDelayTimer>	integer	5	Delay Timer value for Fast Dormancy.
Value:			
1÷60	:	integer value in seconds.	
<SCRITimer>	integer	5	The timer is used for fast dormancy inhibit timer in NAS/UAS to adapt to network operator requirements. The timer value is stored persistently. A timer value of 0 means that the timer is not used.
Value:			
0÷120	:	integer value in seconds.	

Unsolicited field:

Name	Type	Description
<cause>	integer	Reject cause value.
Values:		
0	:	Reject is default cause.
1	:	Reject because T323 timer is running.
2	:	Reject because Protocol Stack is in wrong states.
3	:	Reject when No PS signalling connection exists.
4	:	Reject when CS signalling connection exists.
5	:	Reject when Protocol Stack component (RRC) procedures are.
6	:	Reject when Network deactivated FD, by not sending timer T323 in SIB1.
7	:	Reject when from lower layers FD STOP Request is received.

-
- | | | |
|----|---|--|
| 8 | : | Reject when Protocol Stack component (PDCP) rejects the FD mode. |
| 9 | : | FD Reject when Protocol Stack component (RLC) buffers are not EMPTY. |
| 10 | : | Reject due to peer message received when FD procedure is running. |
| 11 | : | Reject when there is no PAS RAB is established and if we receive FD_START_REQ. |
| 12 | : | Reject due to cell_pch/ura_pch states when v316 is reached max limit. |
| 13 | : | Reject due to ongoing/pending Emergency call. |
| 14 | : | Reject due to ongoing Call re-establishment. |
| 15 | : | Reject due to Establishment of Full rate TCH Channel |
| 16 | : | Reject due to Establishment of Half rate TCH Channel. |
| 17 | : | Reject due to Establishment of Half rate TCH Channel for Data Transfer. |
| 18 | : | Reject due to Location update. |
| 19 | : | Reject due to MT Paging. |
| 20 | : | Reject due to other causes, such as Ongoing SS transactions, etc. |
| 21 | : | Reject due to an ongoing CS procedure while the cell does not support DTM. |
| 22 | : | Reject due to Originating Conversational call. |
| 23 | : | Reject due to Originating Streaming call. |
| 24 | : | Reject due to Originating Interactive call. |
| 25 | : | Reject due to Originating Background call. |
| 26 | : | Reject due to Originating Subscribed Traffic call. |
| 27 | : | Reject due to Terminating Conversational call. |
| 28 | : | Reject due to Terminating Streaming call. |
| 29 | : | Reject due to Terminating Interactive call. |
| 30 | : | Reject due to Terminating Background call. |
| 31 | : | Reject due to Inter RAT Cell Selection. |
| 32 | : | Reject due to Inter RAT Cell Change. |
| 33 | : | Reject due to Registration. |
| 34 | : | Reject due to Detach. |
| 35 | : | Reject due to Originating Higher Priority.signalling. |
| 36 | : | Reject due to Originating Low Priority.signalling. |
| 37 | : | Reject due to Terminating Higher Priority.signalling. |
| 38 | : | Reject due to Terminating Lower Priority.signalling. |
| 39 | : | Reject due to Active RAT not being UMTS. |
| 40 | : | Reject due to Access Stratum being Inactive/Searching. |
| 41 | : | Reject due to RRC connection is not active. |
| 42 | : | Reject due to Active Packet Switch connection. |
-

-
-  **<FDDelayTimer>** and **<SCRITimer>** are stored in NVM but **<mode>** parameter is not.
 -  the reject cause from lower layers is reported by the unsolicited indication.
-

**AT#FDOR?**

Read command returns **OK** string along with last accepted mode and timer values, in the format:

#FDOR: <mode>,< FDDelayTimer >,< SCRITimer>

**AT#FDOR=?**

Test command returns **OK** string along with supported modes and timer values.

3.2.38. AT#PSNT - Packet Service Network Type

The command enables/disables unsolicited result code for packet service network type (PSNT)

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#PSNT=[<mode>]

Set command enables/disables unsolicited result code for packet service network type (PSNT) having the following format:

#PSNT:<nt>

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enables/disables PSNT unsolicited result code.

Values:

- 0 : disables PSNT unsolicited result code
- 1 : enables PSNT unsolicited result code
- 2 : PSNT unsolicited result code is enabled, and read command returns the message shown in the read section.

Unsolicited field:

Name	Type	Description
<nt>	integer	network type

Values:

- 0 : GPRS network
- 1 : EGPRS network
- 2 : WCDMA network
- 3 : HSDPA network
- 4 : LTE network
- 5 : unknown or not registered



AT#PSNT?

Read command returns information according to the <mode> value.

Additional info:

- ▶▶ If <mode> is set to 0 or 1, read command returns the current values of the <mode> and <nt> parameters in the format:

#PSNT: <mode>,<nt>

- If **<mode>** is set to 2, read command returns the current values of the following parameters:

#PSNT: <mode>,<nt>,<HSUPAavailable>,<HSUPAused>,<HSDPAavailable>,<HSDPAused>

Name	Type	Default	Description
<HSUPAavailable>	integer	N/A	HSUPA availability
Values:			
0 : not supported by network			
1 : supported by network			
<HSUPAused>	integer	0	HSUPA in/not in use
Values:			
0 : not in use			
1 : in use			
<HSDPAavailable>	integer	0	HSDPA availability
Values:			
0 : not supported by network			
1 : supported by network			
<HSDPAused>	integer	0	HSDPA in/not in use
Values:			
0 : not supported by network			
1 : supported by network			

- i** When the reported type of the network is **<nt>=2**, the message could be not complete in idle, because it depends on some not always broadcasted network parameters (HSDPA could be supported anyway); it is valid during traffic.



AT#PSNT=?

Test command reports the range for the parameter **<mode>**

3.2.39. AT#ENCALG - Set Encryption Algorithm

This set command enables or disables the GSM and/or GPRS encryption algorithms supported by the module.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#ENCALG=[<encGSM>][,<encGPRS>]

Parameters:

Name	Type	Default	Description
<encGSM>	hex	N/A	<p><encGSM> (one byte long) is a bit mask where each bit, when set, indicates the corresponding GSM encryption algorithm</p> <ul style="list-style-type: none"> • bit 0 = A5/1 • bit 1 = A5/2 • bit 2 = A5/3 • bits 3 - 7 = reserved for future use

The default value depends on the used module.

Values:





- 0 : no GSM encryption algorithm
- 1÷7 : sum of integers each representing a specific GSM encryption algorithm: 1 = A5/1; 2 = A5/2; 4 = A5/3
- 255 : reset to the default values

<encGPRS>	hex	N/A	<p>The <encGPRS> (one byte long) is a bit mask where each bit, when set, indicates the corresponding GPRS encryption algorithm</p> <ul style="list-style-type: none"> • bit 0 = GEA1 • bit 1 = GEA2 • bit 2 = GEA3 • bits 3 - 7 = reserved for future use
-----------	-----	-----	---

The default value depends on the used module.

Values:

- 0 : no GPRS encryption algorithm
- 1÷7 : sum of integers each representing a specific GPRS encryption algorithm: 1 = GEA1; 2 = GEA2; 4 = GEA3
- 255 : reset the default values

-  The values are stored in NVM and available on next reboot.
-  For available <encGSM> and <encGPRS> parameters value see test command response.
-  If no parameter is issued, the set command returns **ERROR**.
-  SKU products running Verizon customization do not support **#ENCALG** command.

**AT#ENCALG?**

Read command reports the currently selected **<encGSM>** and **<encGPRS>** parameters values, and reports also the last used values identified by **<usedGSM>** and **<usedGPRS>**, the format is:

#ENCALG: <encGSM>,<encGPRS>,<usedGSM>,<usedGPRS>

**AT#ENCALG=?**

Test command reports the supported range of values for parameters **<encGSM>** and **<encGPRS>**.



The last two values indicate that the last used GSM encryption algorithm is A5/1 and the last used GPRS encryption algorithm is GEA1

```
AT#ENCALG?  
#ENCALG: 5,2,1,1  
OK
```

Set the GSM encryption algorithm A5/1 and A5/3, and the GPRS encryption algorithm GEA1. It will be available at the next reboot.

```
AT#ENCALG=5,1  
OK
```

The new setting will be available at the next reboot

```
AT#ENCALG?  
#ENCALG: 5,2,1,1  
OK
```

After reboot

```
AT#ENCALG?  
#ENCALG: 5,1,1,1  
OK
```

3.2.40. AT+CEMODE - Set Mode of Operation for EPS

This set command configures the mode of operation for EPS.



[1] 3GPP TS 24.301

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT+CEMODE=<mode>

Parameter:

Name	Type	Default	Description
<mode>	integer	0	mode of operation. The default value depends on product and the support of VoLTE. UE modes of operation can be found in standard [1]. Other values are reserved and will result in an ERROR response to the set command.

Values:


- 0 : PS mode 2 of operation
- 1 : CS/PS mode 1 of operation
- 2 : CS/PS mode 2 of operation
- 3 : PS mode 1 of operation



AT+CEMODE?

Read command returns the current value of parameter <mode> in the format:

+CEMODE: < mode >

-  The read command will return right values after set command, but effectively the mode of operation changes after power cycle.



AT+CEMODE=?

Test command returns the supported range of values of parameters <mode>.



```
Set EPS mode
AT+CEMODE=1
OK
```

```
Check EPS mode
AT+CEMODE?
+CEMODE: 1
OK
```

3.2.41. AT+CESQ - Extended Signal Quality

This command reports received signal quality indicators.



- [1] 3GPP TS 27.007
- [2] 3GPP TS 36.133
- [3] 3GPP TS 45.008
- [4] 3GPP TS 25.133
- [5] 3GPP TS 25.123

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CESQ

Execution command reports the signal quality indicators. See Additional info section.

Additional info:

- ▶▶ The execution command returns the following message:

+CESQ: <rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp>

Name	Type	Default	Description
<rxlev>	integer	N/A	received signal strength level. Indicator used in GERAN network, see document [3], subclause 8.1.4
Values:			
0	:	rssl < -110 dBm	
1	:	- 110 ≤ rssi < -109 dBm	
2	:	- 109 ≤ rssi < -109 dBm	
...	:	...	
61	:	- 50 ≤ rssi < -49 dBm	
62	:	- 49 ≤ rssi < -48 dBm	
63	:	rssi ≥ -48 dBm	
99	:	not known or not detectable or if the current serving cell is not a GERAN cell	
<ber>	integer	N/A	bit error rate. Indicator used in GERAN network, see document [3] subclause 8.2.4
Values:			
0÷7	:	as RXQUAL values, see document [3] subclause 8.2.4	
99	:	not known or not detectable or if the current serving cell is not a GERAN cell	
<rscp>	integer	N/A	received signal code power. Indicator used in UTRA network, see document [4] subclause 9.1.1.3 and document [5] subclause 9.1.1.1.3

Values:

0	:	rscp < -120 dBm
1	:	-120 ≤ rscp < -119 dBm
2	:	-119 ≤ rscp < -118 dBm
...	:	...
94	:	-27 ≤ rscp < -26 dBm
95	:	-26 ≤ rscp < -25 dBm
96	:	rscp ≥ -25 dBm
255	:	not known or not detectable or if the current serving cell is not a UTRA cell

<ecno>	integer	N/A	ratio of the received energy per PN chip to the total received power spectral density. Indicator used in UTRA network, see document [4]
---------------------	---------	-----	---

Values:

0	:	Ec/lo < -24 dB
1	:	-24 ≤ Ec/lo < -23.5 dB
2	:	-23,5 ≤ Ec/lo < -23 dB
...	:	...
47	:	-1 ≤ Ec/lo < -0,5 dB
48	:	-0,5 ≤ Ec/lo < 0 dB
49	:	Ec/lo ≥ 0 dB
255	:	not known or not detectable detectable or if the current serving cell is not a UTRA cell

<rsrq>	integer	N/A	reference signal received quality, see document [2]. Indicator used in 4G network.
---------------------	---------	-----	--

Values:

0	:	rsrq < -19.5 dB
1	:	-19.5 ≤ rsrq < -19.0 dB
2	:	-19.0 ≤ rsrq < -18.5 dB
3÷33	:	-18.5 ≤ rsrq < -3.0 dB; 0.5 dB per step
34	:	rsrq ≥ -3.0 dB
255	:	not known or not detectable or if the current serving cell is not a EUTRA cell

<rsrp>	integer	N/A	reference signal received power, see document [2]. Indicator used in 4G network.
---------------------	---------	-----	--

Values:

0	:	rsrp < -140 dBm
1	:	-140 ≤ rsrp < -139 dBm
2	:	-139 ≤ rsrp < -138 dBm
3÷96	:	-138 ≤ rsrp < -44; 1 dBm per step

97	:	rsrp \geq -44 dBm
255	:	not known or not detectable or if the current serving cell is not a EUTRA cell

**AT+CESQ=?**

Test command returns the supported range of values of the parameters **<rxlev>**, **<ber>**, **<rsrp>**, **<ecno>**, **<rsrq>**, **<rsrp>**.

3.2.42. AT#ENS - Enhanced Network Selection

Set command is used to activate the Enhanced Network Selection (ENS) functionality.



Cingular Wireless LLC Requirement

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#ENS=[<mode>]

Parameter:

Name	Type	Default	Description
<mode>	integer	N/A	enable/disable ENS functionality. Refer to Additional info section for default value.

Values:

- 0 : disable
- 1 : enable

Additional info:

- ▶▶ The default value of <mode> parameter depends on the product as shown in the following table.

Products	<mode> default value
LE910-NA V2, LE910-NA1, LE910B4-NA, LE910B1-NA, LE910B1-SA	1
All other	0

- ▶▶ Assume that **#AUTOBND=0** and **#ENS=0**, now enter **AT#ENS=1**. Only at the next first power up, the following action will happen:

- Automatic Band Selection is enabled (**AT#AUTOBND=2**)

Assume that **#ENS=1**. At every next power up, the following action will happen:

- SIM Application Toolkit will be enabled on user interface 0 if not previously enabled on a different user interface (**AT#STIA=2**)



AT#ENS?

Read command reports whether the ENS functionality is currently enabled or not, in the format:

#ENS: <mode>



AT#ENS=?

Test command reports the available range of values for parameter **<mode>**

3.2.43. AT+WS46 - PCCA STD-101 Select Wireless Network

Set command selects the cellular network (Wireless Data Service, WDS) to operate with the **TA** (WDS-Side Stack Selection).



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT+WS46=[<n>]

Parameter:

Name	Type	Default	Description
<n>	integer	25	<p>WDS-Side Stack to be used by the TA.</p> <ul style="list-style-type: none"> 4G only products support <n> parameter value 28 4G/2G only products support <n> parameter values 12, 28 and 30. 30 is factory default 4G/3G only products support <n> parameter values 22, 28 and 31 only. 31 is factory default

Values:

12	:	GSM Digital Cellular Systems, GERAN only
22	:	UTRAN only
25	:	3GPP Systems (GERAN and UTRAN and E-UTRAN)
28	:	E-UTRAN only
29	:	GERAN and UTRAN
30	:	GERAN and E-UTRAN
31	:	UTRAN and E-UTRAN

- i** <n> parameter setting is stored in NVM, and available at next reboot.
- i** For NA (North America) products supporting AT&T requirement 13340 about RAT Balancing and EF-RAT Mode, the value <n> stored with **+WS46** command can be changed and overwritten in case of full SIM read, examples: power on; **AT+CFUN=4, AT+CFUN=1** sequence; SIM ejection, SIM insertion sequence.



AT+WS46?

Read command reports the currently selected cellular network, in the format:

+WS46: <n>



AT+WS46=?

Test command reports the range for the parameter **<n>**.

3.2.44. AT+CEREG - EPS Network Registration Status

This command monitors the Evolved Packet System (EPS) network registration status in E-UTRAN



[1] 3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CEREG=<mode>

Set command enables/disables the EPS network registration unsolicited result code (URC) in E-UTRAN, and selects one of the two available formats:

short format: **+CEREG: <stat>**

long format: **+CEREG: <stat>,[<tac>],[<ci>],[<AcT>]**

(<tac>, <ci>, and <AcT> are reported by the command only if available)

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enables/disables the network registration unsolicited result code, and selects one of the two formats.

- The URC short format is displayed every time there is a change in the EPS network registration status.
- The URC long format is displayed every time there is a change of the EPS network cell.

Values:

- 0 : disable the network registration unsolicited result code
- 1 : enable the network registration unsolicited result code, and select the short format
- 2 : enable the network registration unsolicited result code, and selects the long format (includes the network cell identification data)



Unsolicited fields:

Name	Type	Description
<stat>	integer	EPS registration status

Values:

- 0 : not registered, terminal is not currently searching a new operator to register to
- 1 : registered, home network
- 2 : not registered, but terminal is currently searching a new operator to register to
- 3 : registration denied
- 4 : unknown. Example, out of E-UTRAN coverage

		5 : registered, roaming
<tac>	string	tracking area code (two bytes) in hexadecimal format (e.g. "00C3" equals 195 in decimal)
<ci>	string	E-UTRAN cell ID (four bytes) in hexadecimal format
<AcT>	integer	indicates the access technology of the serving cell.
		Value:
		7 : E-UTRAN, the module supports only E-UTRAN access technology

-  If the EPS MT in GERAN/UTRAN/E-UTRAN also supports circuit mode services and/or GPRS services, the **+CREG** command and **+CREG:** result codes and/or the **+CGREG** command and **+CGREG:** result codes apply to the registration status and location information for those services.
-  **<tac>**, **<ci>**, and **<AcT>** parameters are reported by URC only if **<mode>=2**, and the module is registered on some network cell.



AT+CEREG?

Read command returns the current value of **<mode>**, the registration status **<stat>**, and the network information (**<tac>**, **<ci>**, and **<AcT>**) according to the current **<mode>** parameter value.

+CEREG: <mode>,<stat>[,<tac>],[<ci>],[<AcT>]

<tac>, **<ci>**, and **<AcT>** parameters are reported only if **<mode>=2**, and the module is registered on some network cell.



AT+CEREG=?

Test command returns supported values for parameter **<mode>**.

3.2.45. AT#RFSTS - Read Current Network Status

Command reads current network status.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#RFSTS

Execution command returns the current network status. The format of the returned message is according to the network on which the module is registered.

GSM network

#RFSTS:<PLMN>,<ARFCN>,<RSSI>,<LAC>,<RAC>,<TXPWR>,<MM>,<RR>,<NOM>,<CID>,<IMSI>,<NetNameAsc>,<SD>,<ABND>

Parameters	Description
<PLMN>	Country code and operator code (MCC, MNC)
<ARFCN>	GSM Assigned Radio Channel
<RSSI>	Received Signal Strength Indication
<LAC>	Localization Area Code
<RAC>	Routing Area Code
<TXPWR>	Tx Power

Parameter/values	Description
<MM>	Mobility Management state (for debug purpose only)
0	NULL
3	LOCATION UPDATING INITIATED
5	WAIT FOR OUTGOING MM CONNECTION
6	CONNECTION ACTIVE
7	IMSI DETACH INITIATED
8	PROCESS CM SERVICE PROMPT
9	WAIT FOR NETWORK COMMAND
10	LOCATION UPDATE REJECTED
13	WAIT FOR RR CONNECTION LOCATION UPDATE
14	WAIT FOR RR CONNECTION MM
15	WAIT FOR RR CONNECTION IMSI DETACH
17	WAIT FOR REESTABLISHMENT
18	WAIT FOR RR ACTIVE
19	IDLE
20	WAIT FOR ADDITIONAL OUTGOING MM CONNECTION
21	CONNECTION ACTIVE GROUP TRANSMIT
22	WAIT RR CONNECTION GROUP TRANSMIT
23	LOCATION UPDATING PENDING
24	IMSI DETACH PENDING
25	RR CONNECTION RELEASE NOT ALLOWED
255	UNKNOWN

Parameter/values	Description
<RR>	Radio Resource state (for debug purpose only)
2	CELL SELECTION

3	WAIT CELL SELECTION
4	DEACTIVATION CELL SELECTION
5	SELECT ANY CELL
6	WAIT SELECT ANY CELL
7	DEACTIVATION SELECT ANY CELL
8	WAIT INACTIVE
9	INACTIVE
10	WAIT IDLE
11	IDLE
12	PLMN SEARCH
13	CELL RESELECTION
14	WAIT CELL RESELECTION
15	DEACTIVATION PLMN SEARCH
16	CELL CHANGE
17	CS CELL CHANGE
18	WAIT CELL CHANGE
19	SINGLE BLOCK ASSIGNMENT
20	DOWNLINK TBF ESTABLISH
21	UPLINK TBF ESTABLISH
22	WAIT TBF
23	TRANSFER
24	WAIT SYNC
25	DTM ENHANCED CALL ESTABLISH
25	DTM
27	DTM ENHANCED MO CALL ESTABLISH
28	MO CONNECTION ESTABLISH
29	MT CONNECTION ESTABLISH
30	RR CONNECTION
31	DTM ESTABLISH
32	DTM RELEASE
33	CALL REESTABLISH
34	DEACTIVATION CALL REESTABLISH
35	NORMAL CHANNEL RELEASE
36	LOCAL CHANNEL RELEASE
37	DEACTIVATION
38	ENHANCED DTM CS CALL ESTABLISH
39	CELL RESELECTION TO UTRAN
40	DTM ENHANCED CS CALL ESTABLISH
41	INTER RAT ACTIVE ON HOLD
42	INTER RAT RESEL ABORT
43	INTER RAT WAIT INTER RAT
44	INTER RAT WAIT FOR RSRC
45	DSIM SUSPEND
46	DSIM WAIT SUSPEND
47	DSIM WAIT SUSPEND IDLE

Parameters	Descriptions
<NOM>	Network Operator Mode
<CID>	Cell ID
<IMSI>	International Mobile Subscriber Identity
<NetNameAsc>	Operator name

Parameter/values	Description
<SD>	Service Domain
0	No Service
1	CS only
2	PS only
3	CS+PS

Parameter/values	Description
<ABND>	Active Band
1	GSM 850
2	GSM 900
3	DCS 1800
4	PCS 1900

3G Network

#RFSTS:[<PLMN>,<UARFCN>,<PSC>,<Ec/lo>,<RSCP>,RSSI],[<LAC>],[<RAC>],<TXPWR>,<DRX>,<MM>,<RRC>,<NOM>,<BLER>,<CID>,<IMSI>,<NetNameAsc>,<SD>,<nAST> [<nUARFCN>,<nPSC>,<nEc/lo>]

Parameters	Description
<PLMN>	Country code and operator code (MCC, MNC)
<UARFCN>	UMTS Assigned Radio Channel
<PSC>	Active PSC (Primary Synchronizations Code)
<Ec/lo>	Active Ec/lo (chip energy per total wideband power in dBm)
<RSCP>	Active RSCP (Received Signal Code Power in dBm)
<RSSI>	Received Signal Strength Indication
<LAC>	Localization Area Code
<RAC>	Routing Area Code
<TXPWR>	Tx Power
<DRX>	Discontinuous reception cycle length, in ms

Parameter/values	Description
<MM>	Mobility Management state (for debug purpose only)
	Refer to 2G Network for <MM> values

Parameter/values	Description
<RRC>	Radio Resource state (for debug purpose only)
0	CELL DCH
1	CELL FACH
2	CELL PCH
3	URA PCH
4	IDLE
5	IDLE CCCH

Parameters	Description
<NOM>	Network Operator Mode
<BLER>	Block Error Rate (e.g., 005 means 0.5 %)

<CID>	Cell ID
<IMSI>	International Mobile Station ID
<NetNameAsc>	Operator name
<SD>	Service Domain
<nAST>	Number of Active Set (Maximum 6)
<nUARFCN>	UARFCN of n th active set
<nPSC>	PSC of n th active set
<nEc/lo>	Ec/lo of nth active Set

LTE network

#RFSTS:<PLMN>,<EARFCN>,<RSRP>,<RSSI>,<RSRQ>,<TAC>,<RAC>,[<TXPWR>],<DRX>,<MM>,<RRC>,<CID>,<IMSI>,[<NetNameAsc>],<SD>,<ABND>,<T3402>,<T3412>

Parameters	Description
<PLMN>	Country code and operator code(MCC, MNC)
<EARFCN>	E-UTRA Assigned Radio Channel
<RSRP>	Reference Signal Received Power
<RSSI>	Received Signal Strength Indication
<RSRQ>	Reference Signal Received Quality
<TAC>	Tracking Area Code
<RAC>	Routing Area Code
<TXPWR>	Tx Power (In traffic only)
<DRX>	Discontinuous reception cycle Length (cycle length in ms)

Parameter/values	Description
<MM>	Mobility Management state (for debug purpose only)
0	NULL
1	DEREGISTERED
2	REGISTRATION INITIATED
3	REGISTERED
4	TRACKING AREA UPDATE INITIATED
5	SERVICE REQUEST INITIATED
6	DEREGISTRATION INITIATED

Parameters	Description
<RRC>	Radio Resource state (for debug purpose only; see above)
<CID>	Cell ID

Parameter	Description
<IMSI>	International Mobile Station ID

Parameter/values	Description
<SD>	Service Domain
0	No Service
1	CS only
2	PS only
3	CS+PS

Parameters	Description
------------	-------------

<NetNameAsc>	Operator name
<SC>	Service Domain

Parameters/values	Description
<ABND>	Active Band
1..63	According to 3GPP TS 36.101

Parameters	Description
<T3402>	Timer T3402 in seconds
<T3412>	Timer T3412 in seconds

**AT#RFSTS=?**

Test command tests for command existence.

3.2.46. AT#SPN - Read SIM Field SPN

This command reads SIM fields SPN.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#SPN

Execution command returns the service provider string contained in the SIM field SPN, in the format:

#SPN: <spn>

Unsolicited field:

Name	Type	Description
<spn>	string	service provider string contained in the SIM field SPN, represented in the currently selected character set, see +CSCS .



If the SIM field SPN is empty, the command returns the **OK** result code.



AT#SPN=?

Test command returns the **OK** result code.

3.2.47. AT#MONI - Cell Monitor

This command is both a set and an execution command.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#MONI=[<number>]

Set command sets one cell out of seven which are contained in the neighbor list of the serving cell, which is one of the seven. From the selected cell, the execution command - **AT#MONI<CR>** - extracts the network information. The information format is shown, for each network, in the Additional info sections.

Parameter:

Name	Type	Default	Description
<number>	integer	-	the parameter meaning depends on the network, see Additional info section.

Additional info:

▶▶ GSM network

Name	Type	Default	Description
<number>	integer	0	GSM network

Values:

- 0-6 : it is the ordinal number of the cell, in the neighbor list of the serving cell.
- 7 : it is a special request to obtain GSM-related information from the whole set of seven cells in the neighbor list of the serving cell

▶▶ UMTS network

Name	Type	Default	Description
<number>	string	0	UMTS network

Values:

- 0 : it is the serving cell in idle; Active set cells are also reported in CELL_DCH state, i.e. during a call (default)
- 1 : it is the candidate set (cells that belong to the Active set, only reported in CELL_DCH state, i.e. during a call)
- 2 : it is the synchronized neighbor set (cells that belong to the Virtual Active set, only reported in CELL_DCH state, i.e. during a call)
- 3 : it is the asynchronous neighbor set (cells which are not suitable cells to camp on)

- 4 : it is the ranked neighbor set (cells which are suitable cells to camp on)
- 5,6 : it is not available
- 7 : it is a special request to obtain information from the whole set of detected cells in the neighbor list of the serving cell.

►► LTE network

Name	Type	Default	Description
<number>	integer	0	LTE network

Values:

- 0 : it is the serving cell
- 1 : it is the intra-frequency cells
- 2 : it is the inter-frequency cells
- 3 : it is the W-CDMA neighbor cells, the report message is empty.
- 4 : it is the GSM neighbor cells
- 5,6 : it is not available
- 7 : it is a special request to obtain LTE-related information from the all available neighbor cells.

- If the last setting is done with **#MONI** not equal to 7, the next execution command returns one of the following output formats according to the current network.

a) When extracting data for the serving cell and the network name is known the format is:

GSM network

#MONI: <netname> **BSIC:**<bsic> **RxQual:**<qual> **LAC:**<lac> **Id:**<id> **ARFCN:**<arfcn> **PWR:**<dBm> **TA:** <timadv>

UMTS network

#MONI: <netname> **PSC:**<psc> **RSCP:**<rscp> **LAC:**<lac> **Id:**<id> **Eclo:**<ecio> **UARFCN:**<uarfcn> **PWR:**<dBm> **DRX:**<drx> **SCR:**<scr>

LTE network

#MONI: <netname> **RSRP:**<rsrp> **RSRQ:**<rsrq> **TAC:**<tac> **Id:**<id> **EARFCN:**<earfcn> **PWR:**<dBm> **DRX:**<drx> **pci:**<physicalCellId> **QRxLevMin:**<QRxLevMin>

b) When the network name is unknown, the format is:

GSM network

#MONI: <cc> <nc> **BSIC:**<bsic> **RxQual:**<qual> **LAC:**<lac> **Id:**<id> **ARFCN:**<arfcn> **PWR:**<dBm> **TA:** <timadv>

UMTS network

#MONI: <cc> <nc> **PSC:**<psc> **RSCP:**<rscp> **LAC:**<lac> **Id:**<id> **Eclo:**<ecio> **UARFCN:**<uarfcn> **PWR:**<dBm> **dBm** **DRX:**<drx> **SCR:**<scr>

LTE network

**#MONI: Cc:<cc> Nc:<nc> RSRP:<rsrp> RSRQ:<rsrq> TAC:<tac> Id:<id>
EARFCN:<earfcn> PWR:<dBm> DRX:<drx> pci:<physicalCellId>
QRxLevMin:<QRxLevMin>**

c) When extracting data for an adjacent cell (or active set cell), the format is:

GSM network

#MONI: Adj Cell<n> [LAC:<lac> Id:<id>] ARFCN:<arfcn> PWR:<dBm>

UMTS network

#MONI: PSC:<psc> RSCP:<rscp> EcIo:<ecio> UARFCN:<uarfcn> SCR:<scr>

LTE network

LTE intra-frequency and inter-frequency cells

**#MONI: RSRP:<rsrp> RSRQ:<rsrq> Id:<id> EARFCN:<earfcn>
PWR:<dBm> pci:<physicalCellId> QRxLevMin:<QRxLevMin>**

LTE WCDMA neighbor cells

#MONI: PSC:<psc> RSCP:<rscp> EcIo:<ecio> UARFCN:<uarfcn> SCR:<scr>

LTE GSM neighbor cells

#MONI: Adj Cell<n> BSIC:<bsic> ARFCN:<arfcn> PWR:<dBm>

Name	Type	Default	Description
<netname>	string	-	name of network operator
<cc>	string	-	country code
<nc>	string	-	network operator code
<n>	integer	-	progressive number of adjacent cell
<bsic>	string	-	base station identification code
<qual>	integer	-	quality of reception: 0..7
<lac>	string	-	localization area code
<id>	integer	-	cell identifier
<arfcn>	integer	-	assigned radio channel
<dBm>	integer	-	received signal strength in dBm.
<timadv>	integer	-	timing advance
<psc>	integer	-	primary scrambling code
<rscp>	integer	-	Received Signal Code Power in dBm.
<ecio>	integer	-	chip energy per total wideband power in dBm; for serving cell this is not available during a call, and is displayed as 255.
<uarfcn>	integer	-	UMTS assigned radio channel
<drx>	string	-	Discontinuous reception cycle length

<scr>	integer	-	scrambling code
<physicalCellId>	integer	-	physical cell identifier
<rsrp>	integer	-	Reference Signal Received Power
<rsrq>	integer	-	Reference Signal Received Quality
<tac>	integer	-	Tracking Area Code
<earfcn>	integer	-	E-UTRA Assigned Radio Channel
<QRxLevMin>	integer	-	minimum required RX level in the cell

- If the last setting is done with **#MONI=7**, the next execution command returns a table-like formatted output:

GSM network

First row reports the identifying name of the columns:

#MONI: Cell BSIC LAC CellId ARFCN Power C1 C2 TA RxQual PLMN<CR><LF>

Second row reports a complete set of GSM-related information for the serving cell:

#MONI: S: <bsic> <lac> <id> <arfcn> <dBm> <C1value> <C2value> <timadv> <qual> <netname><CR><LF>

3rd to 8th rows report a reduced set of GSM-related information for the cells in the neighbors:

#MONI: N<n> <bsic> <lac> <id> <arfcn> <dBm> <C1value> <C2value>[<CR><LF>]

where:

<C1value> is C1 reselection parameter

<C2value> is C2 reselection parameter



UMTS network

First row reports a set of information for the serving cell:

#MONI: <netname> PSC:<psc> RSCP:<rscp> LAC:<lac> Id:<id>Eclo:<ecio> UARFCN:<uarfcn> PWR:<dBm> dBm DRX:<drx> SCR:<scr>

The other rows report a set of information for all detected neighbor cells:

#MONI: PSC:<psc> RSCP:<rscp> Eclo:<ecio> UARFCN:<uarfcn> SCR:<scr>

-  TA: **<timadv>** reported only for the serving cell.
-  The timing advance value is meaningful only during calls or GPRS transfers active.



AT#MONI=?

Test command reports the maximum number of cells, in a neighbor list of the serving cell excluding it, from which we can extract GSM/UMTS related information, along with the ordinal number of the current selected cell, in the format:

#MONI: <MaxCellNo>,<CellSet>

Additional info:

▶▶ Parameters meaning.

Name	Type	Default	Description
<MaxCellNo>	integer	-	maximum number of cells in a neighbor of the serving cell and excluding it from which we can extract GSM related information. This value is always 6.
<CellSet>	integer	-	last setting done with command #MONI .



- Set command selects the cell 0 in GSM network
AT#MONI=0
OK
 Execution command reports GSM-related information for cell 0
AT#MONI
#MONI: I WIND BSIC:70 RxQual:0 LAC:55FA Id:1D23 ARFCN:736 PWR:-83dbm
TA:1
OK
- Set command selects the cell 0 in UMTS network
AT#MONI=0
OK
 Execution command reports UMTS-related information for serving cell and active cell
AT#MONI
#MONI: I TIM PSC:65535 RSCP:255 LAC:EF8D Id:52D2388 Eclo:255
UARFCN:65535 PWR:0dbm DRX:128 SCR:0
#MONI: PSC:49 RSCP:-96 Eclo:-2.0 UARFCN:10638 SCR:784
OK
- Set command selects the special request to obtain GSM-related information from the whole set of seven cells in the neighbor list of the serving cell
AT#MONI=7
OK
AT#MONI
#MONI: Cell BSIC LAC CellId ARFCN Power C1 C2 TA RxQual PLMN
#MONI: S 25 D5BD 3A27 1018 -74dbm 31 31 4 7 I TIM
#MONI: N1 26 D5BD 3A26 1023 -79dbm -1 -1
#MONI: N2 21 D5BD 5265 1009 -78dbm -1 -1
#MONI: N3 27 D5BD 5266 13 -87dbm -1 -1
#MONI: N4 25 D5BD 5251 1020 -88dbm -1 -1
#MONI: N5 27 D5BD 5286 1011 -95dbm -1 -1
#MONI: N6 30 00D2 C5A0 16 -99dbm -1 -1
OK

3.3. SIM

3.3.1. AT+CPIN - Enter the PIN

The command sends to the device a password which is necessary before it can be operated.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT+CPIN=<pin>[,<newpin>]

Set command sends to the device a password which is necessary before it can be operated (SIM PIN, SIM PUK, PH-SIM PIN, etc.).

If the PIN required is SIM PUK or SIM PUK2, the <newpin> is required. This <newpin>, will replace the old pin in the SIM.

The command may be used to change the SIM PIN by sending it with both parameters <pin> and <newpin>.

Parameters:

Name	Type	Default	Description
<pin>	string	-	PIN required or old PIN if the command is used to change the SIM PIN
<newpin>	string	-	new PIN that will replace old pin



AT+CPIN?

Read command reports the PIN/PUK/PUK2 request status of the device in the form:

+CPIN: <code>

Additional info:


▶▶ Parameters:

Name	Type	Default	Description
<code>	string	N/A	PIN/PUK/PUK2 request status code

Values:

READY	:	ME is not pending for any password
SIM PIN	:	ME is waiting SIM PIN to be given
SIM PUK	:	ME is waiting SIM PUK to be given
PH-SIM PIN	:	ME is waiting phone-to-SIM card password to be given

PH-FSIM PIN	:	ME is waiting phone-to-very first SIM card password to be given
PH-FSIM PUK	:	ME is waiting phone-to-very first SIM card unblocking password to be given
SIM PIN2	:	ME is waiting SIM PIN2 to be given; this <code> is returned only when the last executed command resulted in PIN2 authentication failure (i.e. +CME ERROR: 17)
SIM PUK2	:	ME is waiting SIM PUK2 to be given; this <code> is returned only when the last executed command resulted in PUK2 authentication failure (i.e. +CME ERROR: 18)
PH-NET PIN	:	ME is waiting network personalization password to be given
PH-NET PUK	:	ME is waiting network personalization unblocking password to be given
PH-NETSUB PIN	:	ME is waiting network subset personalization password to be given
PH-NETSUB PUK	:	ME is waiting network subset personalization unblocking password to be given
PH-SP PIN	:	ME is waiting service provider personalization password to be given
PH-SP PUK	:	ME is waiting service provider personalization unblocking password to be given
PH-CORP PIN	:	ME is waiting corporate personalization password to be given
PH-CORP PUK	:	ME is waiting corporate personalization unblocking password to be given

-  Pin pending status at startup depends on PIN facility setting; to change or query the default power up setting use the command **AT+CLCK**.

**AT+CPIN=?**

Test command returns **OK** result code.



```
AT+CMEE=1
OK
```

```
AT+CPIN?
+CME ERROR: 10
error: you have to insert the SIM
```

```
AT+CPIN?
+CPIN: READY
OK
you inserted the SIM and module is not waiting for PIN
```


3.3.2. AT#PCT - Display PIN Counter

This command reports the PIN/PUK or PIN2/PUK2 input remaining attempts, if **+CPIN** password is required.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#PCT

Execution command reports the PIN/PUK or PIN2/PUK2 input remaining attempts, depending on **+CPIN** requested password, in the format:

#PCT: <n>

Additional info:

▶▶ Here is shown the parameter meaning.

Name	Type	Default	Description
<n>	integer	N/A	remaining attempts.

Values:

- 0 : the SIM is blocked
- 1÷3 : if the device is waiting either SIM PIN or SIM PIN2 to be given.
- 1÷10 : if the device is waiting either SIM PUK or SIM PUK2 to be given.



AT#PCT=?

Test command returns the **OK** result code.



```
AT+CPIN?
+CPIN: SIM PIN
OK
```

```
AT#PCT          Check PIN remained counter
#PCT: 3
OK
```

```
AT+CPIN=1111   Input incorrect PIN number
+CME ERROR: incorrect password
```

```
AT#PCT
#PCT: 2
OK
```

3.3.3. AT+CCID - Read ICCID

Execution command reads on SIM the Integrated Circuit Card Identification (ICCID). It is the card identification number that provides a unique identification number for the SIM.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2



AT+CCID

The command returns the following message:

```
+CCID: <ICCID>
OK
```



AT+CCID=?

Test command returns the **OK** result code.



```
AT+CCID
+CCID: 89861109091740011006
OK
```

3.3.4. AT+CIMI - International Mobile Subscriber Identity (IMSI)

This command returns the International Mobile Subscriber Identity (IMSI number).



3GPP TS 27.007


SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CIMI

Execution command returns the value of the International Mobile Subscriber Identity stored in the SIM, the returned message has the following format (with command no echoed):

```
<IMSI value>
OK
```

 If the SIM is not inserted, the command returns **ERROR**.



AT+CIMI=?

Test command returns **OK** result code



```
AT+CIMI
22201701202507
OK
```

3.3.5. AT#CIMI - International Mobile Subscriber Identity (IMSI)

This command returns the International Mobile Subscriber Identity (IMSI number).

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#CIMI

Execution command returns the value of the International Mobile Subscriber Identity stored in the SIM, the returned message has the following format (with command echoed):

```
#CIMI: <IMSI value>
OK
```



If the SIM is not inserted, the command returns **ERROR**.



AT#CIMI=?

Test command returns the **OK** result code.



```
AT#CIMI
#CIMI: 450050209516643
OK
```

3.3.6. AT#SIMDET - SIM Detection Mode

The command manages the SIM Detection mode.



[1] Telit Hardware Design Guide of the used module.

[2] SIM Integration Design Guide, 80000NT10001A

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#SIMDET=<mode>

Set command simulates the SIM status, or selects the automatic SIM Detection status. This command is used by modules providing the dedicated SIMIN pin. Refer to document [1] to have information on dedicated SIMIN pin.

Parameter:

Name	Type	Default	Description
<mode>	integer	2	the <mode> parameter can be used as shown in Values section. To have more information refer to document [2].

Values:

- 0 : ignores dedicated SIMIN pin, and simulate the status "SIM Not Inserted"
- 1 : ignores dedicated SIMIN pin, and simulate the status "SIM Inserted"
- 2 : selects automatic SIM detection using dedicated SIMIN Pin



When **#SIMDET=1** (that simulates "SIM Inserted") is issued, a query to detect the presence of the SIM is forced, regardless of SIMIN pin status. If SIM is not responding (for example, because it is not present) then, after a timeout, the modem gives up and sets the SIM status to SIM NOT INSERTED. If SIM is correctly answering to queries then SIM status becomes SIM READY.



AT#SIMDET?

Read command returns the currently selected Sim Detection Mode in the format:

#SIMDET: <mode>,<simIn>

Additional info:

- ▶▶ The values for <simIn> are:

Name	Type	Default	Description
<simIn>	integer	0	SIMIN pin status.

Values:

- 0 : SIM not inserted
- 1 : SIM inserted



AT#SIMDET=?

Test command reports the supported range of values for parameter <mode>.

3.3.7. AT#CCID - Read ICCID

Execution command reads on SIM the Integrated Circuit Card Identification (ICCID). It is the card identification number that provides a unique identification number for the SIM.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#CCID

The command returns the following message:

```
#CCID: <ICCID>
OK
```



AT#CCID=?

Test command returns the **OK** result code.



```
AT#CCID
#CCID: 89861109091740011006
OK
```

3.3.8. AT#SIMPR - SIM Presence Status

The command enables/disables the SIM Presence Status unsolicited indication.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT#SIMPR=[<mode>]

Set command enables/disables the SIM Presence Status unsolicited indication in the ME. This command reports also the status of the remote SIM, if the SIM Access Profile (SAP) functionality is supported and has been enabled.

If notification is enabled, the ME informs about every (local and remote) SIM status change through the following URC:

#SIMPR: <SIM>,<status>

Parameter:

Name	Type	Default	Description
<mode>	integer	0	Specifies if notification must be enabled or disabled.

Values:

0 : notification disabled

1 : notification enabled

Unsolicited fields:

Name	Type	Description
<SIM>	integer	Reports local or remote SIM
Values:		
0	:	local SIM
1	:	remote SIM
<status>	integer	Reports current SIM status
Values:		
0	:	SIM not inserted
1	:	SIM inserted



Entering **AT#SIMPR=** returns **OK** but has no effect.




AT#SIMPR?

Read command reports whether the unsolicited indication **#SIMPR:** is currently enabled or not, along with the local and remote SIM status, in the format:

#SIMPR: <mode>,0,<status><CR><LF>

#SIMPR: <mode>,1,<status>

 If SAP functionality is not supported or enabled the remote SIM status will always be 0



AT#SIMPR=?

Test command reports the range for the parameter **<mode>**

3.3.9. AT#QSS - Query SIM Status

Query SIM Status.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT#QSS=[<mode>]

Enables/disables the Query SIM Status unsolicited indication in the ME. The format of the unsolicited indication is the following:

#QSS: <status>

The parameter is described in the Unsolicited field section.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	Type of notification

Values:

- 0 : disabled. It is only possible to query the current SIM status through read command AT#QSS?
- 1 : enabled. The ME informs at every SIM status change through the basic unsolicited indication where <status> range is 0...1
- 2 : enabled. The ME informs at every SIM status change through the basic unsolicited indication where <status> range is 0...3

Unsolicited field:

Name	Type	Description
<status>	integer	current SIM status

Values:

- 0 : SIM not inserted
- 1 : SIM inserted
- 2 : SIM inserted, and PIN unlocked
- 3 : SIM inserted and READY (SMS and Phonebook access are possible)



AT#QSS?

Read command reports whether the unsolicited indication #QSS is currently enabled or not, along with the SIM status, in the format:

#QSS: <mode>,<status>

The parameters are described in the previous sections.



AT#QSS=?

Test command returns the supported range of values for parameter **<mode>**.

3.3.10. AT+CRSM - Restricted SIM access

The command transmits to the UICC some specific commands and their required parameters.



3GPP TS 11.11
3GPP TS 31.101
3GPP TS 31.102

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CRSM=<command>[,<fileId>[,<P1>[,<P2>[,<P3>[,<data>]]]]]

Set command transmits to the UICC the specific command and its required parameters. The command response shows the status words and response data returned by the UICC in the format:

+CRSM: <sw1>,<sw2>[,<response>]

For parameters meanings see Additional info section.

Parameters:

Name	Type	Default	Description
<command>	integer	176	command passed on to the UICC
Values:			
	176	:	READ BINARY
	178	:	READ RECORD
	192	:	GET RESPONSE
	214	:	UPDATE BINARY
	220	:	UPDATE RECORD
	242	:	STATUS
<fileId>	integer	-	identifier of an elementary data file on UICC; mandatory for every command except STATUS
<P1>	integer	0	parameter passed on to the UICC; it is mandatory for every command except GET RESPONSE and STATUS
Value:			
	0÷255	:	parameter P1 passed on to the UICC in a command APDU
<P2>	integer	0	parameter passed on to the UICC; it is mandatory for every command except GET RESPONSE and STATUS
Value:			
	0÷255	:	parameter P2 passed on to the UICC in a command APDU
<P3>	integer	0	parameter passed on to the UICC; it is mandatory for every command except GET RESPONSE and STATUS
Value:			

	0÷255	:	parameter P3 passed on to the UICC in a command APDU
<data>	string	-	information to be read from UICC or written to the UICC (hexadecimal character format).

Additional info:

▶▶ Response data fields:

Name	Type	Default	Description
<sw1>	integer	-	information from the UICC about the execution of the actual command (successful or failed)
<sw2>	integer	-	information from the UICC about the execution of the actual command (successful or failed)
<response>	hex	-	on a successful completion of the previously issued command it shows the response data. It is not returned after a successful UPDATE BINARY or UPDATE RECORD command



AT+CRSM=?

Test command returns the **OK** result code



Read binary, ICCID(2FE2)

```
AT+CRSM=176,12258,0,0,10
+CRSM: 144,0,982850702001107686F4
OK
```

Read record, ADN(6F3A)

```
AT+CRSM=178,28474,1,4,40
+CRSM: 144,0,42434A554EFFFFFFFFFFFFFFFFFFFFFFFF06811056789282FFFFFFFFFFFFFFF
OK
```

Update Binary, KcGPRS(6F52)

```
AT+CRSM=214,28539,0,0,8,C69018C7958C87
+CRSM: 144,0
OK
```

Update Record, ADN(6F3A)

```
AT+CRSM=220,28474,9,4,30,657469FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFF
+CRSM: 144,0
OK
```

Status, FPLMN(6F7B)

```
AT+CRSM=242,28539
+CRSM:144,0,623C820238218410A0000000871002FFFFFFFF89040300FFA51180013181030
10A3282011E8304000030E08A01058B032F0609C6099001C0830101830181
OK
```

3.3.11. AT+CSIM - Generic SIM Access

This command sends a **<command>** to the SIM/UICC.



[1] GSM TS 11.11
[2] 3GPP TS 31.101

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CSIM=<length>,<command>

The ME shall send the **<command>** as it is to the SIM/UICC. As response to the command, ME sends back the actual SIM/UICC **<response>** to the TA as it is. The response message of the command is in the format:

+CSIM: <length>,<response>

Error case:

+CME ERROR: <err>

The response message parameters are described in the Additional info section.

Parameters:

Name	Type	Default	Description
<length>	integer	-	Number of the characters that are sent to TE in <command> (two times the actual length of the command)
<command>	string	-	Command passed on by the ME to the SIM/UICC in the format as described in standards [1], [2] (hexadecimal character format).

Additional info:

- ▶▶ List of the meaning of the response message parameters.

Name	Type	Default	Description
<length>	string	-	see Parameter section.
<response>	string	-	response to the command passed on by the SIM to the ME in the format as described in standards [1], [2] (hexadecimal character format).
<err>	string	N/A	error values (numeric format followed by verbose format).

Values:

- 3 : operation not allowed (operation mode is not allowed by the ME, wrong interface lock/unlock status)

-
- | | |
|----|---|
| 4 | : operation not supported (wrong format or parameters of the command) |
| 13 | : SIM failure (SIM no response) |
-

**AT+CSIM=?**

Test command returns the **OK** result code.

**AT+CSIM=<lock>**

Between two successive **+CSIM** command, the SIM-ME interface must be locked to avoid commands can modify wrong SIM file. The locking and unlocking of the SIM-ME interface must be done explicitly respectively at the beginning and at the end of the **+CSIM** commands sequence.

Parameters:

<lock>=1 locking of the interface

<lock>=0 unlocking of the interface

In case that TE application does not use the unlock command in a certain timeout value, ME releases the locking.

After the locking of the SIM-ME interface (**AT+CSIM=1**) the SIM will be accessible only by **+CSIM** commands (#QSS: 0). The GSM and GPRS services will be automatically deregistered to avoid the TE commands alter the GSM application. They will be automatically reconditioned after the unlocking of the SIM-ME interface. After the unlocking of the SIM-ME interface if PIN is required it will be necessary to enter it another time.



- Lock SIM interface
AT+CSIM=1
OK

 2G SIM, see standard [1]:
 STATUS
AT+CSIM=10,A0F2000016
+CSIM:48,"000002A87F20020000000000099300220800838A838A9000"
OK

 SELECT EF 6F07
AT+CSIM=14,A0A40000026F07
+CSIM: 4,"9F0F"
OK

 GET RESPONSE
AT+CSIM=10,A0C000000F
+CSIM: 34,"000000096F0704001A001A010200009000"
OK
 SELECT EF 6F30
AT+CSIM=14,A0A40000026F30
+CSIM: 4,"9F0F"
OK

 READ BINARY
AT+CSIM=10,A0B00000FC
+CSIM:508,"FFFFFFFF1300831300901300541300301300651300381300801301801
3000113110913013013009813007713005913004313008113009513014013002313
0016330420130041FFFFFFFFFFFFFF21436542F41922F28822F201FFFFFFFFFFFFFFF
FF
FF
FF
FF
FF
FF
FFFFFFFFFFFFFFFFFFFFFFFF9000"
OK
- 3G UICC, see standard [2]
 STATUS
AT+CSIM=10,A0F2000016
+CME ERROR: operation not supported

 STATUS
AT+CSIM=10,80F2000016
+CSIM:48,"623F8202782183027FF08410A0000000871002FFFFFFFF9000"
OK

 SELECT EF 6F07 No Data Returned
AT+CSIM=18,00A4080C047F206F07
+CSIM: 4,"9000"
OK

 SELECT EF 6F30 Return FCP Template
AT+CSIM=18,00A40804047F206F30
+CSIM: 4,"6120"
OK

 GET RESPONSE
AT+CSIM=10,00C0000020


```
+CSIM:68,"621E8202412183026F30A506C00140DE01008A01058B036F060480  
02006988009000"  
OK
```

```
READ BINARY  
AT+CSIM=10,00B0000069  
+CSIM:214,"02F81012F47022F83082F63082F64022F60192F31412F6031300613  
2F40102F20162  
F21032F23002F60182F41012F91042F41902F46102F40242F22092F52072F22062  
F03062F86032F0  
1032F11042F01032F80217F60127F42027F43027F44027F24337F62037F0209000"  
OK
```

```
Unlock SIM interface  
AT+CSIM=0  
OK
```

3.3.12. AT+CCHO - Open Logical Channel

Open Logical Channel



3GPP TS 31.101

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CCHO=<dfname>

Execution of the command causes the MT to return <sessionId> to allow the TE to identify a channel that is being allocated by the currently selected UICC, which is attached to ME.

The currently selected UICC will open a new logical channel; select the application identified by the <dfname> received with this command and return a <sessionId> as the response.

The ME shall restrict the communication between the TE and the UICC to this logical channel.

The response message of the command is in the format:

+CCHO: < sessionId >

The <sessionId> is described in the Additional info section.

Error case:

+CME ERROR: <err>


Parameter:

Name	Type	Default	Description
<dfname>	string	-	all selectable applications in the UICC are referenced by a DF name coded on 1 to 16 bytes (hexadecimal character format; refer +CSCS).

Additional info:

▶▶ <sessionId> returned by the **+CCHO** command.

Name	Type	Default	Description
<sessionId>	integer	-	session Id to be used to target a specific application on the smart card (e.g. (U)SIM, WIM, ISIM) using logical channels mechanism. Session Id is used when sending commands with Restricted UICC Logical Channel access +CRLA , or Generic UICC Logical Channel access +CGLA commands.

-
-  The logical channel number is contained in the CLASS byte of an APDU command, thus implicitly contained in all APDU commands sent to a UICC.
In this case it will be up to the MT to manage the logical channel part of the APDU CLASS byte and to ensure that the chosen logical channel is relevant to the **<sessionId>** indicated in the AT command. Refer to 3GPP TS 31.101.
-

**AT+CCHO=?**

Returns the **OK** result code.

3.3.13. AT+CCHC - Close Logical Channel

Close a communication session.



3GPP TS 31.101

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CCHC=<sessionId>

Set command asks the ME to close a communication session with the active UICC. The ME shall close the previously opened logical channel. The TE will no longer be able to send commands on this logical channel. The UICC will close the logical channel when receiving this command.

Error case:

+CME ERROR: <err>

Parameter:

Name	Type	Default	Description
<sessionId>	integer	-	a session Id to be used to target a specific application on the smart card (e.g. (U)SIM, WIM, ISIM) using logical channels mechanism. <sessionId> is returned by the +CCHO command.



AT+CCHC=?

Test command returns the **OK** result code.

3.3.14. AT+CGLA - Generic UICC Logical Channel Access

This command is used to control the currently selected UICC on the TE.



- [1] 3GPP TS 11.11
- [2] 3GPP TS 31.101
- [3] 3GPP TS 31.102

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CGLA=<sessionId>,<length>,<command>

Set command transmits to the MT the <command> it then shall send as it is to the selected UICC. In the same manner the UICC <response> shall be sent back by the MT to the TA as it is. This command allows a direct control of the currently selected UICC by a distant application on the TE. The TE shall then take care of processing the received UICC information. The response of the command is in the format:

+CGLA: <length>,<response>

Error case:

+CME ERROR: <err>

The response messages parameters are described in the Additional info section.

Parameters:

Name	Type	Default	Description
<sessionId>	integer	-	this parameter is the identifier of the session to be used in order to send the APDU commands to the UICC. It is mandatory to send commands to the UICC when targeting applications on the smart card using a logical channel other than the default channel (channel "0"). <sessionId> is returned by the +CCHO command.
<length>	integer	-	characters number of the <command> sent to UICC (two times the actual length of the command)
<command>	string	-	command passed on by the MT to the UICC in the format as described in standard [1] or [2] (hexadecimal character format; refer to +CSCS).

Additional info:

- ▶▶ List of the meaning of the response messages parameters.

Name	Type	Default	Description
<length>	integer	-	characters number of the <response> sent to TE (two times the actual length of the response)

<response>	string	-	response to the command passed on by the UICC to the TE in the format as described in standard [1] or [2] (hexadecimal character format)
<err>	string	-	error values (numeric format followed by verbose format)

**AT+CGLA=?**

Test command returns the **OK** result code.

3.3.15. AT#SIMINCFG - SIMIN Pin Configuration

This command configures the SIMIN pin status used for SIM detection.



- [1] Telit Hardware Design Guide of the used module
[2] SIM Integration Design Guide, 80000NT10001A

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#SIMINCFG=<GPIOPin>,<siminDetMode>

Set command allows to configure the status of the dedicated SIMIN pin according to the used SIM holder. Refer to document [1] to have information on dedicated SIMIN pin, see also document [2].

Parameters:

Name	Type	Default	Description
<GPIOPin>	integer	0	dummy parameter. The module uses the dedicated SIMIN pin.
Value:			
0 : Must be used this value.			
<siminDetMode>	integer	0	status of SIMIN pin for SIM detection
Values:			
0 : SIMIN pin LOW means SIM inserted, HIGH means SIM removed (for normal SIM holder)			
1 : SIMIN pin LOW means SIM removed, HIGH means SIM inserted (for micro SIM holder)			



AT#SIMINCFG?

Read command reports the selected parameters in the format:

#SIMINCFG: <GPIOPin>, <siminDetMode>



AT#SIMINCFG=?

Test command reports supported values of parameters <GPIOPin> and <siminDetMode>.

3.4. SIM Toolkit

3.4.1. AT#STIA - SIM/USIM Toolkit Interface Action

The SIM/USIM Application Toolkit (SAT/USAT) provides an interface to the applications existing in the SIM/USIM device. The module must support the mechanisms required by the SIM/USIM applications.



- [1] 3GPP TS 23.038
- [2] 3GPP TS 31.111
- [3] Telit SIM/USIM Application Toolkit Application Note

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT#STIA=[<mode>[,<timeout>]]

Set command is used to enable/disable the SIM/USIM Application Toolkit (SAT/USAT). In addition, the command can enable the URCs sending.

Parameters:

Name	Type	Default	Description
<mode>	integer	1	enables/disables SAT/USAT.

In addition, <mode> parameter enables the:

- **#STN** URCs notifying the user that the SIM/USIM application has issued a proactive command. Some proactive commands require a user response
- **#STN** URCs that are the SIM/USIM device responses concerning actions initiated by the user, refer to Additional info section.

If <mode>=2, the URC format depends on the <cmdType> as described in the Additional info sections. For <cmdType>, and all other URC parameters refer to **#STGI** command. The <mode> parameter values are listed below.

Values:

- 0 : disable SAT/USAT
- 1 : enable SAT/USAT without #STN URC
- 2 : enable SAT/USAT and extended #STN URC
- 3 : enable SAT/USAT and reduced #STN URC
- 17 : enable SAT/USAT without #STN URC and the alphabet used
- 18 : enable SAT/USAT, extended #STN URC, and the alphabet used
- 19 : enable SAT/USAT, reduced #STN URC, and the alphabet used
- 33 : enable SAT/USAT without #STN URC and the UCS2 alphabet used
- 34 : enable SAT/USAT, extended #STN URC, and the UCS2 alphabet used
- 35 : enable SAT/USAT, reduced #STN URC, and the UCS2 alphabet used

<timeout>	integer	2	When an ongoing proactive command, requiring a user response, is not answered before <timeout> minutes, it is automatically aborted. In this case, the terminal response from the module is either "ME currently unable to process command" or, if applicable, "No response from user". In addition, the following URC is sent on the AT interface. For parameter meaning of the URC refer to Unsolicited fields section. #STN:<cmdTerminateValue>
------------------------	---------	---	---

Follows the **<timeout>** range.

Value:

1,2 : timeout expressed in minutes

Additional info:

- ▶▶ **<mode>=3**, the URC has the following reduced format: **#STN: <cmdType>**

- ▶▶ **<mode>=2**, and **<cmdType>=1** (REFRESH proactive command), the URC has the following extended format:
#STN: 1,<refreshType>

- ▶▶ **<mode>=2**, and **<cmdType>=5** (SET UP EVENT LIST proactive command), the URC has the following extended format:
#STN: 5[,<eventListMask>]

- ▶▶ **<mode>=2**, and **<cmdType>=16** (SET UP CALL proactive command), the URC has the following extended format:
#STN: 16,<cmdDetails>,[<confirmationText>],<calledNumber>

- ▶▶ **<mode>=2**, and one of the following proactive command:
 - <cmdType>=17** (SEND SS)
 - <cmdType>=18** (SEND USSD)
 - <cmdType>=19** (SEND SHORT MESSAGE)
 - <cmdType>=20** (SEND DTMF)
 - <cmdType>=32** (PLAY TONE)

Here are the commands that can be executed only if **AT#STTA=1** has been previously set

 - <cmdType>=52** (RUN AT COMMAND)
 - <cmdType>=64** (OPEN CHANNEL)
 - <cmdType>=65** (CLOSE CHANNEL)
 - <cmdType>=66** (RECEIVE DATA)
 - <cmdType>=67** (SEND DATA)

the URC has the following extended format:

#STN: <cmdType>[,<alphaIdentifier>]

If **<cmdType>=19** (SEND SHORT MESSAGE proactive command) fails, the **#STN: 119** URC is sent to the module.

- ▶▶ **<mode>=2**, and **<cmdType>=33** (DISPLAY TEXT proactive command), the URC is sent if allowed by SIM/USIM, the extended format is:
#STN: 33[,<cmdDetails>[,<alphaIdentifier>]]
 If bit 7 of **<cmdDetails>=1**, the response with the **#STSR** command is required.

- ▶▶ **<mode>=2**, and **<cmdType>=34** (GET INKEY proactive command), the URC has the following extended format:
#STN: 34,<cmdDetails>,<text>

- ▶▶ **<mode>=2**, and **<cmdType>=35** (GET INPUT proactive command), the URC has the following extended format:
#STN: 35,<cmdDetails>,<text>,<responseMin>,<responseMax>[,<defaultText>]

- ▶▶ **<mode>=2**, and **<cmdType>=36** (SELECT ITEM proactive command), the URC has the following extended format:
 the first line of output is:
#STN: 36,<cmdDetails>,<numOfItem>[,<titleText>]<CR><LF>
 one line follows for every item, repeated **<numOfItems>** times:
#STN: 36,<itemId>,<itemText>[,<nextActionId>]




- ▶▶ **<mode>=2**, and **<cmdType>=37** (SET UP MENU proactive command), the URC has the following extended format:
 the first line of output is:
#STN: 37,<cmdDetails>,<numOfItem>,<titleText><CR><LF>
 one line follows for every item, repeated for **<numOfItems>**:
#STN: 37,<itemId>,<itemText>[,<nextActionId>]

- ▶▶ **<mode>=2**, and **<cmdType>=40** (SET UP IDLE MODE TEXT proactive command), the URC has the following extended format:
#STN: 40[,<idleModeTextString>]

- ▶▶ This Additional info section deals with the action initiated by the user (no proactive commands activated by the SIM/USIM device).
 If the call control or SMS control facility present in the SIM/USIM device is activated, when the user application makes an outgoing call, or sends a SS or USSD, or a SMS, the following **#STN** URC could be sent to indicate whether the outgoing call has been accepted, rejected or modified by the SIM, or if the SMS service center address or destination has been changed. For parameters meaning refer to Unsolicited fields section.
#STN:
<cmdControlResponse>,<Result>[,<alphaIdentifier>[,<Number>[,<MODestAddr>]]]

Unsolicited fields:

Name	Type	Description
<cmdTerminateValue>	integer	is defined as <cmdType> + terminate offset. Terminate offset = 100
<cmdControlResponse>	integer	response of the SIM/USIM device Values: 150 : SMS control response 160 : call/SS/USSD response
<Result>	integer	identify the result of the Call or SMS control performed by SIM/USIM device Values: 0 : Call/SMS not allowed 1 : Call/SMS allowed 2 : Call/SMS allowed with modification
<alphaIdentifier>	string	optional text provided by the SIM/USIM device in ASCII format
<Number>	string	Called number, Service Center Address or SS String in ASCII format
<MODestAddr>	string	MO destination address in ASCII format

-  The settings are saved on user profile and available on following reboot. SIM/USIM Toolkit activation/deactivation is only performed at power on according to the saved setting.
-  If **AT#ENS=1**, the <mode> parameter is set to 2.
-  Just one instance at a time, the one which first issued **AT#STIA=<mode>** (with <mode> not equal to 0), is allowed to issue SAT/USAT commands, and this is valid till the same instance issues **AT#STIA=0**. After reboot, SAT/USAT can be used on another instance.



AT#STIA?

Read command can be used to get information about the SAT/USAT interface. The message format is:

#STIA: <state>,<mode>,<timeout>,<SatProfile>

Additional info:


- ▶▶ Returned parameters.

Name	Type	Default	Description
<state>	integer	0	state of the sending of the SET UP MENU proactive command (37)

Values:

- 0 : SIM/USIM has not sent the SET UP MENU proactive command (37)
- 1 : SIM/USIM has sent the SET UP MENU proactive command (37)

<mode>	integer	-	refer to Set section
<timeout>	integer	-	refer to Set section
<SatProfile>	string	-	SAT/USAT Terminal Profile. Is the list of SIM/USIM Application Toolkit facilities supported by the ME. The profile cannot be changed by the TA.

-  In SAT/USAT applications an SMS message is usually sent to the network provider containing service requests, e.g. to send the latest news. The provider returns a message with the requested information. Before activating SAT/USAT, it is recommended to set the SMS text mode with the **AT+CMGF=1** command and enable URC for incoming SMS messages with **+CNMI** command.



AT#STIA=?

Test command returns the range of available values for the parameters **<mode>** and **<timeout>**.

3.4.2. AT#STGI - SIM Toolkit Get Information

The **#STGI** command interfaces to the SIM/USIM Application Toolkit to get information on the ongoing *proactive command*.



3GPP TS 31.111
Telit SIM/USIM Application Toolkit Application Note

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#STGI=[<cmdType>]

Set command gets parameters of the ongoing *proactive command*. The command can be used after the reception of the **#STN: <cmdType>** URC. If no proactive command is ongoing, **#STGI** returns an **ERROR** message.

Parameter:

Name	Type	Default	Description
<cmdType>	integer	N/A	proactive command code. For each proactive command listed below, its #STGI response format is described in the Additional info sections.

Values:

- 1 : REFRESH
- 5 : SET UP EVENT LIST
- 16 : SET UP CALL
- 17 : SEND SS
- 18 : SEND USSD
- 19 : SEND SHORT MESSAGE
- 20 : SEND DTMF
- 32 : PLAY TONE
- 33 : DISPLAY TEXT
- 34 : GET INKEY
- 35 : GET INPUT
- 36 : SELECT ITEM
- 37 : SET UP MENU
- 40 : SET UP IDLE MODE TEXT

Additional info:

▶▶ <cmdType>=1 (REFRESH proactive command)

#STGI response format:

#STGI: 1,<refreshType>

Name	Type	Default	Description
------	------	---------	-------------

<refreshType>	integer	N/A	identifies the refresh type
----------------------------	---------	-----	-----------------------------

Values:

- 0 : SIM Initialization and Full File Change Notification
 - 1 : File Change Notification
 - 2 : SIM Initialization and File Change Notification
 - 3 : SIM Initialization
 - 4 : SIM Reset
 - 5 : NAA Application Reset
 - 6 : NAA Session Reset
 - 7 : Steering of Roaming
 - 8 : Steering of Roaming WLAN
-

►► **<cmdType>=5** (SET UP EVENT LIST proactive command)

#STGI response format:

#STGI: 5,<eventListMask>

Name	Type	Default	Description
<eventListMask>	hex	N/A	<p>identifies the list of events to monitor.</p> <p>The <eventListMask> (two bytes long) is a bit mask where each bit, when set, indicates that the corresponding event must be monitored (e.g. if <eventListMask> is 0x0001, it means that MT call must be monitored).</p> <ul style="list-style-type: none"> • bit 0 = MT call • bit 1 = Call connected • bit 2 = Call disconnected • bit 3 = Location status • bit 4 = User activity • bit 5 = Idle screen available • bit 6 = Card reader status (if class "a" is supported) • bit 7 = Language selection • bit 8 = Browser Termination (if class "c" is supported) • bit 9 = Data available (if class "e" is supported) • bit 10 = Channel status (if class "e" is supported) • bits 11 - 15 = reserved for future use

Value:

0x0001÷0x01FF : mask

►► **<cmdType>=16** (SET UP CALL proactive command)

#STGI response format:

#STGI: 16,<cmdDetails>,[<confirmationText>],<calledNumber>

Name	Type	Default	Description
<cmdDetails>	integer	N/A	identifies the command details
Values:			
0	:	set up call, but only if not currently busy on another call	
1	:	set up call, but only if not currently busy on another call, with redial	
2	:	set up call, putting all other calls (if any) on hold	
3	:	set up call, putting all other calls (if any) on hold, with redial	
4	:	set up call, disconnecting all other calls (if any)	
5	:	set up call, disconnecting all other calls (if any), with redial	
<confirmationText>	string	-	string for user confirmation stage
<calledNumber>	string	-	string containing called numbers

- This section is dedicated to the following proactive commands:

<cmdType>=17 (SEND SS)
 <cmdType>=18 (SEND USSD)
 <cmdType>=19 (SEND SHORT MESSAGE)
 <cmdType>=20 (SEND DTMF)
 <cmdType>=32 (PLAY TONE)

#STGI response format:

#STGI: <cmdType>[,<alphIdentifier>]

Name	Type	Default	Description
<alphIdentifier>	string	-	optional text provided by the SIM/USIM device in ASCII format

- <cmdType>=33 (DISPLAY TEXT proactive command)

#STGI response format:

#STGI: 33,<cmdDetails>[,<text>]

Name	Type	Default	Description
<cmdDetails>	hex	N/A	a bit mask where each bit position, according to its value, has a specific meaning: bit 0: 0 - normal priority 1 - high priority bits 1-6: reserved for future use bit 7: 0 - clear message after a delay 1 - wait for user to clear message

Value:

0x00÷0xFF : mask

<text>	string	-	text provided by the SIM/USIM device in ASCII format
---------------------	--------	---	--

▶▶ **<cmdType>=34** (GET INKEY proactive command)

#STGI response format:

#STGI: 34,<cmdDetails>,<text>

Name	Type	Default	Description
<cmdDetails>	hex	N/A	a bit mask where each bit position, according to its value, has a specific meaning: bit 0: 0 - digits only (0-9, *, # and +) 1 - alphabet set bit 1: 0 - SMS default alphabet (GSM character set) 1 - UCS2 alphabet bit 2: 0 - character sets defined by bit 0 and bit 1 are enabled 1 - character sets defined by bit 0 and bit 1 are disabled and the "Yes/No" response is requested bits 3-6: 0 bit 7: 0 - no help information available 1 - help information available

Value:

0x00-0x87 : mask

<text>	string	-	string as prompt for test
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▶▶ **<cmdType>=35** (GET INPUT proactive command)

#STGI response format:

#STGI: 35,<cmdDetails>,<text>,<responseMin>,<responseMax>[,<defaultText>]

Name	Type	Default	Description
<cmdDetails>	hex	N/A	a bit mask where each bit position, according to its value, has a specific meaning: bit 0: 0 - digits only (0-9, *, #, and +) 1 - alphabet set bit 1: 0 - SMS default alphabet (GSM character set) 1 - UCS2 alphabet bit 2: 0 - ME may echo user input on the display 1 - user input shall not be revealed in any way. Hidden entry mode is only available when using digit input. In hidden entry mode only characters ('0'-'9', '*' and '#') are allowed.

			bit 3: 0 - user input to be in unpacked format 1 - user input to be in SMS packed format bits 4-6: 0 bit 7: 0 - no help information available 1 - help information available
	Value:		
	0x00÷0x8F	:	mask
<text>	string	-	string as prompt for text
<responseMin>	integer	N/A	minimum number of characters of the user input
	Value:		
	0÷255	:	minimum length of user input.
<responseMax>	integer	N/A	maximum number of characters of the user input.
	Value:		
	0÷255	:	maximum length of user input
<defaultText>	string	-	string supplied as default response text

▶▶ **<cmdType>=36** (SELECT ITEM proactive command)

#STGI response format:

the first line of output is:

#STGI: 36,<cmdDetails>,<numOfItem>[,<titleText>]<CR><LF>

one line follows for every item, repeated **<numOfItems>** times:

#STGI: 36,<itemId>,<itemText>[,<nextActionId>]

Name	Type	Default	Description
<cmdDetails>	hex	N/A	a bit mask where each bit position, according to its value, has a specific meaning: bit 0: 0 - presentation type is not specified 1 - presentation type is specified in bit 1 bit 1: 0 - presentation as a choice of data values if bit 0 = 1 1 - presentation as a choice of navigation options if bit 0 is 1 bit 2: 0 - no selection preference 1 - selection using soft key preferred bits 3-6: 0

			bit 7: 0 - no help information available 1 - help information available
	Value:		
	0x00÷0x87	:	mask
<numOfItems>	integer	-	number of items in the list
<titleText>	string	-	menu title string
<itemId>	integer	N/A	item identifier
	Value:		
	1÷numOfItems	:	item identifier range
<itemText>	string	-	item title string
<nextActionId>	integer	-	is the code of next proactive command to be issued upon execution of the menu item. If <nextActionId> =0, no next action information available.

- ▶▶ **<cmdType>**=37 (SET UP MENU proactive command)
#STGI response format:
the first line of output is:
#STGI: 37,<cmdDetails>,<numOfItem>,<titleText><CR><LF>
one line follows for every item, repeated for **<numOfItems>**:
#STGI: 37,<itemId>,<itemText>[,<nextActionId>]

Name	Type	Default	Description
<cmdDetails>	hex	N/A	a bit mask where each bit position, according to its value, has a specific meaning: bit 0: 0 - no selection preference 1 - selection using soft key preferred bit 1-6: 0 bit 7: 0 - no help information available 1 - help information available
	Value:		
	0x00÷0x81	:	mask
<numOfItems>	integer	-	number of items in the list
<titleText>	string	-	menu title string
<itemId>	integer	N/A	item identifier
	Value:		
	1÷numOfItems	:	item identifier range
<itemText>	string	-	item title

<nextActionId>	integer	-	numerical code of next proactive command type to be issued upon execution of the menu item. If <nextActionId>=0 , no next action information available.
-----------------------------	---------	---	---

- ▶▶ **<cmdType>=40** (SET UP IDLE MODE TEXT proactive command)

#STGI response format:

#STGI: 40,<idleModeTextString>

Name	Type	Default	Description
<idleModeTextString>	string	-	text provided by the SIM/USIM device in ASCII format

- i** The proactive commands are only those command types that use the AT interface. SAT/USAT commands which are not using the AT interface (not MMI related SAT commands, e.g. PROVIDE LOCAL INFORMATION) are executed without sending any indication to the user.



AT#STGI?

The read command returns the ongoing proactive command and the SAT/USAT state. The message format is:

#STGI: <state>,<cmdType>

Additional info:

- ▶▶ Returned parameters:

Name	Type	Default	Description
<state>	integer	-	state of the sending of the SET UP MENU proactive command (37), refer to AT#STIA? command
<cmdType>	integer	-	ongoing proactive command code



AT#STGI=?

Test command returns the supported values of parameters **<state>** and **<cmdType>**.



- A typical SAT/USAT session, running on AT interface, starts when the user receives the **#STN: 37** URC. The unsolicited result code must be previously enabled by the **#STIA** command. The **#STN: 37** notifies the user that the main menu of the SIM/USIM Application has been sent to TA, and TA has stored the just received menu. Later, at any time, you can type in the **AT#STGI=37** command to display the main menu of the SIM/USIM Application on TE.

Upon receiving the **#STGI** response, you must enter the **#STSR** command to confirm the execution of the *proactive command* and provide any required user response. In this case, you must enter the **AT#STSR=37,0,x** command to select the **x** item of the SIM/USIM Application menu.

The **#STN: 237** URC indicates that the main menu of the SIM/USIM Application has been removed from TA, and it is no longer available. In this case, **AT#STGI=37** command returns **ERROR** message.

3.4.3. AT#STSR - SIM Toolkit Send Response

This command allows the user to provide a response to confirm the execution of the ongoing proactive command.



3GPP TS 31.111
Telit SIM/USIM Toolkit Application Note

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#STSR=[<cmdType>[,<userAction>[,<data>]]]

The set command allows the user to provide a response action to the ongoing proactive command when the action is required by the command itself.

Parameters:

Name	Type	Default	Description
<cmdType>	integer	-	proactive command code, refer to #STGI command to have information on the <cmdType>

<userAction>	integer	0	identify the user action
--------------	---------	---	--------------------------

Values:

- 0 : the user accepts the ongoing proactive command
- 16 : proactive SIM/USIM session terminated by user
- 17 : backward move in the proactive SIM/USIM session requested by the user
- 18 : no response from user
- 19 : help information required by the user
- 20 : USSD/SS Transaction terminated by user
- 32 : TA currently unable to process command
- 34 : user has denied SIM/USIM call setup request
- 35 : user cleared down SIM/USIM call before connection or network release

<data>	string	-	data entered by user, see Additional info section
--------	--------	---	---

Additional info:

▶▶ <data> parameter is used according to <cmdType>, and when <userAction>=0:

- <cmdType>=34 (GET INKEY proactive command)
<data> contains the key pressed by the user. The character set is selected by +CSCS command.


If the ongoing proactive command requires to the user a binary choice (yes/no), the valid content of <data> is:

- "Y" or "y" (positive answer) and "N" or "n" (negative answer) for "IRA", "8859-1", "PCCP437" character sets

- "0079" or "0059" (positive answer) and "006E" or "004E" (negative answer) for UCS2 alphabet

The ongoing proactive command to require a binary choice sets bit 2 of the **<cmdDetails>** parameter to 1, see **#STGI** command.

- **<cmdType>=35** (GET INPUT proactive command).
<data> contains the string of characters entered by the user.
- **<cmdType>=36** (SELECT ITEM proactive command).
<data> contains the item identifier selected by the user.

 **<userAction>=0** is used, for example, to

- accept a call when the ongoing proactive command is SET UP CALL, **<cmdType>=16**
- start a connection when the ongoing proactive command is OPEN CHANNEL, **<cmdType>=64**

 Use of icons is not supported. All icon related actions will respond with no icon available.



AT#STSR?

The read command returns the ongoing proactive command and the SAT/USAT interface state. The format message is:

#STSR: <state>,<cmdType>

If there is no ongoing proactive command, an **ERROR** message is returned.

Additional info:

- ▶▶ Returned parameters.

Name	Type	Default	Description
<state>	integer	-	state of the sending of the SET UP MENU proactive command (37), refer to AT#STIA? command
<cmdType>	integer	-	proactive command code, refer to #STGI command to have information on the <cmdType>



AT#STSR=?

The test command returns the range for the parameters **<state>** and **<cmdType>**.

3.4.4. AT#STTA - SIM/USIM Toolkit Terminal Attach

The command manages SIM/USIM Application Toolkit attachment to an AT instance to communicate with the user.



Telit SIM/USIM Application Toolkit Application Note

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Common profile	No	-	2



AT#STTA=<state>

Set command attaches/detaches the SIM/USIM Application Toolkit to/from an AT instance selected for this use by the **#STACFG** command. Here are the proactive commands (with the relative numerical code, refer to **#STGI**) requiring an attached instance to communicate with the user:

- **<cmdType>=52** RUN AT COMMAND
- **<cmdType>=64** OPEN CHANNEL
- **<cmdType>=65** CLOSE CHANNEL
- **<cmdType>=66** RECEIVE DATA
- **<cmdType>=67** SEND DATA

Parameter:

Name	Type	Default	Description
<state>	integer	0	attached state

Values:

- 0 : detach the SIM/USIM Toolkit from the selected AT instance
- 1 : attach the SIM/USIM Toolkit to the selected AT instance



If SIM/USIM Application Toolkit has been already attached, and the attach command is entered again no actions are performed. The command returns **OK**. Detach command has the same behavior.



AT#STTA?

Read command reports the current **<state>** in the format:

#STTA: <state>



AT#STTA=?

Test command reports the supported range of values for **<state>** parameter.

3.4.5. AT#STACFG - Configure SIM/USIM Toolkit Application Parameters

SIM/USIM Application Toolkit to communicate with the user must be connected to an AT instance provided by the module.



Telit 3G Modules Ports Arrangements User Guide
Telit SIM/USIM Application Toolkit Application Note

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Common profile	No	-	2



AT#STACFG=<instance>[,<unused_1>[,<unused_2>]]

Set command selects the AT instance that will be used by the SIM/USIM Application Toolkit. Refer to #STTA to see which proactive commands require a dedicated AT instance.

Parameters:

Name	Type	Default	Description
<instance>	integer	5	AT instance used by the SIM/USIM Application Toolkit. After selection, the AT instance must be attached to SAT/USAT, see #STTA.
Value:			
	1÷max	:	range of the AT instances (max as returned by the Test command)
<unused_1>	integer	-	reserved for future use. It must be set to 0, otherwise an ERROR message is returned.
<unused_2>	integer	-	reserved for future use. It must be set to 0, otherwise an ERROR message is returned.

i <instance> parameter can be set only if <state> parameter of #STTA is set to 0, otherwise the set command returns **ERROR**.



AT#STACFG?

Read command returns the current settings of parameters in the format:

#STACFG: <instance>,0,0



AT#STACFG=?

Test command returns the supported values for the #STACFG parameters.

3.5. Call & DTMF

3.5.1. AT+CHUP - Hang Up Call

This command cancels all active and held calls



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CHUP

Execution command cancels all active and held calls, also if a multi-party session is running



AT+CHUP=?

Test command returns the **OK** result code

3.5.2. AT#UDUB - User Determined User Busy

This command disconnects all active calls setting the "user busy" cause for disconnection.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#UDUB

Execution command disconnects all active calls (like **H** or **+CHUP**), but setting the "user busy" cause for disconnection (only if we have an incoming call that has not been answered yet, and that we want to reject).



AT#UDUB=?

Test command returns the **OK** result code

3.5.3. AT+CBST - Select Bearer Service Type

Select bearer service type and connection element for data calls



- 3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CBST=[<speed>[,<name>[,<ce>]]]

Set command selects the bearer service <name> with data rate <speed>, and the connection element <ce> to be used when data calls are originated. This setting is also used during mobile terminated data call setup, in case of single numbering scheme calls.

Parameters:

Name	Type	Default	Description
<speed>	integer	0	data rate value

Values:

0	:	autobauding (automatic selection of the speed, factory default)
4	:	2400 bps (V.22bis)
5	:	2400 bps (V.26ter)
6	:	4800 bps (V.32)
7	:	9600 bps (V.32)
12	:	9600 bps (V.34)
14	:	14400 bps (V.34)
15	:	19200 bps (V.34)
16	:	28800 bps (V.34)
17	:	33600 bps (V.34)
68	:	2400 bps (V.110 or X.31 flag stuffing)
70	:	4800 bps (V.110 or X.31 flag stuffing)
71	:	9600 bps (V.110 or X.31 flag stuffing)
75	:	14400 bps (V.110 or X.31 flag stuffing)
79	:	19200 bps (V.110 or X.31 flag stuffing)
80	:	28800 bps (V.110 or X.31 flag stuffing)
81	:	38400 bps (V.110 or X.31 flag stuffing)
82	:	48000 bps (V.110 or X.31 flag stuffing)
83	:	56000 bps (V.110 or X.31 flag stuffing)
84	:	64000 bps (X.31 flag stuffing)
115	:	56000 bps (bit transparent)
116	:	64000 bps (bit transparent)
120	:	32000 bps (PIAFS32k)

121	:	64000 bps (PIAFS64k)
130	:	28800 bps (multimedia)
131	:	32000 bps (multimedia)
132	:	33600 bps (multimedia)
133	:	56000 bps (multimedia)
134	:	64000 bps (multimedia)

<name>	integer	0	bearer service name
---------------------	---------	---	---------------------


Values:

0	:	data circuit asynchronous (factory default)
1	:	data circuit synchronous

<ce>	integer	0	connection element
-------------------	---------	---	--------------------

Values:

0	:	transparent
1	:	non transparent

 The settings
AT+CBST=0,0,0
AT+CBST=14,0,0
AT+CBST=75,0,0 are not supported.

 If **<name>=1** then **<speed>=0,4,6,7,14,68,70,71,75** is not supported.

 The following settings are recommended

AT+CBST=71,0,1 for mobile-to-mobile calls

AT+CBST=7,0,1 for mobile-to-fix calls



AT+CBST?

Read command returns current value of the parameters **<speed>**, **<name>** and **<ce>** in the format:

+CBST: <speed>,<name>,<ce>



AT+CBST=?

Test command returns the supported range of values for the parameters.

3.5.4. AT+CRLP - Radio Link Protocol

Set Radio Link Protocol (RLP) parameters.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CRLP=[<iws>,<mws>,<T1>[,<N2>[,<ver>]]]]]

Set command sets parameters used when non-transparent data calls are originated.

Parameters:

Name	Type	Default	Description
<iws>	integer	61	IWF window dimension
Value: 1÷61 : dimension			
<mws>	integer	61	MS window dimension
Value: 1÷61 : dimension			
<T1>	integer	48	acknowledge timer
Value: 39÷255 : 10 milliseconds units			
<N2>	integer	6	retransmission attempts
Value: 1÷255 : number of attempts			
<ver>	integer	0	protocol version
Value: 0 : version			



AT+CRLP?

Read command returns the current values of the RLP protocol parameters.



AT+CRLP=?

Test command returns values supported as a compound value.

3.5.5. AT+CR - Service Reporting Control

This command enables the **+CR** reporting.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CR=[<mode>]

This command enables/disables the intermediate result code **+CR** reporting.

Its format is: **+CR: <serv>**
(see Unsolicited section).

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enable/disable +CR reporting

Values:

- 0 : disable **+CR** reporting
- 1 : enable **+CR** reporting

Unsolicited field:

Name	Type	Description
<serv>	string	The intermediate result code is transmitted at the point during connect negotiation at which the TA has determined which speed and quality of service will be used, before any error control or data compression reports are transmitted, and before the intermediate result code CONNECT is transmitted.

Values:

- ASYNC : asynchronous transparent
- SYNC : synchronous transparent
- REL ASYNC : asynchronous non-transparent
- REL SYNC : synchronous non-transparent

-  This command replaces V.25ter [14] command Modulation Reporting Control (**+MR**), which is not appropriate for use with a GSM terminal.



AT+CR?

Read command returns whether or not intermediate result code **+CR** is enabled, in the format:
+CR: <mode>



AT+CR=?

Test command returns the supported range of values of parameter **<mode>**.

3.5.6. AT+CRC - Cellular Result Codes

Set command controls whether the extended format of incoming call indication is used.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CRC=[<mode>]

Parameter:

Name	Type	Default	Description
<mode>	integer	0	disables/enables extended format reporting. When enabled, an incoming call is indicated to the TE with unsolicited result code

+CRING: <type>

instead of the normal **RING**

Values:

- 0 : disables extended format reporting (factory default)
- 1 : enables extended format reporting

Unsolicited field:

Name	Type	Description
<type>	string	call type

Values:

- ASYNC : asynchronous transparent data
- SYNC : synchronous transparent data
- REL ASYNC : asynchronous non-transparent data
- REL SYNC : synchronous non-transparent data
- VOICE : normal voice (TS 11)



Entering **AT+CRC=** returns **OK** but has no effect.



AT+CRC?

Read command returns current value of the parameter <mode>



AT+CRC=?

Test command returns supported values of the parameter <mode>

3.5.7. AT+CVHU - Voice Hung Up Control

This command is used in order to set how to disconnect a voice connection.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CVHU=[<mode>]

Set command selects whether **ATH** or "drop DTR" shall cause a voice connection to be disconnected or not.

Parameter:

Name	Type	Default	Description
<mode>	integer	2	Selects how to disconnect a voice connection.

Values:

- 0 : "Drop DTR" ignored but OK result code given. ATH disconnects.
- 1 : "Drop DTR" and ATH ignored but OK result code given.
- 2 : "Drop DTR" behavior according to &D setting. ATH disconnects.



AT+CVHU?

Read command reports the current value of the <mode> parameter, in the format:

+CVHU: <mode>



AT+CVHU=?

Test command reports the range of supported values for parameter <mode>.

3.5.8. AT+CSTA - Select Type of Address

Select type of address.



3GPP TS 24.008

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CSTA=[<type>]

Set command selects the type of number for further dialing commands (D) according to 3GPP specifications.

Parameter:

Name	Type	Default	Description
<type>	integer	129	type of address octet in integer format (refer to 3GPP TS 24.008, sub clause 10.5.4.7); default 145 when dialing string includes international access code character "+", otherwise 129

Values:

- 129 : National address type.
- 145 : International number. Dialing string includes international access code character "+".



AT+CSTA?

Read command returns the current value of <type> parameter in the format:

+CSTA: <type>



AT+CSTA=?

Test command reports the range of the <type> parameter values.

3.5.9. AT+FCLASS - Select Active Service Class

This command sets the wireless module in specified connection mode (data, voice), hence all the calls done afterwards will be data or voice.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+FCLASS=<n>

Parameter:

Name	Type	Default	Description
<n>	integer	0	type of call

Values:

- 0 : data type
- 8 : voice type



AT+FCLASS?

Read command returns the current configuration value of the parameter <n>.



AT+FCLASS=?

Test command returns all supported values of the parameters <n>.

3.5.10. AT#ACAL - Automatic Call

Automatic Call.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#ACAL=[<mode>]

Set command enables/disables the automatic call function.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	disables or enables the automatic call function

Values:

- 0 : disable the automatic call function
- 1 : enable the automatic call function

Additional info:

▶▶ <mode>=1

If the automatic call function is enabled, and **&D2** command has been issued, the transition OFF/ON of DTR causes an automatic call to the first number (position 0) stored in the internal phonebook.

- i** Type of call depends on the last issue of command **+FCLASS**.
- i** See **&Z** and **&N** commands respectively to write or read the phone number on/from the internal phonebook of the module.



AT#ACAL?

Read command reports the current automatic call function mode in the format:

#ACAL: <mode>

As a consequence of the introduction of the command **#ACALEXT** (Extended Automatic Call), it is possible that the read command returns a value supported by **#ACALEXT** but not supported by **#ACAL**. Due to this possible situation it is strongly recommended not to use contemporaneously both commands.

- i** Because of the typing in of the **#ACALEXT** (Extended Automatic Call) command, the **#ACAL?** read command could return a value supported by **#ACALEXT** and not by **#ACAL** set command. Therefore, it is strongly recommended to avoid the use of these two commands at the same time.



AT#ACAL=?

Test command returns the supported range of **<mode>** parameter values.



- Assume that **#ACALEXT** command has been entered. The **#ACAL?** read command could return the following parameter value.

```
AT#ACAL?  
#ACAL: 2  
OK
```

3.5.11. AT#ACALEXT - Extended Automatic Call

This command enables the extended automatic call function.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT#ACALEXT=<mode>,<index>

Set command enables/disables the extended automatic call function.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	enables/disables the automatic call function to a contact in the selected phonebook




Values:

- 0 : disable
- 1 : enable, internal phonebook
- 2 : enable, "SM" phonebook

<index>	integer	0	position in the currently selected phonebook
---------	---------	---	--

Value:

0÷max : index

-  The max value of <index> is given by the test command.
-  If the extended automatic call function is enabled and **&D2** has been issued, the transition OFF/ON of DTR causes an automatic call to the number stored in position <index> in the selected phonebook.
-  The type of call depends on the last setting of the command **+FCLASS**.



AT#ACALEXT?

Read command returns the current value of <mode> and <index> in the format:

#ACALEXT: <mode>,<index>



AT#ACALEXT=?

Test command returns three ranges of values: the first for parameter <mode>, the second for parameter <index>, when the internal phonebook is chosen, and the third for parameter <index>, when the "SM" phonebook is chosen.

-  The range of available positions in a phonebook depends on the selected phonebook.

3.5.12. AT#ECAM - Extended Call Monitoring

This command enables/disables the call monitoring function in the ME.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT#ECAM=[<onoff>]

Set command enables/disables the call monitoring function in the ME.

Parameter:

Name	Type	Default	Description
<onoff>	integer	0	Enables/disables the call monitoring function in the ME, that informs the user about call events such as incoming call, connected, hang up etc. using the following unsolicited indication:

#ECAM: <ccid>,<ccstatus>,<calltype>,,,[<number>,<type>]


Values:

- 0 : disables call monitoring function
- 1 : enables call monitoring function

Unsolicited fields:

Name	Type	Description
<ccid>	integer	call ID number
<ccstatus>	integer	call status
Values:		
0	:	idle
1	:	calling (MO)
2	:	connecting (MO)
3	:	active
4	:	hold
5	:	waiting (MT)
6	:	alerting (MT)
7	:	busy
<calltype>	integer	call type indicator
Values:		
1	:	voice
2	:	data
<number>	string	called number (valid only if <ccstatus> is 1)
<type>	string	type of <number>
Values:		
129	:	national number

145 : international number

 the unsolicited indication is sent along with usual codes (**OK**, **NO CARRIER**, **BUSY...**)



AT#ECAM?

Read command reports whether the extended call monitoring function is currently enabled or not, in the format:

#ECAM: <onoff>



AT#ECAM=?

Test command returns the list of supported values for **<onoff>**

3.5.13. AT#SCT - Show Call Timers

The command reads from USIM the information about incoming and outgoing calls duration.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SCT

Execution command returns the value stored in USIM field Incoming Call Timer, which contains the accumulated incoming call timer duration value for the current call and previous calls, and the value stored in the USIM field Outgoing Call Timer, that contains the accumulated outgoing call timer duration value for the current call and previous calls, in the format:

#SCT: <ICT>,<OCT>

Additional info:

- ▶▶ Intermediate response parameters

Name	Type	Default	Description
<ICT>	string	-	Incoming Call Timer string, in the format: "hh:mm:ss", where hh - hour mm - minute ss - seconds
<OCT>	string	-	<OCT> - Outgoing Call Timer string, in the format: "hh:mm:ss", where hh - hour mm - minute ss - seconds



AT#SCT=?

Test command returns **OK** result code.

3.5.14. AT#SCI - Show Call Information

The command reads from USIM the information about incoming and outgoing calls timing.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SCI

Execution command returns the value stored in USIM field Incoming Call Information, which contains the time of the call and duration of the last calls, and the value stored in the USIM field Outgoing Call Information, that contains time of the call and duration of the last calls, in the format:

#SCI: <indexn>,<number>,<text>,<callTime>,<callDuration>[,<status>]<CR><LF>

#SCI: <indexn>,<number>,<text>,<callTime>,<callDuration>[,<status>][...]]]

Additional info:

- ▶▶ Intermediate response parameters

Name	Type	Default	Description
<indexn>	integer	-	the type of the entry (1: incoming call; 2: outgoing call)
<number>	string	-	phone number associated to the call
<text>	string	-	the alphanumeric text associated to the number; character as specified by command Select TE Character Set +CSCS
<callTime>	string	-	call time in format "yy/MM/dd,hh:mm:ss ±zz", where: yy: year, MM: month, dd: day, hh: hour, mm: minute, ss: seconds, ±zz: time zone
<callDuration>	string	-	call duration in the format: "hh:mm:ss", where hh: hour, mm: minute, ss: seconds
<status>	integer	-	only for incoming calls, call status (0: answered: 1: not answered)



AT#SCI=?

Test command returns **OK** result code.

3.5.15. AT#CFF - Call Forwarding Flags

The command configures the format of call forwarding URC

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT#CFF=<enable>

Set command enables/disables the presentation of the call forwarding flags URC

Parameter:

Name	Type	Default	Description
<enable>	integer	0	enable/disable the presentation of the #CFF URC

The URC format is:

#CFF: <status>,<fwdtonum>

Values:

- 0 : disable the presentation of the #CFF URC
- 1 : enable the presentation of the #CFF URC. The #CFF URC is shown each time the Call Forwarding Unconditional (CFU) SS setting is changed or checked. It is also shown on each startup, and it reports the status of the call forwarding flags, as they are currently stored on SIM

Unsolicited fields:

Name	Type	Description
<status>	integer	Reports if CFU is enabled or disabled
Values:		
0	:	CFU disabled
1	:	CFU enabled
<fwdtonum>	string	Reports phone number used to forward the incoming calls



AT#CFF?

Read command reports whether the presentation of the call forwarding flags URC is currently enabled or not.

Moreover, if the flags field is present in the SIM, it reports the current status of the call forwarding flags as they are currently stored on SIM and the number incoming calls are forwarded to.

The format is:

#CFF: <enable>[,<status>,< fwdtonum >]



AT#CFF=?

Test command returns the range of available values for parameter <enable>

3.5.16. AT#NCIH - NO CARRIER Indication Handling

This command purpose is to Enable\Disable the **NO CARRIER** indication message when an incoming call is dropped.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT#NCIH=<enable>

Set command enables/disables the sending of a **NO CARRIER** indication due to incoming ringing call dropped by the caller before the answer takes place.

Parameter:

Name	Type	Default	Description
<enable>	integer	0	Enable/Disable value for NO CARRIER indication sending.

Values:

0 : disabled

1 : enabled



AT#NCIH?

Read command reports whether the feature is currently enabled or not, in the format:

#NCIH: <enable>



AT#NCIH=?

Test command returns the supported range of values for parameter <enable>.

3.5.17. AT#CESTHLCK - Call Establishment Lock

This command disables/enables the call abort.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT#CESTHLCK=[<closure_type>]

Set command disables/enables the call abort before the device enters connected state.

Parameter:

Name	Type	Default	Description
<closure_type>	integer	0	Disables/enables the call abort before the device enters connected state:

Values:

- 0 : aborting the call setup by reception of a character is generally possible at any time before the device enters connected state
- 1 : aborting the call setup is disabled until the device enters connected state



AT#CESTHLCK?

Read command returns the current value of the parameter <closure_type> in the format:

#CESTHLCK: <closure_type>



AT#CESTHLCK=?

Test command returns the supported values of the parameter <closure_type>.

3.5.18. AT+VTS - DTMF Tones Transmission

The command handles the transmission of DTMF tones.



3GPP TS 27.007
TIA IS-101

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+VTS=<dtmfString>[,<duration>]

Execution command allows the transmission of DTMF tones.

Parameters:

Name	Type	Default	Description
<dtmfString>	string	-	string of <dtmf>s, i.e. ASCII characters in the set (0 9), #, *, (A-D), P; it allows the user to send a sequence of DTMF tones, each of them with a duration that was defined through +VTD command
<duration>	integer	0	duration of a tone in 1/100 sec; this parameter can be specified only if the length of first parameter is just one ASCII character

Values:

- 0 : a single DTMF tone will be transmitted for a duration depending on the network, no matter what the current AT+VTD setting is
- 1÷255 : a single DTMF tone will be transmitted for a time <duration> (in 10 ms multiples), no matter what the current AT+VTD setting is



The character P does not correspond to any DTMF tone, but it is interpreted as a pause of 3 seconds between the preceding and succeeding DTMF string elements.



AT+VTS=?

Test command provides the list of supported <dtmf>s and the list of supported <duration>s in the format:

(list of supported <dtmf>s)[,(list of supported <duration>s)]

3.5.19. AT+VTD - Tone Duration

This command sets the length of tones transmitted with **+VTS** command.



3GPP TS 27.007
TIA IS-101

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Common profile	No	-	2



AT+VTD=<n>

Set command refers to an integer <n> that defines the length of tones emitted with **+VTS** command.

Parameter:

Name	Type	Default	Description
<n>	integer	0	duration of a tone

Values:

- 0 : the duration of every single tone is dependent on the network
- 1÷255 : duration of every single tone in 1/10 sec



AT+VTD?

Read command reports the current Tone Duration, in the format:

<duration>



AT+VTD=?

Test command provides the list of supported <duration>

3.5.20. AT#CREJ - User Determined User Busy

This command disconnects all active calls (like **ATH** or **AT+CHUP**).

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#CREJ

Execution command disconnects all active calls (like **ATH** or **AT+CHUP**), but setting the “call rejected” cause (cause #21) for disconnection (only if we have an incoming call that has not been answered yet, and that we want to reject).



AT#CREJ=?

Test command returns the **OK** result code.

3.5.21. AT#CHUP - Hang Up Call

This command cancels all active and held calls

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CHUP

Execution command cancels all active and held calls, also if a multi-party session is running. It also allows disconnecting of a data call from a CMUX instance different from the one that was used to start the data call.



AT#CHUP?

Test command returns the **OK** result code.

3.6. SMS & CB

3.6.1. AT+CSMS - Select Message Service

Set command selects messaging service <service>



3GPP TS 27.005
3GPP TS 23.040
3GPP TS 23.041

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CSMS=[<service>]

Set command selects messaging service <service>. It returns the types of messages supported by the ME:

+CSMS: <mt>,<mo>,<bm>

For parameters meaning see Additional info section.

Parameter:

Name	Type	Default	Description
<service>	integer	0	Select Message Service

Values:

- 0 : 3GPP TS 23.040 and 3GPP TS 23.041. The syntax of SMS AT commands is compatible with 3GPP TS 27.005
- 1 : 3GPP TS 23.040 and 3GPP TS 23.041. The syntax of SMS AT commands is compatible with 3GPP TS 27.005. The requirement of <service> setting 1 is mentioned under corresponding command descriptions

Additional info:

- ▶▶ Parameters meaning of the returned message.

Name	Type	Default	Description
<mt>	integer	0	mobile terminated messages support:

Values:

- 0 : type not supported
- 1 : type supported

<mo>	integer	0	mobile originated messages support
------	---------	---	------------------------------------

Values:

0 : type not supported
 1 : type supported

<bm>	integer	0	broadcast type messages support
-------------------	---------	---	---------------------------------

Values:

0 : type not supported
 1 : type supported



AT+CSMS?

Read command reports current service setting along with supported message types in the format:

+CSMS: <service>, <mt>, <mo>, <bm>



AT+CSMS=?

Test command reports the supported value of the parameter **<service>**

3.6.2. AT+CPMS - Preferred Message Storage

The command selects the memory storage used by SMs (Short Messages).



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CPMS=<memr>[,<memw>[,<mems>]]

Set command selects memory storages <memr>, <memw> and <mems> to be used for reading, writing, sending and storing SMs

The command returns the memory storage status in the format:

+CPMS: <usedr>,<totalr>,<usedw>,<totalw>,<useds>,<totals>

The parameters are described in the Additional info section.

Parameters:


Name	Type	Default	Description
<memr>	string	SM	memory from which messages are read and deleted
Values:			
SM	:	SIM SMS memory storage	
ME	:	NVM SMS storage	
<memw>	string	SM	memory to which writing and sending operations are made
Values:			
SM	:	SIM SMS memory storage	
ME	:	NVM SMS storage	
<mems>	string	SM	memory to which received SMs are preferred to be stored
Values:			
SM	:	SIM SMS memory storage	
ME	:	NVM SMS storage	

Additional info:

- ▶▶ Here is the meaning of the parameters returned by the command.

Name	Type	Default	Description
<usedr>	integer	-	number of SMs stored in <memr>
<totalr>	integer	-	max number of SMs that <memr> can contain
<usedw>	integer	-	number of SMs stored in <memw>
<totalw>	integer	-	max number of SMs that <memw> can contain

<useds>	integer	-	number of SMs stored in <mems>
<totals>	integer	-	max number of SMs that <memw> can contain

-  When **<memr>** is set to a specific memory, also **<memw>** and **<mems>** are set to the same memory.

**AT+CPMS?**

Read command reports the message storage status.

+CPMS:<memr>,<usedr>,<totalr>,<memw>,<usedw>,<totalw>,<mems>,<useds>,<totals>

The parameters are described in previous sections.

**AT+CPMS=?**

Test command reports the supported values for parameters **<memr>**, **<memw>** and **<mems>**.



- Get **ME** memory status. 15 SM positions are occupied.
AT+CPMS="ME"
+CPMS: "ME",15,100,"ME",15,100,"ME",15,100
OK
- Get **SM** memory status. 5 of 10 SMs positions of the SIM are already occupied.
AT+CPMS?
+CPMS: "SM",5,10,"SM",5,10,"SM",5,10
OK

3.6.3. AT+CMGF - Message Format

Selects the format of SMS messages to be used in following SMS commands.



- 3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CMGF=[<mode>]

Set command selects the format of SMS messages used with send, list, read and write commands.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	format to use for SMS operations

Values:

- 0 : PDU mode
- 1 : text mode



AT+CMGF?

Read command reports the current value of the parameter <mode> in the format:

+CMGF: <mode>



AT+CMGF=?

Test command returns the supported values of parameter <mode>.

3.6.4. AT+CSCA - Service Center Address

This command allows to set the Service Center Address for SMS transmissions.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2



AT+CSCA=<number>[,<type>]

Set command sets the Service Center Address to be used for mobile originated SMS transmissions

Parameters:

Name	Type	Default	Description
<number>	string	-	String type phone number of forwarding address in format specified by <type> parameter
<type>	integer	145	The type of number

Values:


129	:	National numbering scheme
145	:	International numbering scheme (contains the character "+")



AT+CSCA?

Read command reports the current value of the SCA in the format:

+CSCA: <number>,<type>




-  If SCA is not present the device reports an error message.



AT+CSCA=?

Test command returns the **OK** result code.



-  To use the SM service, is mandatory to set a Service Center Address at which service requests will be directed.
-  In Text mode, this setting is used by send and write commands; in PDU mode, setting is used by the same commands, but only when the length of the SMSC address coded into the <pdu> parameter equals zero.
-  The current settings are stored through **+CSAS**



```
AT+CSCA="+821029190903",145  
OK
```

```
AT+CSCA?  
+CSCA: "+821029190903",145  
OK
```


3.6.5. AT+CSMP - Set Text Mode Parameters

This command is used to select values for additional parameters for storing and sending SMS when the text mode is used (**AT+CMGF=1**).



3GPP TS 23.40
3GPP TS 23.038

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2








AT+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]

Set command is used to select values for additional parameters for storing and sending SMS when the text mode is used (**AT+CMGF=1**).

Parameters:


Name	Type	Default	Description															
<fo>	integer	17	<p>first octet of SMS-SUBMIT or SMS-DELIVER PDU, as described in 3GPP TS 23.040</p> <p>bit 0/1 = Message Type Indicator bit 2 = Reject Duplicates bit 3/4 = Validity Period Format bit 5 = Status Report Request bit 6 = User Data Header Indicator bit 7 = Reply Path</p>															
Value:																		
0÷255 : mask																		
<vp>	mixed	167	<p>Validity Period, the format depends on Validity Period Format in <fo>, as described in 3GPP TS 23.040:</p> <table border="1"> <thead> <tr> <th>bit 3</th> <th>bit 4</th> <th>Format</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Validity Period not present</td> </tr> <tr> <td>0</td> <td>1</td> <td>Validity Period present, enhanced format</td> </tr> <tr> <td>1</td> <td>0</td> <td>Validity Period present, relative format</td> </tr> <tr> <td>1</td> <td>1</td> <td>Validity Period present, absolute format</td> </tr> </tbody> </table>	bit 3	bit 4	Format	0	0	Validity Period not present	0	1	Validity Period present, enhanced format	1	0	Validity Period present, relative format	1	1	Validity Period present, absolute format
bit 3	bit 4	Format																
0	0	Validity Period not present																
0	1	Validity Period present, enhanced format																
1	0	Validity Period present, relative format																
1	1	Validity Period present, absolute format																
Value:																		
0÷255 : range for Validity Period in relative format																		
<pid>	integer	0	TP-Protocol-Identifier, as described in 3GPP TS 23.40															
Value:																		
0÷255 : described in 3GPP TS 23.40																		
<dcs>	integer	0	SMS Data Coding Scheme, as described in 3GPP TS 23.038															
Value:																		
0÷255 : described in 3GPP TS 23.038																		

-  In the parameter **<fo>**: only the following values are supported for Message Type Indicator:
 [00] - SMS-DELIVER
 [01] - SMS-SUBMIT
-  In the parameter **<fo>**: user is not responsible for setting **bit 2** and **bit 6**, if set, they will have no meaning.
-  In the parameter **<vp>**: the *absolute format* is a quoted time-string type (see **+CCLK**)
-  The current settings are stored through **+CSAS**.
<vp> is stored only as integer type, i.e. only in its *relative format*.
-  **<vp>**, **<pid>** and **<dcs>** default values are loaded from first SIM SMS Parameters profile, if present. If it is not present, then the default values are those above indicated.

**AT+CSMP?**

Read command returns the current setting in the format:

+CSMP: <fo>,<vp>,<pid>,<dcs>

-  If the Validity Period Format (**<fo>**'s **bit[4]bit[3]**) is [00] (i.e. Not Present), **<vp>** is represented just as a quoted empty string ("").

**AT+CSMP=?**

Test command returns the OK result code.



- Set the parameters for an outgoing message with 24 hours of validity period and default properties:

```
AT+CSMP=17,167,0,0  
OK
```

Set the parameters for an outgoing message with validity period in enhanced format: the **<vp>** string actually codes 24 hours of validity period.

```
AT+CSMP=9,"01A80000000000"  
OK
```

Set the parameters for an outgoing message with validity period in enhanced format: the **<vp>** string actually codes 60 seconds of validity period.

```
AT+CSMP=9,"023C0000000000"  
OK
```

Set the parameters for an outgoing message with validity period in enhanced format: the **<vp>** string actually codes 29 hours 85 minutes 30 seconds of validity period.

```
AT+CSMP=9,"03925803000000"  
OK
```

3.6.6. AT+CSDH - Show Text Mode Parameters

This command controls whether detailed header information is shown in text mode.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CSDH=[<show>]

Set command controls whether detailed header information is shown in text mode (**AT+CMGF=1**) result codes.

Parameter:

Name	Type	Default	Description
<show>	integer	0	control the display of the result codes.

Values:

- 0 : see Additional info section
- 1 : show the values in result codes

Additional info:

▶▶ If <show>=0

do not show header values defined in commands **+CSCA** and **+CSMP** (<sca>,<tosca>,<fo>,<vp>,<pid> and <dcs>) nor <length>,<toda> or <toa> in **+CMT**, **+CMGL**, **+CMGR** result codes for SMS-DELIVERs and SMS-SUBMITs in text mode.

For SMS-COMMANDs in **+CMGR** result code do not show <pid>,<mn>,<da>,<toda>,<length> or <cdata>



AT+CSDH?

Read command reports the current setting in the format:

+CSDH: <show>



AT+CSDH=?

Test command reports the supported range of values for parameter <show>.

3.6.7. AT+CSCB - Select Cell Broadcast

The command selects which types of Cell Broadcast Messages are to be received by the device.



3GPP TS 27.005
3GPP TS 23.041
3GPP TS 23.038

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Common profile	No	-	2



AT+CSCB=[<mode>[,<mids>[,<dcss>]]]

Set command selects which types of Cell Broadcast Messages are to be received by the device

Parameters:

Name	Type	Default	Description
<mode>	integer	0	select which types of Cell Broadcast messages are to be received
Values:			
0 : the message types defined by <mids> and <dcss> are accepted			
1 : the message types defined by <mids> and <dcss> are rejected			
<mids>	string	-	message Identifiers: all different possible combinations of the CBM message identifiers; default is empty string ("").
<dcss>	string	-	Data Coding Schemes: all different possible combinations of CBM data coding schemes; default is empty string ("").



The current settings are stored also by **+CSAS** command



AT+CSCB?

Read command reports the current value of parameters <mode>, <mids> and <dcss>



AT+CSCB=?

Test command returns the range of values for parameter <mode>



All CBMs are accepted, none is rejected

```
AT+CSCB?
+CSCB: 1,"",""
OK
Select a range
AT+CSCB=0,"0,1,300-315,450","0-3"
OK
```

3.6.8. AT+CSAS - Save Settings

This command saves settings which have been made by the **+CSCA**, **+CSMP** and **+CSCB** commands in local non volatile memory or in SIM.



- 3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CSAS[=<profile>]




Execution command saves settings which have been made by the **+CSCA**, **+CSMP** and **+CSCB** commands in local non volatile memory or in SIM.

Parameter:

Name	Type	Default	Description
<profile>	integer	0	Index of the profile where the settings are saved

Values:

- 0 : it saves the settings to NVM
- 1÷n : SIM profile number; the value of <n> depends on the SIM and its max is 3

-  Certain settings may not be supported by the SIM and therefore they are always saved to NVM, regardless the value of **<profile>**.
-  If parameter is omitted the settings are saved in the non volatile memory.
-  **+CSCB <mids>** (Message Identifiers) parameter can be saved to SIM only if the "Cell broadcast message identifier selection" file is present on the SIM itself. This file, if present, has storage for only a single set of data. Therefore, it is not possible to save different **<mids>** in different SIM profiles; **<mids>** value, once changed and saved, will be the same for all SIM profiles.



AT+CSAS=?

Test command returns the possible range of values for the parameter **<profile>**.

3.6.9. AT+CRES - Restore Settings

Execution command restores message service settings saved by **+CSAS** command from either NVM or SIM.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2





AT+CRES[=<profile>]

Parameter:

Name	Type	Default	Description
<profile>	integer	N/A	Defines which message service profiles to restore.

Values:

- 0 : restores message service settings from NVM
- 1÷n : restores message service settings from SIM. The n value depends on the SIM.

-  Certain settings may not be supported by the SIM and therefore they are always restored from NVM, regardless the value of **<profile>**
-  If parameter is omitted the command restores message service settings from NVM.



AT+CRES=?

Test command returns the possible range of values for the parameter **<profile>**.

3.6.10. AT+CMMS - More Message to Send

Set command controls the continuity of SMS relay protocol link. When feature is enabled (and supported by network) multiple messages can be sent much faster as link is kept open.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2




AT+CMMS=[<n>]

Parameter:

Name	Type	Default	Description
<n>	integer	0	enables/disables the relay protocol link continuity.

Values:

- 0 : disable
- 1 : keep enabled until the time between the response of the latest message send command (+CMGS, +CMSS, etc.) and the next send command exceeds 5 seconds, then the link is closed and the parameter <n> is automatically reset to 0
- 2 : enable (if the time between the response of the latest message send command and the next send command exceeds 5 seconds, the link is closed but the parameter <n> remains set to 2)

 Entering **AT+CMMS=** returns **OK** but has no effect.



AT+CMMS?

Read command reports the current value of the parameter <n> in the format:

+CMMS: <n>



AT+CMMS=?

Test command returns the range of supported <n>

3.6.11. AT+CNMI - New Message Indications to Terminal Equipment

This command sets the parameters for receiving SMS messages.



3GPP TS 27.005
3GPP TS 23.040
GSM 03.38
GSM 03.40

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CNMI=[<mode>,<mt>[,<bm>[,<ds>[,<bfr>]]]]]

Set command selects the behavior of the device on how the receiving of new messages from the network is indicated to the DTE.

Parameters:

Name	Type	Default	Description
<mode>	integer	N/A	unsolicited result codes buffering option.

Values:

- 0 : Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.
- 1 : Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved, otherwise forward them directly to the TE.
- 2 : Buffer unsolicited result codes in the TA in case the DTE is busy and flush them to the TE after reservation. Otherwise forward them directly to the TE.
- 3 : if <mt> is set to 1 the hardware ring line is enabled for 1 sec when a SMS is received while the module is in GPRS online mode

<mt>	integer	0	result code indication reporting for SMS-DELIVER.
------	---------	---	---

Values:

- 0 : No SMS-DELIVER indications are routed to the TE and messages are stored in SIM.
- 1 : If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE using the URC described in Add. info section.
- 2 : SMS-DELIVERs (except class 2 messages and messages in the "store" message waiting indication group) are routed directly to the TE using the URC described in the Add. info section.
- 3 : Class 3 SMS-DELIVERs are routed directly to TE using unsolicited result codes defined in <mt>=2. Messages of other data coding schemes result in indication as defined in <mt>=1.

<bm>	integer	0	broadcast reporting option
------	---------	---	----------------------------

Values:

- 0 : Cell Broadcast Messages are not sent to the DTE
- 2 : New Cell Broadcast Messages are sent to the DTE with the URC described in Add. info section.

<ds>	integer	0	SMS-STATUS-REPORTs reporting option
-------------------	---------	---	-------------------------------------

Values:

- 0 : status report receiving is not reported to the DTE and is not stored
- 1 : the status report is sent to the DTE with the URC described in the Add. info section.
- 2 : if a status report is stored, then the unsolicited result code described in Add. info section is sent.

<bfr>	integer	0	buffered result codes handling method
--------------------	---------	---	---------------------------------------

Values:

- 0 : TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode>=1..3 is entered (OK response shall be given before flushing the codes)
 - 1 : TA buffer of unsolicited result codes defined within this command is cleared when <mode>=1..3 is entered.
-

Additional info:

- ▶▶ **<mt>=1**
+CMTI: <mems>,<index>

- ▶▶ **<mt>=2, PDU mode**
+CMT: <alpha>,<length><CR><LF><PDU>

- ▶▶ **<mt>=2, TEXT mode**
+CMT: <oa>,<alpha>,<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>

The parameters written in italics will be present depending on **+CSDH** last setting

- ▶▶ **<bm>=2, PDU mode**
+CBM: <length><CR><LF><PDU>

 - ▶▶ **<bm>=2, Text mode**
+CBM: <sn>,<mid>,<dcs>,<pag>,<pags><CR><LF><data>

 - ▶▶ **<ds>=1, PDU mode**
-

+CDS: <length><CR><LF><PDU>

▶▶ <ds>=1, TEXT mode
+CDS: <fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st>

▶▶ <ds>=2
+CDSI: <mems>,<index>

Unsolicited fields:

Name	Type	Description
<mems>	string	memory storage where the new message is stored (see +CPMS).
<index>	integer	location on the memory where SMS is stored.
<alpha>	string	alphanumeric representation of originator/destination number corresponding to the entry found in MT phonebook; used character set should be the one selected with command +CSCS .
<length>	integer	PDU length
<PDU>	string	PDU message
<oa>	string	originating address, string type converted in the currently selected character set (see +CSCS)
<alpha>	string	alphanumeric representation of <oa>; used character set should be the one selected with command +CSCS .
<scts>	string	arrival time of the message to the SC
<tooa>	integer	type of number <oa>: 129 - number in national format 145 - number in international format (contains the "+")
<fo>	string	first octet of message PDU, see 3GPP TS 23.040
<pid>	string	Protocol Identifier
<dcs>	string	Data Coding Scheme
<sca>	string	Service Centre address, string type, converted in the currently selected character set (see +CSCS)
<tosca>	integer	type of number <sca>: 129 - number in national format 145 - number in international format (contains the "+")
<length>	integer	text length
<data>	string	TP-User-Data <ul style="list-style-type: none"> If <dcs> indicates that GSM 03.38 default alphabet is used and <fo> indicates that GSM 03.40 TP-User-Data-Header-Indication is not set (bit 6 of <fo> is 0), each character of GSM alphabet will be converted into current TE character set (see +CSCS). If <dcs> indicates that 8-bit or UCS2 data coding scheme is used or <fo> indicates that GSM 03.40 TP-User-Data-Header-Indication is set (bit 6 of <fo> is 1), each 8-bit octet will be converted into two IRA character long hexadecimal number (e.g. octet 0x2A will be converted as two characters 0x32 0x41).

		Class 2 messages and messages in the "store" message waiting indication group result in indication as defined in <code><mt>=1</code> .
<code><sn></code>	integer	message serial number
<code><mid></code>	integer	message ID
<code><dc></code>	string	Data Coding Scheme
<code><pag></code>	integer	page number
<code><pags></code>	integer	total number of pages of the message
<code><data></code>	string	CBM Content of Message <ul style="list-style-type: none"> If <code><dc></code> indicates that GSM 03.38 default alphabet is used, each character of GSM alphabet will be converted into current TE character set (see <code>+CSCS</code>) If <code><dc></code> indicates that 8-bit or UCS2 data coding scheme is used, each 8-bit octet will be converted into two IRA character long hexadecimal number (e.g. octet 0x2A will be converted as two characters 0x32 0x41)
<code><mr></code>	integer	message reference number; 3GPP TS 23.040 TP-Message-Reference in integer format
<code><ra></code>	string	recipient address, string type, represented in the currently selected character set (see <code>+CSCS</code>)
<code><tora></code>	integer	type of number <code><ra></code> : 129 - number in national format 145 - number in international format (contains the "+")
<code><scts></code>	string	arrival time of the message to the SC
<code><dt></code>	string	sending time of the message
<code><st></code>	string	message status as coded in the PDU

i DTR signal is ignored, hence the indication is sent even if the DTE is inactive (DTR signal is Low). In this case the unsolicited result code may be lost so if MODULE remains active while DTE is not, at DTE startup is suggested to check whether new messages have reached the device meanwhile with command `AT+CMGL=0` that lists the new messages received.

i It has been necessary to take the following decisions to get over any incoherence problem, due to the possibility to have contemporaneous different settings of parameter `<mt>` in different sessions (see `#PORTCFG` and `+CMUX`):

<code><mt></code> settings in different sessions	Message Class or Indication group, as in the DCS	
	SM Class is No Class, or SM Class is 0 or 1 or 3, or SM is an Indication with group "Discard"	SM Class is 3
<code><mt>=2</code> for session "0" and <code><mt>=any value</code> for other session(s)	URC is shown only on session "0"	
<code><mt>=3</code> for session "0" and		URC is shown only on session "0"

<mt>=0 or 1 for other session(s)		
----------------------------------	--	--

i The following table clarifies which URC is shown and if the DELIVER SM is stored, depending on the <mt> parameter value and the SM class.

<mems> is the memory where the received messages are stored (see **+CPMS**)

<mt>	SM CLASS				
	0/msg waiting discard	1/no class	2	3	msg waiting store
0	store in <mems>	store in <mems>	store in SIM	store in <mems>	store in <mems>
1	store in <mems>, send ind +CMTI	store in <mems>, send ind +CMTI	store in SIM, send ind +CMTI	store in <mems>, send ind +CMTI	store in <mems>, send ind +CMTI
2	route msg to TE: +CMT	route msg to TE: +CMT	store in SIM, send ind +CMTI	route msg to TE: +CMT	store in <mems>, send ind +CMTI
3	store in <mems>, send ind +CMTI	store in <mems>, send ind +CMTI	store in SIM, send ind +CMTI	route msg to TE: +CMT	<mems>, send ind +CMTI

i It has been necessary to take the following decision to get over an incoherence problem, due to the possibility to have contemporaneous different settings of parameter <ds> in different sessions (see **#PORTCFG** and **+CMUX**):

<ds> settings in different sessions	
<ds>=1 for session "0" AND <ds>=2 for at least one of the other sessions	URC +CDS : is shown only on session "0" and no status report is stored on <mems>
<ds>=0 for session "0" AND <ds>=2 for at least one of the other sessions	no URC is shown on any session and no status report is stored on <mems>



AT+CNMI?

Read command returns the current parameter settings for +CNMI command in the form:

+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>



AT+CNMI=?

Test command reports the supported range of values for the +CNMI command parameters

3.6.12. AT+CNMA - New Message Acknowledgement

This command is used to confirm the correct reception of a new message.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CNMA

Execution command confirms correct reception of a new message (SMS-DELIVER or SMS-STATUS-REPORT) which is routed directly to the TE.

Acknowledge with **+CNMA** is possible only if the **+CSMS** parameter is set to 1 (**+CSMS=1**) when a **+CMT** or **+CDS** indication is shown.

If no acknowledgement is given within the network timeout (17 seconds), an **RP-ERROR** is sent to the network, the **<mt>** and **<ds>** parameters of the **+CNMI** command are then reset to zero (do not show new message indication).

If command is executed, but no acknowledgement is expected, or some other ME related error occurs, result code **+CMS ERROR: <err>** is returned.

The AT command syntax and functionalities are different between SMS PDU Mode and SMS Text Mode, as explained in Additional info sections.

Additional info:

►► PDU Mode

AT+CNMA[=<n>[,<length>[<CR>PDU is given<ctrl-Z/ESC>]]]

Either positive (**RP-ACK**) or negative (**RP-ERROR**) acknowledgement to the network is possible. Parameter **<n>** defines which one will be sent. Optionally (when **<length>** is greater than zero) an acknowledgement TPDU (**SMS-DELIVER-REPORT** for **RP-ACK** or **RP-ERROR**) may be sent to the network. The entering of PDU is done similarly as specified in command Send Message **+CMGS**, except that the SMSC address field is not present.

Name	Type	Default	Description
<n>	integer	N/A	type of acknowledgement in PDU mode
Values:			
0	:	send RP-ACK without PDU (same as TEXT mode)	
1	:	send RP-ACK with optional PDU message	
2	:	send RP-ERROR with optional PDU message	
<length>	integer	-	length of the PDU message

►► Text Mode

AT+CNMA

Only positive acknowledgement to network (**RP-ACK**) is possible.



AT+CNMA=?


Test command returned information are different between SMS PDU Mode and SMS Text Mode, as explained below.


Additional info:

- ▶▶ PDU Mode
Test command returns the possible range of values for the parameter <n>.

- ▶▶ Text Mode
Test command returns the **OK** result code.



-  In case that a directly routed message must be buffered in ME/TA (possible when **+CNMI** parameter <mode> equals 0 or 2) or AT interpreter remains too long in a state where result codes cannot be sent to TE (e.g. user is entering a message using **+CMGS**), acknowledgement (**RP-ACK**) is sent to the network without waiting **+CNMA** command from TE.

-  It has been necessary to take the following decision to get over any incoherence problem, due to the possibility to have contemporaneous different settings of parameter <mt> and <ds> of the **+CNMI** command in different sessions (see **#PORTCFG** and **+CMUX**): only the <mt> and <ds> setting for session "0" are considered as valid to decide if **+CNMA** acknowledgment is expected or not.



- PDU Mode

```
AT+CSMS=1
+CSMS: 1,1,1
OK
```

```
Set PDU mode.
AT+CMGF=0
OK
```

```
AT+CNMI=2,2,0,0,0
OK
```

```
Message is received from network.
+CMT: "",70
06816000585426000480980600F170110370537284...
```

```
Send positive acknowledgement to the network.
AT+CNMA=0
OK
```

```
Message is received from network.
+CMT: "",70
06816000585426000480980600F170110370537284...
```

```
Send negative acknowledgment (Unspecified error) to the network.
AT+CNMA=2,3<CR>
> 00FF00 <Ctrl-Z>
OK
```

- Text Mode

```
AT+CSMS=1
+CSMS: 1,1,1
OK
```

```
Set Text mode.
AT+CMGF=1
OK
```

```
AT+CNMI=2,2,0,0,0
OK
```

```
Message is received from network.
+CMT: "+821020955219",,"07/07/26,20:09:07+36"
TEST MESSAGE
```

```
Send positive acknowledgement to the network.
AT+CNMA
OK
```

3.6.13. AT+CMGL - List Messages

This command is used to list the messages.



3GPP TS 27.005
3GPP TS 23.040
3GPP TS 23.038

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CMGL[=<stat>]

Execution command reports the list of all the messages with status value **<stat>** stored into **<memr>** message storage (**<memr>** is the message storage for read and delete SMS as last settings of command **+CPMS**).

Parameter:

Name	Type	Default	Description
<stat>	mixed	-	<p><stat> parameter type and the command output depend on the last settings of the +CMGF command (message format to be used). There are two modes:</p> <ul style="list-style-type: none"> • PDU mode • Text mode <p>See the following Additional info sections.</p>

Additional info:

- ▶▶ When message format is PDU mode, the **<stat>** parameter is:

Name	Type	Default	Description
<stat>	integer	N/A	status value

Values:

- 0 : new message
- 1 : read message
- 2 : stored message not sent yet
- 3 : stored message already sent
- 4 : all messages

- ▶▶ In case of PDU mode the representation format (see **+CMGF**) is:

+CMGL: <index>,<stat>,<alpha>,<length><CR><LF><pdu>[<CR><LF>
+CMGL: <index>,<stat>,<alpha>,<length><CR><LF><pdu>[...]]

Name	Type	Default	Description
<index>	integer	-	message position in the storage list.
<stat>	integer	-	message status. See the above <stat> parameter description.
<alpha>	string	-	String type alphanumeric representation of <da> or <oa>, corresponding to an entry found in the phonebook; used character set is the one selected with command +CSCS .
<length>	integer	-	PDU length in bytes
<pdu>	string	-	message in PDU format, according to 3GPP TS 23.040

►► When message format is TEXT mode, the <stat> parameter is:

Name	Type	Default	Description
<stat>	string	N/A	status value
Values:			
	"REC UNREAD"	:	new message
	"REC READ"	:	read message
	"STO UNSENT"	:	stored message not sent yet
	"STO SENT"	:	stored message already sent
	"ALL"	:	all messages

►► In case of TEXT mode, the representation format for stored messages (either sent or unsent) or received messages (either read or unread, not message delivery confirm) is:

```
+CMGL: <index>,<stat>,<oa/da>,<alpha>,<scts>[,<toa/toda>,<length>]-<CR><LF>
<data>[<CR><LF>
+CMGL: <index>,<stat>,<oa/da>,<alpha>,<scts>[,<toa/toda>,<length>]-<CR><LF>
<data>[...]]
```

The information written in italics will be present depending on **+CSDH** last setting.

Name	Type	Default	Description
<index>	integer	-	message position in the storage list.
<stat>	string	-	message status. See the above <stat> parameter description.
<oa/da>	string	-	originator/destination address, represented in the currently selected character set (see +CSCS).
<alpha>	string	-	The alphanumeric representation of <da> or <oa>, corresponding to an entry found in the phonebook; used character set is the one selected with command +CSCS .
<scts>	string	-	TP-Service Centre Time Stamp in Time String Format.


<tooa/toda>	integer	N/A	type of number <oa/da>
Values:			
129	:	number in national format	
145	:	number in international format (contains the "+")	
<length>	integer	-	text length
<data>	string	-	TP-User-Data If <dcs> indicates that 3GPP TS 23.038 default alphabet is used, each character of GSM alphabet will be converted into current TE character set (see +CSCS) If <dcs> indicates that 8-bit or UCS2 data coding scheme is used, each 8-bit octet will be converted into two IRA character long hexadecimal number (e.g. octet 0x2A will be converted as two characters 0x32 0x41) If <fo> indicates that a UDH is present each 8-bit octet will be converted into two IRA character long hexadecimal number. The <length> indicates text length in characters without UDH length.

►► In case of TEXT mode, the representation format for delivery confirm messages is:

**+CMGL: <index>,<stat>,<fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st>[<CR><LF>
+CMGL: <index>,<stat>,<fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st>[...]]**

Name	Type	Default	Description
<index>	integer	-	message position in the storage list.
<stat>	string	-	Message status. See the last <stat> parameter description.
<fo>	integer	-	first octet of the message PDU
<mr>	integer	-	message reference number; 3GPP TS 23.040 TP-Message-Reference in integer format
<ra>	string	-	recipient address, represented in the currently selected character set (see +CSCS)
<tora>	string	-	type of number <ra>
<scts>	string	-	arrival time of the message to the SC
<dt>	string	-	sending time of the message
<st>	integer	-	message status as coded in the PDU

i If parameter is omitted the command returns the list of SMS with "REC UNREAD" status.

-
-  The order in which the messages are reported by **+CMGL** corresponds to their position in the memory storage
-

**AT+CMGL=?**

Test command returns a list of supported **<stat>**s

3.6.14. AT+CMGR - Read Message

This command is used to read a message.



3GPP TS 27.005
3GPP TS 23.040
3GPP TS 23.038

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CMGR=<index>

Execution command reports the message with location value <index> from <memr> message storage (<memr> is the message storage for read and delete SMs as last settings of command +CPMS).

Parameter:

Name	Type	Default	Description
<index>	integer	-	message index. The command output depends on the last settings of command +CMGF (message format to be used). There are two modes: <ul style="list-style-type: none"> • PDU mode • Text mode

See the following Additional info sections.

Additional info:

- ▶▶ In case of PDU mode, if there is a message in location <index>, the output has the following format:

+CMGR: <stat>,<alpha>,<length><CR><LF><pdu>

Name	Type	Default	Description
<stat>	integer	N/A	status of the message
Values:			
	0	:	new message
	1	:	read message
	2	:	stored message not yet sent
	3	:	stored message already sent
<alpha>	string	-	string type alphanumeric representation of <da> or <oa>, corresponding to an entry found in the phonebook; used character set is the one selected with command +CSCS
<length>	integer	-	PDU length in bytes

<PDU>	string	-	message in PDU format, according to 3GPP TS 23.040
--------------------	--------	---	--

►► In case of Text mode, if there is a received message in location **<index>**, the output has the following format (the information written in italics will be present depending on **+CSDH** last setting):

+CMGR:*<stat>*,*<oa>*,*<alpha>*,*<scts>*
[,<toa>,*<fo>*,*<pid>*,*<dcS>*,*<sca>*,*<tosca>*,*<length>*]*<CR><LF><data>*

In case of Text mode, if there is either a sent or an unsent message in location **<index>** the output format is:


+CMGR:*<stat>*,*<da>*,*<alpha>*
[,<toda>,*<fo>*,*<pid>*,*<dcS>*,*[<vp>*],*<sca>*,*<tosca>*,*<length>*]*<CR><LF><data>*

In case of Text mode, if there is a Message Delivery Confirm message in location **<index>** the output format is:

+CMGR: *<stat>*,*<fo>*,*<mr>*,*<ra>*,*<tora>*,*<scts>*,*<dt>*,*<st>*

Name	Type	Default	Description
<stat>	string	N/A	status of the message
	Values:		
	"REC UNREAD"	:	new received message
	"REC READ"	:	received message read
	"STO UNSENT"	:	message stored not yet sent
	"STO SENT"	:	message stored already sent
<fo>	integer	-	first octet of the message PDU
<mr>	integer	-	message reference number; 3GPP TS 23.040 TP-Message-Reference in integer format
<ra>	string	-	recipient address, represented in the currently selected character set (see +CSCS)
<tora>	string	-	type of number <ra>
<scts>	string	-	arrival time of the message to the SC
<dt>	string	-	sending time of the message
<st>	integer	-	message status as coded in the PDU
<pid>	integer	-	Protocol Identifier
<dcS>	integer	-	Data Coding Scheme
<vp>	mixed	-	Validity Period; its format depends on SMS-SUBMIT <fo> setting (see +CPMS): <ol style="list-style-type: none"> 1. Not present: if <fo> tells that Validity Period Format is not present 2. Integer: if <fo> tells that Validity Period Format is relative

			<ol style="list-style-type: none"> 3. Quoted time-string type: if <fo> tells that Validity Period Format is absolute 4. Quoted hexadecimal representation of 7 octets: if <fo> tells that Validity Period Format is enhanced
<oa>	string	-	Originator address, represented in the currently selected character set (see +CSCS).
<da>	string	-	Destination address, represented in the currently selected character set (see +CSCS).
<alpha>	string	-	The alphanumeric representation of <da> or <oa> , corresponding to an entry found in the phonebook; used character set is the one selected with command +CSCS .
<sca>	string	-	Service Centre Address
<tooa>	integer	N/A	type of number of <oa>
	Values:		
	129	:	number in national format
	145	:	number in international format (contains the "+")
<toda>	integer	N/A	type of number of <da>
	Values:		
	129	:	number in national format
	145	:	number in international format (contains the "+")
<tosca>	integer	N/A	type of number of <sca>
	Values:		
	129	:	number in national format
	145	:	number in international format (contains the "+")
<length>	integer	-	text length
<data>	string	-	<p>TP-User-Data</p> <p>If <dcs> indicates that 3GPP TS 23.038 default alphabet is used, each character of GSM alphabet will be converted into current TE character set (see +CSCS)</p> <p>If <dcs> indicates that 8-bit or UCS2 data coding scheme is used, each 8-bit octet will be converted into two IRA character long hexadecimal number (e.g. octet 0x2A will be converted as two characters 0x32 0x41)</p> <p>If <fo> indicates that a UDH is present each 8-bit octet will be converted into two IRA character long hexadecimal number. The <length> indicates text length in characters without UDH length.</p>

 Both in PDU and Text Mode, if status of the message was 'received unread' before reading, then status in the storage changes to 'received read'



AT+CMGR=?

Test command returns the **OK** result code

3.6.15. AT+CMGS - Send Short Message

The command is related to sending short messages.



3GPP TS 27.005
3GPP TS 23.040
3GPP TS 23.038

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CMGS

Execution command sends a short message to the network. It can have two syntax formats according to the SMS format: PDU or Text mode (see **+CMGF** command). If short message is successfully sent to the network, the result is shown with the following URC:

+CMGS: <mr>[,<scts>]

Additional info:

- ▶▶ In PDU mode the **+CMGS** command has the following syntax:

AT+CMGS=<length>

After command line is terminated with <CR>, the module responds sending a four-character sequence prompt:

<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)

and waits for the specified number of bytes. the PDU shall be hexadecimal format (each octet of the PDU is given as two IRA character long hexadecimal number) and given in one line.

To send the message issue Ctrl-Z char (0x1A hex). To exit without sending the message issue ESC char (0x1B hex).

Name	Type	Default	Description
<length>	integer	N/A	length in bytes of the PDU to be sent (excluding the SMSC address octets)

Value:

7÷164 : number of bytes

- ▶▶ In Text mode the **+CMGS** command has the following syntax:

AT+CMGS=<da>[,<toda>]

After command line is terminated with <CR>, the module responds sending a four-character sequence prompt:

<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)

After this prompt, you can enter text that should be formatted as follows:

- if current **<dcs>** (see **+CSMP**) indicates that GSM03.38 default alphabet is used and current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is not set, then ME/TA converts the entered text into GSM alphabet, according to 3GPP TS 27.005, Annex A; backspace can be used to delete last character and carriage returns can be used; after every **<CR>** entered by the user the sequence **<CR><LF><greater_than><space>** is sent to the TE.
- if current **<dcs>** (see **+CSMP**) indicates that 8-bit or UCS2 data coding scheme is used or current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is set, the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. the 'asterisk' will be entered as 2A (IRA50 and IRA65) and this will be converted to an octet with integer value 0x2A)

To send the message issue Ctrl-Z char (0x1A hex). To exit without sending the message issue ESC char (0x1B hex).

Name	Type	Default	Description
<da>	string	-	destination address, string type represented in the currently selected character set (see +CSCS).
<toda>	string	129	type of destination address

Values:

129 : number in national format

145 : number in international format (contains the "+")

Unsolicited fields:

Name	Type	Description
<mr>	integer	TP-Message-Reference number as per 3GPP TS 23.040
<scts>	string	TP-Service Centre Time Stamp in Time String Format. <scts> is returned when +CSMS <service> value is 1 and network supports.

- i** The DCD signal shall be in **ON** state while data is entered. The echoing of data is controlled by echo command **E**.
- i** in PDU mode: when the length of the SMSC address equals 0, then the SMSC address set with command **+CSCA** is used; in this case the SMSC Type of Address octet shall not be present in the data.
- i** To ensure that during the command execution, which may take several seconds, no other SIM interacting commands issued, care must take.

i It is possible to send a concatenation of at most 10 SMS; the maximum number of chars depends on the **<dc>**:

- 2448 chars
- 2144 chars if 8-bit is used
- 1072 chars if UCS2 is used

i If message sending fails for some reason, then an error code is reported.



AT+CMGS=?

Test command returns the **OK** result code.

i To avoid malfunctions is suggested to wait for the **+CMGS: <mr>** or **+CMS ERROR: <err>** response before issuing further commands.



To avoid malfunctions it is suggested to wait for the **+CMGS: <mr>** or **+CMS ERROR: <err>** response before issuing further commands.



Set PDU mode

AT+CMGF=0

AT+CMGS=18

> 088128010099010259115507811020905512F90000A704F4F29C0E

+CMGS: 124

OK

Set text mode

AT+CMGF=1

AT+CSMP=17,167,0,0

AT+CMGS="01090255219",129

>TEST MESSAGE

+CMGS:125

OK

3.6.16. AT+CMSS - Send Message from Storage

This command sends to the network a message which is already stored in the **<memw>** storage.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CMSS=<index>[,<da>[,<toda>]]

Execution command sends to the network a message which is already stored in the **<memw>** storage (see **+CPMS**) at the location **<index>**.

Parameters:

Name	Type	Default	Description
<index>	string	-	location value in the message storage <memw> of the message to send
<da>	string	-	destination address, string type represented in the currently selected character set (see +CSCS); if it is given it shall be used instead of the one stored with the message.
<toda>	integer	N/A	type of destination address

Values:

- 129 : number in national format
- 145 : number in international format (contains the "+")

Additional info:

- ▶▶ If message is successfully sent to the network then the result is sent in the format:
+CMSS: <mr>
where:
<mr> - message reference number.
If message sending fails for some reason, an error code is reported:
+CMS ERROR:<err>

- i** To store a message in the **<memw>** storage see command **+CMGW**.
- i** Care must be taken to ensure that during the command execution, which may take several seconds, no other SIM interacting commands are issued.



AT+CMSS=?

Test command returns the **OK** result code.

- i** To avoid malfunctions is suggested to wait for the **+CMSS: <mr>** or **+CMS ERROR: <err>** response before issuing further commands.

3.6.17. AT+CMGW - Write Short Message to Memory

The command is related to writing short messages.



3GPP TS 27.005
3GPP TS 23.040
3GPP TS 23.038

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CMGW

Execution command writes a new short message in the **<memw>** memory storage (see **+CPMS**). It can have two syntax formats according to the SMS format: PDU or Text mode (see **+CMGF** command). If short message is successfully written the following URC is displayed:

+CMGW: <index>

Additional info:

- ▶▶ In PDU mode the **+CMGW** command has the following syntax:

AT+CMGW=<length>[,<stat>]

After command line is terminated with <CR>, the module responds sending a four-character sequence prompt:

<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)

and waits for the specified number of bytes.

To write the message issue Ctrl-Z char (0x1A hex). To exit without sending the message issue ESC char (0x1B hex).

Name	Type	Default	Description
<length>	integer	N/A	length in bytes of the PDU to be written
Value:			
7÷164 : number of bytes			
<stat>	integer	N/A	message status
Values:			
0 : new message new message (received unread message; default for DELIVER messages (3GPP TS 23.040 SMS-DELIVER messages))			
1 : read message			
2 : stored message not sent yet (default for SUBMIT messages(3GPP TS 23.040 SMS-SUBMIT messages))			
3 : stored message already sent			

<data>	hex	-	PDU bytes, given in online mode
---------------------	-----	---	---------------------------------

►► In Text mode the **+CMGW** command has the following syntax:

AT+CMGW[=<da>[,<toda>[,<stat>]]]

After command line is terminated with <CR>, the module responds sending a four-character sequence prompt:

<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)

After this prompt, you can enter text that should be formatted as follows:

- if current **<dcs>** (see **+CSMP**) indicates that GSM03.38 default alphabet is used and current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is not set, then ME/TA converts the entered text into GSM alphabet, according to 3GPP TS 27.005, Annex A; backspace can be used to delete last character and carriage returns can be used; after every <CR> entered by the user the sequence <CR><LF><greater_than><space> is sent to the TE.
- if current **<dcs>** (see **+CSMP**) indicates that 8-bit or UCS2 data coding scheme is used or current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is set, the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. the "asterisk" will be entered as 2A (IRA50 and IRA65) and this will be converted to an octet with integer value 0x2A)





The command waits for the specified number of bytes.

To write the message issue Ctrl-Z char (0x1A hex). To exit without writing the message issue ESC char (0x1B hex).


Name	Type	Default	Description
<da>	string	-	destination address, string type represented in the currently selected character set (see +CSCS).
<toda>	integer	N/A	type of destination address
Values:			
129	:	number in national format	
145	:	number in international format (contains the character "+")	
<stat>	string	N/A	message status
Values:			
"REC UNREAD"	:	new received message unread (default for DELIVER messages)	
"REC READ"	:	received message read	
"STO UNSENT"	:	message stored not yet sent (default for SUBMIT messages)	
"STO SENT"	:	message stored already sent	

Unsolicited field:

Name	Type	Description
<index>	integer	message location index in the memory <memw> (see +CPMS). If message storing fails for some reason, an error code is reported.


-  The DCD signal shall be in **ON** state while <data> is entered. The echoing of <data> is controlled by echo command **E**.
-  In PDU mode, not only SUBMIT messages can be stored in SIM, but also DELIVER and STATUS REPORT messages (3GPP TS 23.040 SMS-STATUS-REPORT messages). SUBMIT messages can only be stored with status 2 or 3; DELIVER and STATUS REPORT messages can only be stored with status 0 or 1.
-  Care must be taken to ensure that during the command execution, which may take several seconds, no other SIM interacting commands are issued.
-  It is possible to save a concatenation of at most 10 SMS; the maximum number of chars depends on <dc>:
 - 1530 chars if 3GPP TS 23.038 default alphabet is used
 - 1340 chars if 8-bit is used
 - 670 chars if UCS2 is used

If entered text is longer than this maximum value, then an error is raised.

-  In text mode, not only SUBMIT messages can be stored in SIM, but also DELIVER messages.

The type of saved message depends upon the current <fo> parameter (see **+CSMP**). For a DELIVER message, current <vp> parameter (see **+CSMP**) is used to set the message Service Centre Time Stamp <scts>, so it has to be an absolute time string, e.g. "09/01/12,11:15:00+04".

SUBMIT messages can only be stored with status "STO UNSENT" or "STO SENT"; DELIVER messages can only be stored with status "REC UNREAD" or "REC READ".

-  If message writing fails for some reason, then an error code is reported.



AT+CMGW=?

Test command returns the **OK** result code.



To avoid malfunctions it is suggested to wait for the **+CMGW: <index>** or **+CMS ERROR: <err>** response before issuing further commands.

3.6.18. AT+CMGD - Delete Message

This command allows to delete from memory messages.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CMGD=<index>[,<delflag>]

Execution command deletes SMS message(s) from a selected memory storage. Storage is selected by command **+CPMS**.

Parameters:

Name	Type	Default	Description
<index>	integer	-	Message index in the selected storage; it can have values from 1 to N, where N depends on the available space in the selected storage (see +CPMS)
<delflag>	integer	0	Type of multiple message deletion

Values:

- 0 : delete message specified in <index>
- 1 : delete all read messages from selected storage, leaving unread messages and stored mobile originated messages (whether sent or not) untouched
- 2 : delete all read messages from selected storage and sent mobile originated messages, leaving unread messages and unsent mobile originated messages untouched
- 3 : delete all read messages from selected storage, sent and unsent mobile originated messages, leaving unread messages untouched
- 4 : delete all messages from selected storage.

- i** If <delflag> is present and not set to 0 then, if <index> is greater than 0, <index> is ignored and the command follows the rules for <delflag> shown above.



AT+CMGD=?

Test command shows the valid memory locations <index> and the supported values of <delflag>.



```
AT+CMGD=?
+CMGD: (1,2,3,6,7,17,18,19,20,37,38,39,47),(0-4)
OK
```

3.6.19. AT+CGSMS - Select Service for MO SMS Messages

Set command is used to specify the service or service preference that the MT will use to send MO SMS messages.



3GPP TS 27.005

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CGSMS=[<service>]

Parameter:

Name	Type	Default	Description
<service>	integer	1	indicates the service or service preference to be used

Values:

- 0 : GPRS
- 1 : circuit switched
- 2 : GPRS preferred. Use circuit switched if SMS via GPRS service not available or GPRS not registered.
- 3 : circuit switched preferred. Use GPRS if SMS via circuit switched not available.



Entering **AT+CGSMS=** returns **OK** but has no effect.



AT+CGSMS?

The read command returns the currently selected service or service preference in the format:

+CGSMS: <service>



AT+CGSMS=?

Test command reports the supported list of currently available <service>.



The <service> value is saved on NVM as global parameter.

3.6.20. AT#SMSMODE - SMS Commands Operation Mode

Set command enables/disables the check for presence of SMS Service Centre Address (SCA) in the Fixed Dialing Number (FDN) phonebook.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#SMSMODE=<mode>

Parameter:

Name	Type	Default	Description
<mode>	integer	2	Enables/disables the check for presence of SCA in FDN phonebook.

Values:

- 1 : Disables the check for presence of SCA in FDN phonebook.
- 2 : Enables the check for presence of SMS SCA in the FDN phonebook when FDN are enabled. If the SMS SCA is not present a SMS cannot be sent.



AT#SMSMODE?

Read command reports whether the check of SMS SCA in FDN phonebook is enabled or not, in the format:

#SMSMODE: <mode>



AT#SMSMODE=?

Test command reports the range of <mode> parameter values.

3.6.21. AT#CMGS - Send Short Message

This command sends a short message.



3GPP TS 27.005
3GPP TS 23.040
3GPP TS 23.038

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#CMGS=<param1>,<param2>

Execution command sends a short message to the network. <param1> and <param2> assume different meanings according to the used SMS format.

If message is successfully sent, then the result is shown with the following URC:

#CMGS: <mr>

<mr> parameter is described in Unsolicited fields section.

Parameters:

Name	Type	Default	Description
<param1>	mixed	-	The meaning of this parameter depends on the SMS format (PDU or Text mode) selected by +CMGF.
<param2>	mixed	-	The meaning of this parameter depends on the SMS format (PDU or Text mode) selected by +CMGF.

Additional info:

- ▶▶ In case of PDU mode the parameters meaning is the following:

Name	Type	Default	Description
<param1>	integer	N/A	length in bytes of the PDU to be sent (excluding the SMSC address octets)

Value:

7÷164 : number of bytes




<param2>	hex	-	PDU bytes
----------	-----	---	-----------

- ▶▶ In case of Text mode the parameters meaning is the following:

Name	Type	Default	Description
<param1>	string	-	destination address
<param2>	string	-	text to send

Unsolicited field:


Name	Type	Description
<mr>	integer	TP-Message-Reference number as per 3GPP TS 23.040

-
-  in PDU mode: when the length of the SMSC address equals 0, then the SMSC address set with command **+CSCA** is used; in this case the SMSC Type Of Address octet shall not be present in the **<param2>**.
 -  In Text mode, the text entered with **<param2>** should be enclosed between double quotes and formatted as follows:
 - if current **<dcs>** (see **+CSMP**) indicates that 3GPP TS 23.038 default alphabet is used and current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-DataHeader-Indication is not set, then the ME/TA converts the entered text into GSM alphabet, according to 3GPP TS 27.005 Annex A.
 - if current **<dcs>** (see **+CSMP**) indicates that 8-bit or UCS2 data coding scheme is used and current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-DataHeader-Indication is set, then the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. the asterisk will be entered as 2A (IRA 50 and IRA 65) and this will be converted to an octet with integer value 0x2A).
 -  If message sending fails for some reason, then an error code is reported.
-

**AT#CMGS=?**

Test command returns the **OK** result code.



-  To avoid malfunctions it is suggested to wait for the **#CMGS: <mr>** or **+CMS ERROR: <err>** response before issuing further commands.

3.6.22. AT#CMGW - Write Short Message To Memory

This command writes a new short message.



3GPP TS 27.005
3GPP TS 23.040
3GPP TS 23.038

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#CMGW=<param1>,<param2>

Execution command writes a new short message in the **<memw>** memory storage (see **+CPMS**). **<param1>** and **<param2>** assume different meanings according to the used SMS format.

If message is successfully written in the memory, then the result is shown with the following URC:

#CMGW: <index>

<index> parameter is described in Unsolicited fields section.

Parameters:

Name	Type	Default	Description
<param1>	mixed	-	The meaning of this parameter depends on the SMS format selected (PDU or Text mode) by +CMGF .
<param2>	string	-	The meaning of this parameter depends on the SMS format selected (PDU or Text mode) by +CMGF .

Additional info:

- ▶▶ In case of PDU mode the parameters meaning is the following:

Name	Type	Default	Description
<param1>	integer	N/A	length in bytes of the PDU to be written
	Value:		
	7÷164	:	number of bytes
<param2>	hex	-	PDU bytes

- ▶▶ In case of Text mode the parameters meaning is the following:

Name	Type	Default	Description
<param1>	string	-	destination address
<param2>	string	-	text to write

Unsolicited field:

Name	Type	Description
<index>	integer	message location index in the memory <memw> (see +CPMS)

-
- i** In Text mode, the text entered with **<param2>** should be enclosed between double quotes and formatted as follows:
- if current **<dcs>** (see **+CSMP**) indicates that 3GPP TS 23.038 default alphabet is used and current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-DataHeader-Indication is not set, then the ME/TA converts the entered text into GSM alphabet, according to 3GPP TS 27.005 Annex A.
 - if current **<dcs>** (see **+CSMP**) indicates that 8-bit or UCS2 data coding scheme is used and current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-DataHeader-Indication is set, then the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. the asterisk will be entered as 2A (IRA 50 and IRA 65) and this will be converted to an octet with integer value 0x2A).
- i** If message storing fails for some reason, then an error code is reported.
-

**AT#CMGW=?**

Test command returns the **OK** result code.



To avoid malfunctions it is suggested to wait for the **#CMGW: <index>** or **+CMS ERROR: <err>** response before issuing further commands.

3.6.23. AT#CMGLCONCINDEX - Report Concatenated SMS Indexes

The command reports list of all concatenated SMS

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#CMGLCONCINDEX

The command reports a line for each concatenated SMS containing:

#CMGLCONCINDEX: <N>,<i>,<j>,<k>,...

If no concatenated SMS is present on the SIM, only **OK** result code will be returned.

The parameters are described in the Additional info section.

Additional info:

- ▶▶ Here is the meaning of the parameters returned by the command.

Name	Type	Default	Description
<N>	integer	-	Number of segments that form the whole concatenated SMS.
<i>	integer	-	index of the first SMS segment. 0 if segment has not been received.
<j>	integer	-	index of the second SMS segment. 0 if segment has not been received.
<k>	integer	-	index of the third SMS segment 0 if segment has not been received
<...>	integer	-	index of the next SMS segment ...



AT#CMGLCONCINDEX=?

Test command returns **OK** result code.



- Example of 2 concatenated SMS:
First composed by 3 segments: 1,2,3, but segment 0 not received yet.
Secondo composed by segments: 4,5,6,7,8, but segment 7 not received yet.
AT#CMGLCONCINDEX
#CMGLCONCINDEX: 3,0,2,3
#CMGLCONCINDEX: 5,4,5,6,0,8
OK

3.6.24. AT#E2SMSRI - SMS Ring Indicator

This set command enables/disables the Ring Indicator pin response to an incoming SMS message. If enabled, a negative going pulse is generated when receiving an incoming SMS message.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Common profile	No	-	2



AT#E2SMSRI=[<n>]

Parameter:

Name	Type	Default	Description
<n>	integer	0	RI enabling

Values:

- 0 : disables RI pin response for incoming SMS messages
- 50÷1150 : enables RI pin response for incoming SMS. The value of <n> is the duration in ms of the pulse generated on receipt of an incoming SMS.

- i** If **+CNMI=3,1** command is issued, and the module is in a GPRS connection, a 100 ms break signal is sent and a 1 sec. pulse is generated on RI pin, no matter if the RI pin response is either enabled or not.



AT#E2SMSRI?

Read command reports the duration in ms of the pulse generated on receipt of an SMS, in the format:

#E2SMSRI: <n>

- i** <n>=0 means that the RI pin response to an incoming SMS is disabled



AT#E2SMSRI=?

Reports the range of supported values for parameter <n>

3.6.25. AT#SMOV - SMS Overflow

The command is used to enable the SMS overflow signaling functionality.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT#SMOV=[<mode>]

Set command enables the SMS overflow signaling function. If enabled, URC code is:

#SMOV: <memo>

Parameter:

Name	Type	Default	Description
<mode>	integer	0	signaling functionality mode

Values:

0 : disables SMS overflow signaling function

1 : enables SMS overflow signaling function

Unsolicited field:

Name	Type	Description
<memo>	string	<memo> is a string indicating the SMS storage that has reached the maximum capacity

Values:

"SM"	:	SIM Memory
"ME"	:	NVM SMS Storage



When the maximum storage capacity has been reached, if enabled, a network-initiated notification is sent.



AT#SMOV?

Read command reports whether the SMS overflow signaling function is currently enabled or not, in the format:

#SMOV: <mode>



AT#SMOV=?

Test command returns the supported range of values of parameter <mode>.

3.6.26. AT#SMSMOVE - Move Short Message to other Memory

This command moves selected Short Message from current memory to destination memory.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2




AT#SMSMOVE=<index>

Execution command moves selected Short Message from current memory to destination memory.

Parameter:

Name	Type	Default	Description
<index>	string	-	message index in the memory selected by +CPMS command. It can have values form 1 to N, where N depends on the available space, see +CPMS .

-  If the destination memory is full, an error is returned



AT#SMSMOVE?

Read command reports the message storage status of the current memory and the destination memory in the format:

```
#SMSMOVE:<curr_mem>,<used_curr_mem>,<total_curr_mem>,<dest_mem>,<used_dest_mem>,<total_dest_mem>
```

Additional info:

▶▶ Parameters:

Name	Type	Default	Description
<curr_mem>	string	N/A	current memory, selected by +CPMS command
Values:			
SM	:		SIM SMS memory storage
ME	:		NVM SMS storage
<used_curr_mem>	integer	-	number of SMS stored in the current memory
<total_curr_mem>	integer	-	max number of SMS that the current memory can contain
<dest_mem>	string	SM	destination memory
Values:			
SM	:		SIM memory
ME	:		device memory

<used_dest_mem>	integer	-	number of SMs stored in the destination memory
<total_dest_mem>	integer	-	max number of SMs that the destination memory can contain

**AT#SMSMOVE=?**

Test command reports the supported values for parameter **<index>**

**AT#SMSMOVE?**

```
#SMSMOVE: "ME",3,100,"SM",0,50
```

OK

The current memory is ME where 3 SMs are stored; the destination memory is SIM that is empty

AT+CMGL=ALL

```
+CMGL: 1,"STO UNSENT","32XXXXXXXXX","",
```

Test 1

```
+CMGL: 2,"STO UNSENT","32XXXXXXXXX","",
```

Test 2

```
+CMGL: 3,"STO UNSENT","32XXXXXXXXX","",
```

Test 3

OK

List the SMs to discover the memory index

AT#SMSMOVE=1

OK

Move the SM in the first position of ME to SIM

AT#SMSMOVE?

```
#SMSMOVE: "ME",2,100,"SM",1,50
```

OK

Now we have 2 SMs in ME and 1 in SIM

3.7. Phonebook

3.7.1. AT+CPBS - Select Phonebook Memory Storage

This set command selects phonebook memory storage, which will be used by other phonebook commands.



3GPP TS 27.007


SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CPBS=<storage>[,<password>]

Parameters:


Name	Type	Default	Description
<storage>	string	"SM"	specify the phonebook memory storage
Values:			
"SM"	:	SIM phonebook	
"FD"	:	SIM fixed dialing-phonebook (FDN)(only phase 2/2+ SIM)	
"LD"	:	SIM last-dialing-phonebook (+CPBF is not applicable for this storage)	
"MC"	:	device missed (unanswered received) calls list (+CPBF is not applicable for this storage)	
"RC"	:	ME received calls list (+CPBF is not applicable for this storage)	
"MB"	:	mailbox numbers stored on SIM; it is possible to select this storage only if the mailbox service is provided by the SIM (see #MBN)	
"DC"	:	ME last-dialing-phonebook (+CPBF is not applicable for this storage)	
"ME"	:	ME phonebook	
"EN"	:	SIM emergency numbers phonebook (+CPBW and +CPBF not applicable for this storage)	
"ON"	:	SIM own numbers (MSISDNs) phonebook (+CPBF is not applicable for this storage)	
"SD"	:	SIM Service Dialing Numbers (SDN) phonebook (+CPBW is not applicable for this storage)	
<password>	string	-	string type value representing the PIN2-code required when selecting PIN2-code locked <storage> above "FD". if <password> parameter is given, PIN2 will be verified, even if it is not required, i.e. PIN2 is verified even if it has already been inserted and verified during current session.

-  If "SM" is the currently selected phonebook, selecting "FD" phonebook with **AT+CPBS="FD"** command simply selects the FDN as the phonebook upon which all subsequent **+CPBW**, **+CPBF** and **+CPBR** commands act. The command does not deactivate "SM" phonebook, and does not activate FDN.

**AT+CPBS?**

Read command returns the actual values of the parameter **<storage>**, the number of occupied records **<used>** and the maximum index number **<total>**, in the format:

+CPBS: <storage>,<used>,<total>

-  For **<storage>="MC"**: if there are more than one missed calls from the same number the read command will return only the last call.

**AT+CPBS=?**

Test command returns the supported range of values for the parameter **<storage>**

3.7.2. AT+CPBR - Read Phonebook Entries

The command reads phonebook entries.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CPBR=<index1>[,<index2>]

Execution command returns phonebook entries in location number range <index1>..<index2> from the current phonebook memory storage selected with **+CPBS**. If <index2> is omitted, only location <index1> is returned.

The intermediate response format is:

```
[+CPBR:<index1>,<number>,<type>,<text>[,<hidden>]][,<group>]
[,<adnumber>][,<adtype>][,<secondtext>][,<email>]]
```

...

```
[<CR><LF> +CPBR:<index2>,<number>,<type>,<text>[,<hidden>]
[,<group>][,<adnumber>] [,<adtype>][,<secondtext>][,<email>]]]
```

Parameters:

Name	Type	Default	Description
<index1>	integer	-	value in the range of location numbers of the currently selected phonebook memory storage (see +CPBS).
<index2>	integer	-	value in the range of location numbers of the currently selected phonebook memory storage (see +CPBS).

Additional info:

►► Intermediate response parameters

Name	Type	Default	Description
<indexn>	integer	-	the location number of the phonebook entry
<number>	string	-	phone number of format <type>
<type>	integer	N/A	type of phone number octet
Values:			
	129	:	national numbering scheme
	145	:	international numbering scheme (contains the character "+")
<test>	string	-	the alphanumeric text associated to the number; character set as specified by command Select TE Character Set +CSCS
<hidden>	integer	0	indicates if the entry is hidden or not

Values:

- 0 : phonebook entry not hidden
- 1 : phonebook entry hidden

<group>	string	-	the group the entry may belong to; character set as specified by command Select TE Character Set +CSCS
<adnumber>	string	-	additional phone number of format <adtype>
<adtype>	integer	-	type of address octet
<secondtext>	string	-	second text field associated with the number; character set as specified by command Select TE Character Set +CSCS
<email>	string	-	email address; character set as specified by command Select TE Character Set +CSCS

- i** If "MC" is the currently selected phonebook memory storage, a sequence of missed calls coming from the same number will be saved as one missed call and **+CPBR** will show just one line of information.
- i** If all queried locations are empty (but available), no information text lines will be returned, while if listing fails in an ME error, **+CME ERROR: <err>** is returned.



AT+CPBR=?


Test command returns the supported range of values for parameters **<indexn>** and the maximum lengths of **<number>**, **<text>**, **<group>**, **<secondtext>** and **<email>** string parameters, in the format:

+CPBR: (<minIndex> - <maxIndex>),<nlength>,<tlength>,<glength>,<slength>,<elength>


Additional info:

- ▶▶ Test command response parameters

Name	Type	Default	Description
<minIndex>	integer	-	the minimum <index> number
<maxIndex>	integer	-	the maximum <index> number
<nlength>	integer	-	maximum <number> field length
<tlength>	integer	-	maximum <name> field length
<glength>	integer	-	maximum <group> field length
<slength>	integer	-	maximum <secondtext> field length
<elength>	integer	-	maximum <email> field length

-
-  The value of **<nlength>** could vary, depending on the availability of Extension service, in the following situations:
1. if "SM" memory storage has been selected (see **+CPBS**) and the SIM supports the Extension1 service
 2. if "FD" memory storage has been selected (see **+CPBS**) and the SIM supports the Extension2 service
 3. if "MB" memory storage has been selected (see **+CPBS**) and the SIM supports the Extension6 service
-



-  Remember to select the PB storage with **+CPBS** command before issuing PB commands.

3.7.3. AT+CPBF - Find Phonebook Entries

This command returns phonebook entries.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2



AT+CPBF=<findtext>

Execution command returns phonebook entries (from the current phonebook memory storage selected with **+CPBS**) which alphanumeric field start with string **<findtext>**.

Parameter:

Name	Type	Default	Description
<findtext>	string	-	string to be searched among the phonebook entries; used character set should be the one selected with command +CSCS .

Additional info:

►► The command returns a report in the form:

```
[+CPBF:<index1>,<number>,<type>,<text>[,<hidden>][,<group>][,<adnumber>]
[,<adtype>][,<secondtext>][,<email>]<CR><LF>
+CPBF:<index2>,<number>,<type>,<text>[,<hidden>][,<group>][,<adnumber>]
[,<adtype>][,<secondtext>][,<email>][...]]
```




Name	Type	Default	Description
<indexn>	integer	-	The location number of the phonebook entry
<number>	string	-	Phone number of format <type>
<type>	integer	N/A	type of phone number octet
Values:			
	129	:	national numbering scheme
	145	:	international numbering scheme (contains the character "+")
<text>	string	-	The alphanumeric text associated to the number; the character set used should be the one selected with command +CSCS
<group>	string	-	Field of maximum length <glength> indicating a group the entry may belong to; character set as specified by command Select TE Character Set +CSCS
<adnumber>	string	-	additional number; phone number of format <adtype>
<adtype>	integer	-	type of address octet

<secondtext>	string	-	Field of maximum length <slength> indicating a second text field associated with the number; character set as specified by command Select TE Character Set +CSCS
<email>	string	-	field of maximum length <elength> indicating an email address; character set as specified by command Select TE Character Set +CSCS
<hidden>	string	N/A	indicates if the entry is hidden or not

Values:

0 : phonebook entry not hidden

1 : phonebook entry hidden

-  **+CPBF** is not applicable if the current selected storage (see **+CPBS**) is either "MC", "RC" or "LD".
-  If **<findtext>=""** the command returns all the phonebook records.
-  If no PB records satisfy the search criteria then an **ERROR** message is reported.



AT+CPBF=?


Test command reports the maximum lengths of **<number>** and **<text>** fields, in the format:

+CPBF: <nlength>,<tlength>,<glength>,<slength>,<elength>

Additional info:

- ▶▶ Test command response fields

Name	Type	Default	Description
<nlength>	integer	-	Maximum length of field <number>
<tlength>	integer	-	Maximum length of field <text>
<glength>	integer	-	Maximum length of field <group>
<slength>	integer	-	Maximum length of field <secondtext>
<elength>	integer	-	Maximum length of field <email>

-  The value of **<nlength>** could vary, depending on the availability of Extension service, in the following situations:
 1. if "SM" memory storage has been selected (see **+CPBS**) and the SIM supports the **Extension1** service
 2. if "FD" memory storage has been selected (see **+CPBS**) and the SIM supports the **Extension2** service
 3. if "MB" memory storage has been selected (see **+CPBS**) and the SIM supports the **Extension6** service



Remember to select the PB storage with **+CPBS** command before issuing PB commands.

3.7.4. AT+CPBW - Write Phonebook Entry

This command writes phonebook entry in the current phonebook memory.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2



AT+CPBW=[<index>][,<number>,<type>,<text>,<group>,<adnumber>,<adtype>[,<secondtext>,<email>,<hidden>]]]]]]]]]

Execution command writes phonebook entry in location number <index> in the current phonebook memory storage selected with +CPBS.

Parameters:

Name	Type	Default	Description
<index>	integer	-	value in the range of location numbers of the currently selected phonebook memory storage (see +CPBS)
<number>	string	-	phone number in the format <type>
<type>	integer	129	type of number
Values:			
	129	:	national numbering scheme
	145	:	international numbering scheme (contains the character "+")
<text>	string	-	text associated to the number; used character set should be the one selected with command +CSCS
<group>	string	-	string type field of maximum length <glength> indicating a group the entry may belong to; character set as specified by command Select TE Character Set +CSCS
<adnumber>	string	-	additional number; string type phone number of format <adtype>
<adtype>	integer	-	type of address octet
<secondtext>	string	-	string type field of maximum length <slength> indicating a second text field associated with the number; character set as specified by command Select TE Character Set +CSCS
<email>	string	-	field of maximum length <elength> indicating an email address; character set as specified by command Select TE Character Set +CSCS
<hidden>	integer	0	indicates if the entry is hidden or not
Values:			
	0	:	phonebook entry not hidden
	1	:	phonebook entry hidden



If record number <index> already exists, it will be overwritten.

- i** If either **<number>**, **<type>** and **<text>** are omitted, the phonebook entry in location **<index>** is deleted.
- i** If either "LD", "MC" or "RC" memory storage has been selected (see **+CPBS**) it is possible just to delete the phonebook entry in location **<index>**, therefore parameters **<number>**, **<type>** and **<text>** must be omitted.
- i** Before defining **<group>** string, it is recommended to check, with **#CPBGR** command, the predefined group names, that could be already stored in USIM in Grouping information Alpha String (GAS) file. If all records in such file are already occupied, **+CPBW** command will return ERROR when trying to use a new group name that is not in the predefined GAS names. To define a new custom group string, it is necessary to overwrite with it one of the old predefined strings, using **#CPBGW** command.



AT+CPBW=?

Test command returns location range supported by the current storage as a compound value, the maximum length of **<number>** field, supported number format of the storage and maximum length of **<text>** field. The format is:

+CPBW: (list of supported **<index>s**),**<nlength>**,(list of supported **<type>s**),**<tlength>**,**<glength>**,**<slength>**,**<elength>**

Additional info:

- ▶▶ Test command response fields

Name	Type	Default	Description
<nlength>	integer	-	Maximum length of field <number>
<tlength>	integer	-	Maximum length of field <text>
<glength>	integer	-	Maximum length of field <group>
<slength>	integer	-	Maximum length of field <secondtext>
<elength>	integer	-	Maximum length of field <email>

- i** the value of **<nlength>** could vary, depending on the availability of Extension service, in the following situations:
 1. if "SM" memory storage has been selected (see **+CPBS**) and the SIM supports the **Extension1** service
 2. if "FD" memory storage has been selected (see **+CPBS**) and the SIM supports the **Extension2** service
 3. if "MB" memory storage has been selected (see **+CPBS**) and the SIM supports the **Extension6** service



Remember to select the PB storage with **+CPBS** command before issuing PB commands.



if **<index>** is omitted or **<index>=0**, the number **<number>** is stored in the first free phonebook location.

```
AT+CPBW=0,"+39040X192YZ1",129,"Text"
```

```
AT+CPBW=,"+39040X192YZ1",129,"Text"
```

3.7.5. AT#CPBGR - Read Group Entries

This command returns Grouping information Alpha String (GAS) USIM file entries.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#CPBGR=<indexFirst>[,<indexLast>]

Set command returns Grouping information Alpha String (GAS) USIM file entries in location number range <indexFirst>...<indexLast>. If <indexLast> is omitted, only location <indexFirst> is returned. The response, for each location, is a string. This string is a name used for a group the ADN entries can belong to.

The response format is:

```
[#CPBGR: <index1>,<text1>[<CR><LF>
#CPBGR: <index2>,<text2>[...]]]
```

Parameters:

Name	Type	Default	Description
<indexFirst>	integer	NA	first location to be read
Value:			
minIndex÷maxIndex		:	range of location numbers of GAS, where "minIndex" and "maxIndex" can be obtained by issuing the test command
<indexLast>	integer	NA	last location to be read
Value:			
minIndex÷maxIndex		:	range of location numbers of GAS, where "minIndex" and "maxIndex" can be obtained by issuing the test command

Additional info:

▶▶ Response parameters:

Name	Type	Default	Description
<index>	integer	N/A	location number of the GAS entry
Value:			
indexFirst÷indexLast		:	range of location numbers of GAS returned in the response
<text>	string	-	alphanumeric text associated to the entry



AT#CPBGR=?

Test command returns the supported values of the parameters <index_n> and the maximum length of <text_n> field, in the format:

#CPBGR: (<minIndex> - <maxIndex>),<tlength>

Additional info:

▶▶ Parameters:

Name	Type	Default	Description
<minIndex>	integer	-	minimum <index> number
<maxIndex>	integer	-	maximum <index> number
<tlength>	integer	-	maximum <text> field length

3.7.6. AT#CPBGW - Write Group Entry

Set command writes the name of a phonebook group <text> in the Grouping information Alpha String (GAS) USIM file in a specified location number <index>.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#CPBGW=<index>,<text>

Parameters:

Name	Type	Default	Description
<index>	integer	-	number of the record in the GAS file to be written; value ranges from 1 to the number of records of the GAS file, that varies from USIM to USIM
<text>	string	-	text to be stored in the record



If record number <index> already exists, it will be overwritten



AT#CPBGW=?

Test command returns location range supported by the current storage as a compound value, and maximum length of <text> field. The format is:

+CPBGW: (list of supported <index>s),<tlength>

Additional info:

▶▶ Parameter:

Name	Type	Default	Description
<tlength>	integer	-	maximum length of field <text> in bytes; actual maximum number of characters that can be stored depends upon <text> coding (see +CSCS)

3.7.7. AT#CPBD - Delete All Phonebook Entries

This command deletes all phonebook entries.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#CPBD

This execution command deletes all phonebook entries in the current phonebook memory storage selected with **+CPBS**.



AT#CPBD=?

Test command returns **OK** result code.

3.8. Time & Alarm

3.8.1. AT+CCLK - Clock Management

The command is related to real time clock management.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT+CCLK=<time>

Set command sets the real-time clock of the module.

Parameter:

Name	Type	Default	Description
<time>	string	N/A	Current time as quoted string in the format: "yy/MM/dd, hh:mm:ss±zz,d"

Values:

- yy : year (two last digits are mandatory), range is 00..99
- MM : month (two digits are mandatory), range is 01..12
- dd : day (two digits are mandatory) The range for dd(day) depends either on the month and on the year it refers to. Available ranges are: (01..28) (01..29) (01..30) (01..31). Trying to enter an out of range value will raise an ERROR message.
- hh : hour (two digits are mandatory), range is 00..23
- mm : minute (two digits are mandatory), range is 00..59
- ss : seconds (two digits are mandatory), range is 00..59
- ±zz : time zone (indicates the difference, expressed in quarter of an hour, between the local time and GMT; two digits are mandatory), range is -96...+96



AT+CCLK?

Read command returns the current setting <time> of the real-time clock, in the format:

+CCLK: <time>

- i** The three last characters of <time>, i.e. the time zone information, are returned by AT+CCLK? only if the #NITZ URC 'extended' format has been enabled (see #NITZ).



AT+CCLK=?

Test command returns the OK result code.



Set date and time:
AT+CCLK="02/09/07,22:30:00+00"
OK

Read date and time:
AT+CCLK?
+CCLK: "02/09/07,22:30:25"
OK

3.8.2. AT+CALA - Alarm Management

Set command stores in the internal Real Time Clock of the module an alarm time with respective settings.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT+CALA=<time>[,<n>[,<type>[,<text>[,<recurr>[,<silent>]]]]]

The command can set up a recurrent alarm for one or more days in the week. Currently only one alarm can be set. Alarms are not supported after disconnecting from power. Coin cell are supported. In case of a power cut, alarm will be deleted and needs to be re-set.

When the RTC time reaches the alarm time then the alarm starts, the behavior of the module depends on the setting <type> and if the module was already ON when the alarm time had come.

Parameters:

Name	Type	Default	Description
<time>	string	-	current alarm time as quoted string in the format: "yy/MM/dd,hh:mm:ss±zz" Refer to +CCLK for the string meaning. Empty string (+CALA="") deletes the current alarm and resets all the +CALA parameters to the factory default configuration. "hh:mm:ss±zz" string must be used only when issuing +CALA with parameter <recurr>.
<n>	integer	0	index of the alarm Value: 0 : the only value supported
<type>	integer	1	alarm behavior type Values: 0 : reserved 1 : the module wakes up fully operative as if the ON/OFF button has been pressed. If the module is already ON when the alarm times out, then it does nothing. 2÷8 : see Additional info section.
<text>	string	-	alarm code text string used in the URC +CALA . It has meaning only if <type> is equal to 2, 5 or 6.
<recurr>	string	N/A	string type value indicating day of week for the alarm in one of the following formats: <ul style="list-style-type: none"> "<1..7>[,<1..7>[...]]" it sets a recurrent alarm for one or more days in the week; the digits 1 to 7 corresponds to the days in the week "0" it sets a recurrent alarm for all days in the week Values:

0	:	all days in the week
1	:	Monday
2	:	Tuesday
3	:	Wednesday
4	:	Thursday
5	:	Friday
6	:	Saturday
7	:	Sunday

<silent> integer N/A indicates if the alarm is silent or not

Values:

0	:	the alarm is not silent
1	:	the alarm is silent

Additional info:

▶▶ **<type>=2**

The module wakes up in "alarm mode" if at the alarm time it was powered OFF, otherwise it remains fully operative. In both cases the module issues an unsolicited code every 3 s:

+CALA: <text>

Where **<text>** is the **+CALA** optional parameter previously set.

The module keeps on sending the unsolicited code every 3 s until a **#WAKE** or **#SHDN** command is received or a 90 seconds timer expires. If the module is in "alarm mode" and it does not receive the **#WAKE** command within 90s then it shuts down.

▶▶ **<type>=3**

The module wakes up in "alarm mode" if at the alarm time it was powered OFF, otherwise it remains fully operative. In both cases the module starts playing the alarm tone on the selected path for the ringer (see command **#SRP**).

The module keeps on playing the alarm tone until a **#WAKE** or **#SHDN** command is received or a 90 s time-out occurs. If the device is in "alarm mode" and it does not receive the **#WAKE** command within 90s then it shuts down.

▶▶ **<type>=4**

The module wakes up in "alarm mode" if at the alarm time it was off, otherwise it remains fully operative. In both cases the module brings the GPIO6 pin high, provided its **<direction>** has been set to alarm output, and keeps it in this state until a **#WAKE** or **#SHDN** command is received or a 90 seconds timer expires. If the device is in "alarm mode" and it does not receive the **#WAKE** command within 90s then it shuts down.

▶▶ **<type>=5**

The module will make both the actions as for **<type>=2** and **<type>=3**.

▶▶ **<type>=6**

The module will make both the actions as for **<type>=2** and **<type>=4**.

▶▶ **<type>=7**

The module will make both the actions as for **<type>=3** and **<type>=4**.

▶▶ **<type>=8**

The module wakes up in "alarm mode" if at the alarm time it was off, otherwise it remains fully operative. In both cases the module sets high the RI output pin. The RI output pin remains high until next **#WAKE** issue or until a 90s timer expires. If the device is in "alarm mode" and it does not receive the **#WAKE** command within 90s. After that it shuts down.

- i** During the "alarm mode" the device will not make any network scan and will not register to any network and therefore is not able to dial or receive any call or SMS.
The only commands that can be issued to the module in this state are the **#WAKE** and **#SHDN**, every other command must not be issued during this state.



AT+CALA?

Read command returns the list of current active alarm settings in the device, in the following format:

[+CALA: <time>,<n>,<type>,<text>,<recurr>,<silent>]



AT+CALA=?

Test command returns the list of supported index values, alarm types, maximum length of the text to be displayed in the URC **+CALA**, maximum length of **<recurr>** and supported **<silent>**s, in the format:

+CALA: (list of supported **<n>**s),(list of supported **<type>**s),**<tlength>**,**<rlength>**,(list of supported **<silent>**s)

Additional info:

- ▶▶ Parameters:

Name	Type	Default	Description
<tlength>	string	-	maximum length of <text> parameter
<rlength>	string	-	maximum length of <recurr> parameter



```
AT+CALA="02/09/07,23:30:00+00"
OK
```

3.8.3. AT+CAPD - Postpone Alarm

Set command postpones or dismisses a currently active alarm.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2




AT+CAPD=[<sec>]

Parameter:

Name	Type	Default	Description
<sec>	integer	0	time in seconds to postpone the alarm.

Values:

- 0 : alarm is dismissed
- 1÷60 : postpone time

 Entering **AT+CAPS=** returns **OK** but has no effect.



AT+CAPD=?

Test command reports the supported range of values for parameter <sec>.

3.8.4. AT+CSDF - Setting Date Format

This command sets the date format of the date information presented to the user.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CSDF=[<mode>[,<auxmode>]]

This command sets the date format of the date information presented to the user, which is specified by use of the **<mode>** parameter. The **<mode>** affects the date format on the phone display and doesn't affect the date format of the AT command serial interface, so it has no effect on our device.

The command also sets the date format of the TE-TA interface, which is specified by use of the **<auxmode>** parameter (i.e., the **<auxmode>** affects the **<time>** of **+CCLK** and **+CALA**).

Parameters:

Name	Type	Default	Description
<mode>	integer	1	phone display data format.
Values:			
1	:	DD-MMM-YYYY	
2	:	DD-MM-YY	
3	:	MM/DD/YY	
4	:	DD/MM/YY	
5	:	DD.MM.YY	
6	:	YYMMDD	
7	:	YY-MM-DD	
<auxmode>	integer	1	TE-TA interface data format.
Values:			
1	:	yy/MM/dd	
2	:	yyyy/MM/dd	

- i** The **<time>** format of **+CCLK** and **+CALA** is:
 - "yy/MM/dd,hh:mm:ss+zz" when **<auxmode>=1**
 - "yyyy/MM/dd,hh:mm:ss+zz" when **<auxmode>=2**
- i** If the parameters are omitted (**AT+CSDF=**), then this command sets the default value of **<mode>**.



AT+CSDF?

Read command reports the currently selected **<mode>** and **<auxmode>** in the format:

+CSDF: <mode>,<auxmode>

**AT+CSDF=?**

Test command reports the supported range of values for parameters **<mode>** and **<auxmode>**.



- **AT+CSDF?**
+CSDF: 1,1
OK

AT+CCLK?
+CCLK: "00/01/02,03:42:08+00"
OK
- **AT+CSDF=1,2**
OK

AT+CCLK?
+CCLK: "2000/01/02,03:42:23+00"
OK

3.8.5. AT+CTZR - Time Zone Reporting

This command enables and disables the time zone change event reporting.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CTZR=<onoff>

Set command permits to enable/disable the time zone change event reporting.

If the reporting is enabled and whenever the time zone is changed, the MT returns the unsolicited result code:

+CTZV: <tz>

Parameter:

Name	Type	Default	Description
<onoff>	string	0	enable/disable the time zone change event reporting.

Values:

- 0 : Disable time zone change event reporting
- 1 : Enable time zone change event reporting

Unsolicited field:

Name	Type	Description
<tz>	string	represents the sum of the local time zone (difference between the local time and GMT expressed in quarters of an hour) plus daylight saving time



AT+CTZR?

Read command reports the currently selected <onoff> in the format:

+CTZR: <onoff>



AT+CTZR=?

Test command reports the supported range of values for parameter <onoff>

3.8.6. AT+CTZU - Automatic Time Zone Update

Set command enables/disables the automatic time zone update via NITZ.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2





AT+CTZU=<onoff>

Parameter:

Name	Type	Default	Description
<onoff>	integer	0	enables/disables the automatic time zone update via NITZ

Values:

- 0 : disable
- 1 : enable

-  The command **+CTZU** is the ETSI standard equivalent of Telit custom command **#NITZ** (for the date and time update functionality).
-  Despite of the name, the command **+CTZU** enables automatic update of the date and time set by **+CCLK** command (not only time zone). This happens when a Network Identity and Time Zone (NITZ) message is sent by the network.
If the automatic date and time update functionality has been enabled by **+CTZU** or **#NITZ** (or both), NITZ message will cause a date and time update.



AT+CTZU?

Read command reports the current setting of <onoff> in the format:

+CTZU: <onoff>



AT+CTZU=?

Test command returns the supported values of parameter <onoff>.

3.8.7. AT#NITZ - Network Identity and Time Zone

This command handles Network Identity and Time Zone.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2



AT#NITZ=[<val>[,<mode>]]

Set command enables/disables the automatic date/time updating and the Full Network Name applying. It enables also the #NITZ URC in the format:

#NITZ: <datetime>

and permits to change its format.

Parameters:

Name	Type	Default	Description
<val>	integer	7	<p>identifies the functionalities to enable. The <val> parameter is a sum of integer values, where every value corresponds to a functionality:</p> <ul style="list-style-type: none"> • 1 - enables automatic date/time updating • 2 - enables Full Network Name applying • 4 - sets the #NITZ URC 'extended' format (see <datetime> below) • 8 - sets the #NITZ URC 'extended' format with Daylight Saving Time (DST) support (see <datetime> below)

Values:

- 0 : disables every functionality
- 1÷15 : sum of integer values

<mode>	integer	0	enables/disables the #NITZ URC
--------	---------	---	--------------------------------

Values:

- 0 : disables the URC
- 1 : enables the URC

Unsolicited field:

Name	Type	Description
<datetime>	string	<p>string format depends on parameter <val></p> <ul style="list-style-type: none"> • "yy/MM/dd, hh:mm:ss" - 'basic' format, if <val> is in (0..3) • "yy/MM/dd, hh:mm:ss±zz" - 'extended' format, if <val> is in (4..7) • "yy/MM/dd, hh:mm:ss±zz,d" - 'extended' format with DST support, if <val> is in (8..15)

For the meaning of the <datetime> subfields, please check +CCLK and #CCLK commands

-
- If the DST information isn't sent by the network, then the **<datetime>** parameter will have the format "**yy/MM/dd,hh:mm:ss±zz**".
 - Date and time information can be sent by the network after GSM registration or after PS attach.
-

**AT#NITZ?**

Read command reports whether

- automatic date/time updating
- Full Network Name applying
- **#NITZ** URC (as well as its format)

are currently enabled or not in the format:

#NITZ: <val>,<mode>

**AT#NITZ=?**

Test command returns supported values of parameters **<val>** and **<mode>**.



The command parameters are stored in two different profiles:

- **<val>** must be valid for all AT instances, so its value is entered in Common profile (extended section).
- **<mode>** must be valid only for the AT instance where it has been set, so its value is entered in Specific profile (extended section).

Use the **#W[<n>]** command to store the updated profiles in NVM.

3.8.8. AT#CCLK - Clock Management

The command is related to real time clock management.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#CCLK=<time>

Set command sets the real-time clock of the module.

Parameter:

Name	Type	Default	Description
<time>	string	N/A	Current time as quoted string in the format: "yy/MM/dd,hh:mm:ss±zz,d"

Values:

- yy : year (two last digits are mandatory), range is 00..99
- MM : month (two digits are mandatory), range is 01..12
- dd : day (two digits are mandatory) The range for dd(day) depends either on the month and on the year, it refers to. Available ranges are: (01..28) (01..29) (01..30) (01..31). Trying to enter an out of range value will raise an ERROR message.
- hh : hour (two digits are mandatory), range is 00..23
- mm : minute (two digits are mandatory), range is 00..59
- ss : seconds (two digits are mandatory), range is 00..59
- ±zz : time zone (indicates the difference, expressed in quarter of an hour, between the local time and GMT; two digits are mandatory), range is: -96..+96
- d : number of hours added to the local TZ because of Daylight Saving Time (summertime) adjustment; range is 0-2.



AT#CCLK?

Read command returns the current setting of the real-time clock, in the format <time>.

If the time is set by the network but the DST information is missing, or the time is set by +CCLK command, then the <time> format is:

"yy/MM/dd,hh:mm:ss±zz"



If the time is set by the network but the Daylight-Saving Time (DST) information is missing, or the time is set by +CCLK command, then the <time> format is:

"yy/MM/dd,hh:mm:ss±zz"



AT#CCLK=?

Test command returns the **OK** result code.



Set command:
AT#CCLK="02/09/07,22:30:00+04,1"
OK

Read command:
AT#CCLK?
#CCLK: "02/09/07,22:30:25+04,1"
OK

3.8.9. AT#CCLKMODE - Clock Mode

This command allows to enable the local time or the UTC time.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#CCLKMODE=<mode>

Set command enables the local time or the UTC time in **+CCLK** and **#CCLK** commands and in **#NITZ** URC

Parameter:

Name	Type	Default	Description
<mode>	integer	0	Time and date mode

Values:

- 0 : Local time + local time zone offset
- 1 : UTC time + local time zone offset



AT#CCLKMODE?

Read command reports whether the local time or the UTC time is enabled, in the format:

#CCLKMODE: <mode>



AT#CCLKMODE=?

Test command reports the supported range of values for parameter <mode>



Example of the two clock mode settings:

```
AT#CCLKMODE?  
#CCLKMODE: 0  
OK  
#NITZ: 13/03/05,15:20:33+04,0  
AT+CCLK?  
+CCLK: "13/03/05,15:20:37+04"  
OK  
AT#CCLKMODE=1  
OK  
AT+CCLK?  
+CCLK: "13/03/05,14:20:45+04"  
OK  
AT#CCLKMODE?  
#CCLKMODE: 1  
OK  
#NITZ: 13/03/05,14:20:53+04,0  
AT+CCLK?  
+CCLK: "13/03/05,14:20:55+04"  
OK  
AT#CCLKMODE=0  
OK  
AT+CCLK?  
+CCLK: "13/03/05,15:20:59+04"  
OK
```

3.8.10. AT#WAKE - Wake from Alarm Mode

Stop any alarm activity

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#WAKE=<opmode>

Execution command stops any eventually present alarm activity and, if the module is in alarm mode, it exits the alarm mode and enters the normal operating mode.

Parameter:

Name	Type	Default	Description
<opmode>	integer	0	operating mode

Value:

- 0 : normal operating mode; the module exits the alarm mode and enters the normal operating mode, any alarm activity is stopped (e.g. alarm tone playing) and an OK result code is returned.

- i** If #WAKE=0 command is issued after an alarm has been set with +CALA command, but before the alarm has expired, it will answer OK but have no effect.



AT#WAKE?

Read command returns the operating status of the device in the format:

#WAKE: <status>

where:

<status>

0 - normal operating mode

1 - alarm mode or normal operating mode with some alarm activity.



AT#WAKE=?

Test command returns OK result code.



- i** The alarm mode is indicated by status ON of hardware pin CTS and by status ON of pin DSR; the power saving status is indicated by a CTS - OFF and DSR - OFF status; the normal operating status is indicated by DSR - ON.
- i** During the alarm mode the device will not make any network scan and will not register to any network and therefore is not able to dial or receive any call or SM, the only commands that can be issued to the MODULE in this state are the #WAKE and #SHDN, every other command must not be issued during this state.

3.8.11. AT+CSTF - Setting Time Format

Set command sets the time format of the time information presented to the user, which is specified by use of the `<mode>` parameter.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2




AT+CSTF=[<mode>]

Parameter:

Name	Type	Default	Description
<code><mode></code>	integer	1	<code><mode></code> affects the time format on the phone display and doesn't affect the time format of the AT command serial interface, so it not actually not used

Values:

- 1 : [hh]:[mm] (24 hour clock)
- 2 : [hh]:[mm] (a.m./p.m.)

 Entering `AT+CSTF=` returns `OK` but has no effect.



AT+CSTF?

Read command reports the currently selected `<mode>` in the format:

`+CSTF: <mode>`.



AT+CSTF=?

Test command reports the supported range of values for parameter `<mode>`.

3.8.12. AT+CALD - Delete Alarm

This command deletes an alarm in the ME.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CALD=<n>

Parameter:

Name	Type	Default	Description
<n>	integer	N/A	alarm index

Value:

0 : alarm index



AT+CALD=?

Test command reports the range of supported values for <n> parameter.

3.9. Audio

3.9.1. Audio Basic Configuration

3.9.1.1. AT+CALM - Alert Sound Mode

This command is used to select the general alert sound mode of the device.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT+CALM=<mode>

Select the general alert sound mode of the device.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	general alert sound mode

Values:

- 0 : normal mode
- 1 : silent mode; no sound will be generated by the device, except for alarm sound
- 2 : stealth mode; no sound will be generated by the device



If silent mode is selected, then incoming calls will not produce alerting sounds but only the unsolicited messages **RING** or **+CRING**.



AT+CALM?

Read command returns the current value of parameter <mode>.



AT+CALM=?

Test command returns supported values as compound value.

3.9.1.2. AT+CRSL - Ringer Sound Level

This command is used to select the incoming call ringer sound level of the device.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT+CRSL=<level>

Set command is used to select the incoming call ringer sound level of the device.

Parameter:

Name	Type	Default	Description
<level>	integer	3	Incoming call ringer sound level.

Values:

- 0 : Level: Off
- 1 : Level: Low
- 2 : Level: Middle
- 3 : Level: High
- 4 : Level: Progressive



AT+CRSL?

Read command reports the current <level> setting of the call ringer in the format:

+CRSL: <level>



AT+CRSL=?

Test command reports <level> supported values as compound value.

+CRSL: (0-4)

3.9.1.3. AT+CLVL - Loudspeaker Volume Level

This command allows to set the volume of internal loudspeaker audio output.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT+CLVL=<level>

Set command is used to select the volume of the internal loudspeaker audio output of the device.

Parameter:

Name	Type	Default	Description
<level>	integer	10	Loudspeaker volume.

Value:

0= max : max value can be read by issuing the Test command.



AT+CLVL?

Read command reports the current <level> setting of the loudspeaker volume in the format:

+CLVL: <level>



AT+CLVL=?

Test command returns the supported values of parameter <level>.



The setting is saved using the **&W** command.

3.9.1.4. AT+CMUT - Microphone Mute Control

This command enables/disables the muting of the microphone audio line during a voice call.



- 3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT+CMUT=<n>

Set command enables/disables the uplink voice muting during a voice call.

Parameter:

Name	Type	Default	Description
<n>	integer	0	Controls the muting of the microphone audio line

Values:

- 0 : mute off, microphone active
- 1 : mute on, microphone muted



This command mutes/activates both internal and external microphone audio paths.



AT+CMUT?

Read command reports whether the muting of the microphone audio line during a voice call is enabled or not, in the format:

+CMUT:<n>



AT+CMUT=?

Test command reports the supported values for <n> parameter.



The setting is saved using the **&W** command.

3.9.1.5. AT+CSIL - Silence Command

This command enables the silent mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT+CSIL=[<n>]

Set command enables/disables the silent mode. When the phone is in silent mode, all signaling tones from MT are suppressed.

Parameter:

Name	Type	Default	Description
<n>	integer	0	enables/disables the silent mode

Values:

0 : disable

1 : enable



AT+CSIL?

Read command returns the current value of the parameter <n> in the format:

+CSIL: <n>



AT+CSIL=?

Test command returns the supported values of parameter <n>.

3.9.1.6. AT#SRP - Select Ringer Path

This command has no effect and is included only for backward compatibility.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#SRP=[<n>]

Parameter:

Name	Type	Default	Description
<n>	integer	0	ringer path number

Values:

- 0 : it has no effect
- 1 : it has no effect
- 2 : it has no effect
- 3 : it has no effect



AT#SRP?

Read command reports the set value of the parameter <n> in the format:

#SRP: <n>



AT#SRP=?

Test command returns the supported values of parameter <n>

3.9.1.7. AT#DIGMICG - Digital Microphone Gain

This command manages the gain of the handset microphone.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#DIGMICG=<gainLevel>

Set command sets the handset microphone input gain through 46 levels by 1 dB steps.

Parameter:

Name	Type	Default	Description
<gainLevel>	integer	0	handset microphone input gain

Value:

0-45 : input gain (+1dB/step)



This command substitutes the **#HSMICG** command and has the same default values.



AT#DIGMICG?

Read command returns the current handset microphone input gain in the format:

#DIGMICG: <gainLevel>



AT#DIGMICG=?

Test command returns the supported range of values of parameter <gainLevel>.



The setting is saved using the **&W** command.



Only digital audio is supported.

3.9.1.8. AT#SHFSD - Handsfree Sidetone Set

The command purpose is to enable/disable sidetone feature on audio Handsfree path.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#SHFSD=<mode>

It has no effect and is included only for backward compatibility.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enable/disable handsfree sidetone

Values:

- 0 : disable handsfree sidetone
- 1 : enable handsfree sidetone



Note: This setting returns to default after power off.



AT#SHFSD?

Read command reports the value of parameter <mode>, in the format:

#SHFSD: <mode>



AT#SHFSD=?

Test command returns the supported range of values of parameter <mode>.

3.9.1.9. AT#SHSSD - Set Handset Sidetone

This command enables the sidetone on headset audio output.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#SHSSD=<mode>

Set command enables/disables the sidetone on handset audio output.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enables/disables the handset sidetone

Values:

0 : disable

1 : enable



This parameter is saved in NVM issuing AT&W command.



AT#SHSSD?

The read command reports whether the headset sidetone is currently enabled or not, in the format:

#SHSSD: <mode>



AT#SHSSD=?

Test command returns the supported range of values of parameter <mode>.

3.9.1.10. AT#SPKMUT - Speaker Mute Control

This command enables/disables the global muting of the speaker audio line.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#SPKMUT=[<n>]

Set command enables/disables the global muting of the speaker audio line, for every audio output (ring, incoming sms, voice, Network coverage).

Parameter:

Name	Type	Default	Description
<n>	integer	0	muting of the speaker audio line

Values:

- 0 : mute OFF, speaker active
- 1 : mute ON, speaker muted



this command mutes/activates both speaker audio paths, internal speaker and external speaker.



AT#SPKMUT?

Read command reports whether the muting of the speaker audio line during a voice call is enabled or not, in the format:

#SPKMUT: <n>



AT#SPKMUT=?

Test command reports the supported values for <n> parameter.



The setting is saved in NVM using the **&W** command.

3.9.1.11. AT#OAP - Open Audio Loop

This set command enables/disables the Open Audio Path.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#OAP=[<mode>]

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enables/disables the Open Audio Path

Values:

0 : disable
1 : enable



AT#OAP?

Read command reports the current value of the parameter <mode> in the format:

#OAP: <mode>



AT#OAP=?

Test command returns the supported values of parameter <mode>.



The audio loop is established between microphone and speaker using sidetone scaling value.

#OAP is intended for testing purposes only. Thus, care must be taken to ensure that during the command execution no other audio interacting commands are issued.

3.9.1.12. AT#SRS - Select Ringer Sound

Set command sets the ringer tone.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#SRS=[<n>,<tout>]

Parameters:

Name	Type	Default	Description
<n>	integer	10	ringing tone
Values:			
0	:	current ringing tone. If also <tout> = 0 current ringing tone is set as default	
1÷max	:	ringing tone number. Max ringing tone number can be read by issuing the test command	
<tout>	integer	0	ringing tone playing timer in units of seconds.
Values:			
0	:	ringer is stopped (if present) and current ringer tone is set	
1÷60	:	duration in seconds of ringer tone playing. If also <n> > 0 then <n> tone is played for <tout> seconds and stored as default ringing tone	

- i** When the command is issued with:
 - <n> > 0 and <tout> > 0 then <n> ringing tone is played for <tout> seconds and stored as default ringing tone
 - <n> > 0 and <tout> = 0 then playing of the ringing is stopped (if present) and <n> ringing tone is set as current
 - <n> = 0 and <tout> > 0 then current ringing tone is played for <tout> seconds
 - <n> = 0 and <tout> = 0 then the default ringing tone is set as current and ringing is stopped
- i** If all parameters are omitted, then the behavior of set command is the same as read command.



AT#SRS?

Read command reports current selected ringing tone and its status in the following format:

#SRS: <n>,<status>

Additional info:

►► Parameters returned by the Read command and not described in the previous sections.

Name	Type	Default	Description
<status>	integer	N/A	ringing status

Values:

- 0 : selected but not playing
- 1 : currently playing

**AT#SRS=?**

Test command reports the supported values for the parameters <n> and <tout>

3.9.1.13. AT#HSMICG - Handset Microphone Gain

This set command sets the handset microphone input gain.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#HSMICG=[<level>]

Parameter:

Name	Type	Default	Description
<level>	integer	0	handset microphone input gain

Value:

0÷7 : input gain (+6dB/step)



AT#HSMICG?

Read command returns the current handset microphone input gain, in the format:

#HSMICG: <level>





AT#HSMICG=?

Test command returns the supported range of values of parameter <level>.



The setting is saved using the **&W** command.

-  The setting is saved using the **&W** command.
-  Only digital audio is supported.

3.9.1.14. AT#HSRECG - Handset Receiver Gain

This set command sets the handset analog output gain.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#HSRECG=<level>

Parameter:

Name	Type	Default	Description
<level>	integer	0	handset analogue output gain

Value:

0÷6 : analogue output gain (-3dB/step)



AT#HSRECG?

Read command returns the current handset analog output gain, in the format:

#HSRECG: <level>



AT#HSRECG=?

Test command returns the supported range of values of parameter <level>.



The setting is saved using the **&W** command.

3.9.1.15. AT#HFRECG - Handsfree Receiver Gain

It has no effect and is included only for backward compatibility.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#HFRECG=<level>

Parameter:

Name	Type	Default	Description
<level>	integer	0	level description

Value:

0÷6 : level setting



AT#HFRECG?

Read command returns the current value of parameter <level>, in the format:

#HFRECG: <level>



AT#HFRECG=?

Test command returns the supported range of values of parameter <level>.

3.9.1.16. AT#HFMICG - Handsfree Microphone Gain

This command has no effect and is included only for backward compatibility.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#HFMICG=[<level>]

Parameter:

Name	Type	Default	Description
<level>	integer	4	gain value
Value:			
0÷7 : gain value			



AT#HFMICG?

Read command returns the current value for parameter <level>, in the following format:

#HFMICG: <level>



AT#HFMICG=?

Test command returns the supported range of values for parameter <level>

3.9.2. Tones configuration

3.9.2.1. AT#STM - Signaling Tones Mode

This set command enables/disables the signaling tones output on the audio path.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#STM=[<mode>]

Parameter:

Name	Type	Default	Description
<mode>	integer	1	signaling tones status

Values:

- 0 : signaling tones disabled
- 1 : signaling tones enabled
- 2 : all tones disabled



AT#STM=0 has the same effect as **AT+CALM=2**

AT#STM=1 has the same effect as **AT+CALM=0**



AT#STM?

Read command reports whether the current signaling tones status is enabled or not, in the format:

#STM: <mode>



AT#STM=?

Test command reports supported range of values for parameter <mode>



The setting is saved in NVM using the **&W** command.

3.9.2.2. AT#TONE - Tone Playback

This command allows the reproduction of a set of both standard and user defined tones for a certain time.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#TONE=<tone>[,<duration>]

Execution command allows the reproduction of DTMF tones, standard free tone, standard busy tone and a set of user defined tones for a certain time.

Parameters:

Name	Type	Default	Description
<tone>	mixed	N/A	ASCII character describing the tone to be reproduced.
Values:			
0÷9	:	DTMF tones from 0 to 9	
#	:	DTMF tone #	
*	:	DTMF tone *	
A÷D	:	DTMF tones from A to D	
G÷L	:	User Defined Tones	
Y	:	free tone	
Z	:	busy tone	
<duration>	integer	30	Duration of current tone in 1/10 of sec.
Value:			
1÷300	:	tenth of seconds	

 See #UDTSET command to set user defined tones.



AT#TONE=?

Test command returns the supported range of values for parameters <tone> and <duration>.

3.9.2.3. AT#TONEEXT - Extended Tone Generation

The command allows an extended set of tones to be reproduced or stopped.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#TONEEXT=<toneld>,<act>

Execution command can both stop the running tone and allow the reproduction of an extended set of tones, such as DTMF tones, standard free tone, standard busy tone and a set of user defined tones for an infinite time.

Parameters:

Name	Type	Default	Description										
<toneld>	string	-	ASCII character in the set: <table border="1" data-bbox="727 801 1337 967"> <thead> <tr> <th>Set</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>(0-9), #, *, (A-D)</td> <td>DTMF tone</td> </tr> <tr> <td>G-L</td> <td>User defined tones</td> </tr> <tr> <td>Y</td> <td>Free tone</td> </tr> <tr> <td>Z</td> <td>Busy tone</td> </tr> </tbody> </table>	Set	Description	(0-9), #, *, (A-D)	DTMF tone	G-L	User defined tones	Y	Free tone	Z	Busy tone
Set	Description												
(0-9), #, *, (A-D)	DTMF tone												
G-L	User defined tones												
Y	Free tone												
Z	Busy tone												

<act>	integer	N/A	Action to be performed
-------	---------	-----	------------------------

Values:

- 0 : Stop the selected <toneld> if running
- 1 : Start the selected <toneld>

 For User Defined Tones, see also #UDTSET, #UDTRST and #UDTSAV command description.



AT#TONEEXT=?

Test command returns the range of supported values for parameter <toneld>,<act>.



```
Start the user tone G
AT#TONEEXT=G,1
OK
Stop the running user tone G
AT#TONEEXT=G,0
OK
```


3.9.2.4. AT#TSVOL - Tone Classes Volume

This command is used to manage the tone classes volume selection.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#TSVOL=<class>,<mode>[,<volume>]

Set command is used to select the volume mode for one or more tone classes.

Parameters:

Name	Type	Default	Description
<class>	integer	-	<p>the <class> is a bit mask (1 Byte long) where each bit, if set, indicates the volume corresponding to a class of tones:</p> <ul style="list-style-type: none"> • bit 0 = GSM tones • bit 1 = ringer tones • bit 2 = alarm tones • bit 3 = signaling tones • bit 4 = DTMF tones • bit 5 = SIM Toolkit tones • bit 6 = user defined tones • bit 7 = dial tones
<mode>	integer	0	it indicates which volume is used for the classes of tones represented by <class>
Values:			
0 : default volume is used			
1 : the volume <volume> is used			
<volume>	integer	N/A	volume to be applied to the set of classes of tones represented by <class>; mandatory if <mode> is 1
Value:			
0÷max : the 'max' value can be read issuing the Test Command AT#TSVOL=?			

- i** The class DTMF Tones (<class>=16) refers only to the volume for locally generated DTMF tones. It does not affect the level of the DTMF generated by the network as result of +VTS command.



AT#TSVOL?

Read command returns for each class of tones the last setting of <mode> in the format:

#TSVOL: 1,<mode1><CR><LF>

...

#TSVOL:128,<mode128>

Additional info:

- ▶▶ If <mode> is not 0, also the <volume> is reported in the format:

```
#TSVOL: 1,<mode1>,<volume1><CR><LF>
#TSVOL: 2,<mode2>,<volume2><CR><LF>
#TSVOL: 4,<mode4>,<volume4><CR><LF>
#TSVOL: 8,<mode8>,<volume8><CR><LF>
#TSVOL: 16,<mode16>,<volume16><CR><LF>
#TSVOL: 32,<mode32>,<volume32><CR><LF>
#TSVOL: 64,<mode64>,<volume64><CR><LF>
#TSVOL:128,<mode128>,<volume128>
```

**AT#TSVOL=?**

Test command returns the supported range of values of parameters **<class>**, **<mode>** and **<volume>**.



- Set tone class volume
AT#TSVOL=64,1,5
OK
Read current **<mode>** setting values
AT#TSVOL?
#TSVOL:1,0
#TSVOL:2,0
#TSVOL:4,1,5
#TSVOL:8,0
#TSVOL:16,1,5
#TSVOL:32,0
#TSVOL:64,1,5
#TSVOL:128,0
OK

3.9.2.5. AT#UDTSET - User Defined Tone SET

Command sets an user defined tone with frequency and amplitude configurable

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2







AT#UDTSET=<tone>,<F1>,<A1>[,<F2>,<A2>[,<F3>,<A3>]]

Set command sets a tone identified by the index <tone> as the sum of 3 independent frequencies <Fi> and amplitudes <Ai>

Parameters:

Name	Type	Default	Description
<tone>	string	N/A	Configure the tone index
	Value:		G÷L : tone index (G,H,I,J,K,L)
<F1>	integer	300	Set tone frequency
	Value:		300÷3000 : frequency in Hz; step of 1 Hz
<A1>	integer	10	Set Tone amplitude
	Value:		10÷100 : amplitude in dB; step of 1 dB
<F2>	integer	300	Set tone frequency
	Value:		300÷3000 : frequency in Hz; step of 1 Hz
<A2>	integer	10	Set Tone amplitude
	Value:		10÷100 : amplitude in dB; step of 1 dB
<F3>	integer	300	Set tone frequency
	Value:		300÷3000 : frequency in Hz; step of 1 Hz
<A3>	integer	10	Set Tone amplitude
	Value:		10÷100 : amplitude in dB; step of 1 dB

-  <Ai> = 100 is the max value of the single tone. Lower values attenuate output by the difference between 100 and the selected amplitude:
 Example <Ai> = 80 is equal to 100-80 = -20dB

-  Issuing **AT&F1** or **AT&Z** has the effect to set the parameters with the last values saved in NVM.
-  Every time the set command is issued, the unspecified parameters are automatically reset to zero.
-  To able to set **<F3>**,**<A3>**, the value of **<F2>**,**<A2>** must be set also.

**AT#UDTSET?**

Read command returns the current settings for the tones:

```
#UDTSET: G,<F1>,<A1>,<F2>,<A2>,<F3>,<A3>  
#UDTSET: H, <F1>,<A1>,<F2>,<A2>,<F3>,<A3>  
#UDTSET: I, <F1>,<A1>,<F2>,<A2>,<F3>,<A3>  
#UDTSET: J, <F1>,<A1>,<F2>,<A2>,<F3>,<A3>  
#UDTSET: K, <F1>,<A1>,<F2>,<A2>,<F3>,<A3>  
#UDTSET: L, <F1>,<A1>,<F2>,<A2>,<F3>,<A3>
```

**AT#UDTSET=?**

Test command returns the supported range of values for **<tone>**, **<Fi>** and **<Ai>** parameters

3.9.2.6. AT#UDTRST - User Defined Tone Reset

The command reset the values of user define tone.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#UDTRST

Execution command resets to the default set the actual values of frequency and amplitude parameters that can be set with the command **#UDTSET**.



AT#UDTRST=?

Test command returns the **OK** result code

3.9.2.7. AT#UDTSAV - User Defined Tone Save

This command saves the actual values of frequency and amplitude parameters.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#UDTSAV

Execution command saves in NVM the actual values of frequency and amplitude parameters that have been set with the command #UDTSET.



AT#UDTSAV=?

Test command returns the **OK** result code.

3.9.2.8. AT#OOBTSET - Out of Band Tone Set

This set command sets offset gain for an out of band tone set.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#OOBTSET=<mode>,<setting>

Parameters:

Name	Type	Default	Description
<mode>	integer	0	selects type of OOB tone set
Values:			
0	:	embedded DTMF tones	
1÷255	:	reserved	
<setting>	integer	-	offset gain expressed in dB, -22 is mute



AT#OOBTSET?

Read command reports the currently setting in the form:

#OOBTSET: <mode>,<setting>



AT#OOBTSET=?

Test command returns the supported range of values of parameters.



Set offset gain for DTMF tones to -15 dB.
AT#OOBTSET = 0,-15

3.9.3. Audio Profiles

3.9.3.1. AT#PRST - Audio Profile Factory Configuration

This command restores the audio profile to default.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#PRST

Execution command resets the actual audio parameters in the NVM of the device to the default set. It is not allowed if active audio profile is 0. The audio parameters to reset are:

- uplink path biquad filters
- downlink path biquad filters



AT#PRST=?

Test command returns the **OK** result code.



```
Current audio profile is reset
AT#PRST
OK
```


3.9.3.2. AT#PSAV - Audio Profile Configuration Save

The command stores in NVM the current audio profile. It is not allowed if active audio profile is 0, refer to #PSEL command for active profile selection.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#PSAV

Execution command saves the following audio parameters:

- uplink path biquad filters
- downlink path biquad filters



AT#PSAV=?

Test command returns the **OK** result code



Current audio profile is saved in NVM

```
AT#PSAV
OK
```

3.9.3.3. AT#PSEL - Audio Profile Selection

This command manages the audio profile selection.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#PSEL=<prof>

Set command selects the active audio profile.

Parameter:

Name	Type	Default	Description
<prof>	integer	0	current profile

Values:

- 0 : standard profile
- 1÷3 : extended profiles, modifiable



AT#PSEL?

Read command returns the active profile in the format:

#PSEL:<prof>



AT#PSEL=?

Test command returns the supported range of values of parameter <prof>.



The setting is saved using the **&W** command.

3.9.4. Audio Filters

3.9.4.1. AT#BIQUADIN - Uplink Path Biquad Filters

This command configures the coefficients of the two biquad filters in Uplink path (sending).



[1] Audio Tuning for Handsfree Systems, 80464NT11417A

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT#BIQUADIN=<aF0>[,<aF1>[,<aF2>[,<bF1>[,<bF2>[,<aS0>[,<aS1>[,<aS2>[,<bS1>[,<bS2>]]]]]]]]]]

Set command configures the parameters of the two-cascaded digital biquad filters $H_{\text{First}}(z)$ x $H_{\text{Second}}(z)$ in Uplink path (sending).

Note, in the following formulas, the multiplier "2" for parameters <aF1>, <aS1>, <bF1> and <bS1>.

$$H_F(z) = \frac{a_{F0} + 2 \cdot a_{F1} \cdot z^{-1} + a_{F2} \cdot z^{-2}}{1 + 2 \cdot b_{F1} \cdot z^{-1} + b_{F2} \cdot z^{-2}}$$

$$H_S(z) = \frac{a_{S0} + 2 \cdot a_{S1} \cdot z^{-1} + a_{S2} \cdot z^{-2}}{1 + 2 \cdot b_{S1} \cdot z^{-1} + b_{S2} \cdot z^{-2}}$$

Each entered filter parameter is interpreted as signed fixed point number in two's complement format with 15 fractional bits in a 16 bits word: Q15 number format.

Parameters:

Name	Type	Default	Description
<aF0>	integer	28519	Its meaning is described in the document [1].
	Value:	-32768÷32767	: filter parameter range
<aF1>	integer	-28519	Its meaning is described in the document [1].
	Value:	-32768÷32767	: filter parameter range
<aF2>	integer	28519	Its meaning is described in the document [1].
	Value:	-32768÷32767	: filter parameter range
<bF1>	integer	-28242	Its meaning is described in the document [1].
	Value:		

		-32768÷32767	: filter parameter range
<bF2>	integer	24679	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range
<aS0>	integer	23453	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range
<aS1>	integer	23453	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range
<aS2>	integer	23453	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range
<bS1>	integer	22101	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range
<bS2>	integer	16842	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range

**AT#BIQUADIN?**

Read command returns the current parameters values in the format:

#BIQUADIN: <aF0>,<aF1>,<aF2>,<bF1>,<bF2>,<aS0>,<aS1>,<aS2>,<bS1>,<bS2>

**AT#BIQUADIN=?**

Test command returns the supported ranges of parameters values.



- Parameters can be saved in NVM only in audio profiles 1,2 and 3 using **#PSAV** command. For audio profile 0 the values are fixed, the saving is not allowed. Refer to **#PSEL** command for active audio profile selection.
- Use **#PRST** command to set all parameters to the default values.
- Set and read commands return **ERROR** message if current active audio profile is 0.

3.9.4.2. AT#BIQUADINEX - Extended Uplink Biquad Filters

This command configures the coefficients of the two-extended biquad filters in Uplink path (sending).



[1] Audio Tuning for Handsfree Systems, 80464NT11417A

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT#BIQUADINEX=<aF0>[,<aF1>[,<aF2>[,<bF1>[,<bF2>[,<aS0>[,<aS1>[,<aS2>[,<bS1>[,<bS2>]]]]]]]]]]

Set command configures the parameters of the two-extended cascaded digital biquad filters $H_{\text{First}}(z) \times H_{\text{Second}}(z)$ in Uplink path (sending).

Note, in the following formulas, the multiplier "2" for parameters <aF1>, <aS1>, <bF1> and <bS1>.

$$H_F(z) = \frac{a_{F0} + 2 \cdot a_{F1} \cdot z^{-1} + a_{F2} \cdot z^{-2}}{1 + 2 \cdot b_{F1} \cdot z^{-1} + b_{F2} \cdot z^{-2}}$$

$$H_S(z) = \frac{a_{S0} + 2 \cdot a_{S1} \cdot z^{-1} + a_{S2} \cdot z^{-2}}{1 + 2 \cdot b_{S1} \cdot z^{-1} + b_{S2} \cdot z^{-2}}$$

Each entered filter parameter is interpreted as signed fixed point number in two's complement format with 15 fractional bits in a 16 bits word: Q15 number format.

Parameters:

Name	Type	Default	Description
<aF0>	integer	28519	Its meaning is described in the document [1].
Value: -32768÷32767 : filter parameter range			
<aF1>	integer	-28519	Its meaning is described in the document [1].
Value: -32768÷32767 : filter parameter range			
<aF2>	integer	28519	Its meaning is described in the document [1].
Value: -32768÷32767 : filter parameter range			
<bF1>	integer	-28242	Its meaning is described in the document [1].
Value: -32768÷32767 : filter parameter range			
<bF2>	integer	24679	Its meaning is described in the document [1].

	Value:		
		-32768÷32767	: filter parameter range
<aS0>	integer	23453	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range
<aS1>	integer	23453	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range
<aS2>	integer	23453	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range
<bS1>	integer	22101	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range
<bS2>	integer	16842	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range

**AT#BIQUADINEX?**

Read command returns the current parameters values in the format:

#BIQUADINEX: <aF0>,<aF1>,<aF2>,<bF1>,<bF2>,<aS0>,<aS1>,<aS2>,<bS1>,<bS2>

**AT#BIQUADINEX=?**

Test command returns the supported ranges of parameters values.



- Parameters can be saved in NVM only in audio profiles 1,2 and 3 using **#PSAV** command. For audio profile 0 the values are fixed, the saving is not allowed. Refer to **#PSEL** command for active audio profile selection.
- Use **#PRST** command to set all parameters to the default values.
- Set and read commands return **ERROR** message if current active audio profile is 0.

3.9.4.3. AT#BIQUADOUT - Downlink Path Biquad Filters

This command configures the coefficients of the two biquad filters in Downlink path (receiving).



[1] Audio Tuning for Handsfree Systems, 80464NT11417A

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT#BIQUADOUT=<aF0>[,<aF1>[,<aF2>[,<bF1>[,<bF2>[,<aS0>[,<aS1>[,<aS2>[,<bS1>[,<bS2>]]]]]]]]]

Set command configures the parameters of the two-cascaded digital biquad filters $H_{\text{First}}(z) \times H_{\text{Second}}(z)$ in Downlink path (receiving).

Note, in the following formulas, the multiplier "2" for parameters <aF1>, <aS1>, <bF1> and <bS1>.

$$H_F(z) = \frac{a_{F0} + 2 \cdot a_{F1} \cdot z^{-1} + a_{F2} \cdot z^{-2}}{1 + 2 \cdot b_{F1} \cdot z^{-1} + b_{F2} \cdot z^{-2}}$$

$$H_S(z) = \frac{a_{S0} + 2 \cdot a_{S1} \cdot z^{-1} + a_{S2} \cdot z^{-2}}{1 + 2 \cdot b_{S1} \cdot z^{-1} + b_{S2} \cdot z^{-2}}$$

Each entered filter parameter is interpreted as signed fixed point number in two's complement format with 15 fractional bits in a 16 bits word: Q15 number format.

Parameters:

Name	Type	Default	Description
<aF0>	integer	28519	Its meaning is described in the document [1].
Value: -32768÷32767 : filter parameter range			
<aF1>	integer	-28519	Its meaning is described in the document [1].
Value: -32768÷32767 : filter parameter range			
<aF2>	integer	28519	Its meaning is described in the document [1].
Value: -32768÷32767 : filter parameter range			
<bF1>	integer	-28242	Its meaning is described in the document [1].
Value: -32768÷32767 : filter parameter range			

<bF2>	integer	24679	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range
<aS0>	integer	23453	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range
<aS1>	integer	23453	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range
<aS2>	integer	23453	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range
<bS1>	integer	22101	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range
<bS2>	integer	16842	Its meaning is described in the document [1].
	Value:		
		-32768÷32767	: filter parameter range

**AT#BIQUADOUT?**

Read command returns the current parameters values for in the format:

#BIQUADIN: <aF0>,<aF1>,<aF2>,<bF1>,<bF2>,<aS0>,<aS1>,<aS2>,<bS1>,<bS2>

**AT#BIQUADOUT=?**

Test command returns the supported ranges of parameters values.



- Parameters can be saved in NVM only in audio profiles 1,2 and 3 using **#PSAV** command. For audio profile 0 the values are fixed, the saving is not allowed. Refer to **#PSEL** command for active audio profile selection.
- Use **#PRST** command to set all parameters to the default values.
- Set and read commands return **ERROR** message if current active audio profile is 0.

3.9.4.4. AT#BIQUADOUTEX - Extended Downlink Biquad Filters

This command configures the coefficients of the two-extended biquad filters in Downlink path (receiving).



[1] Audio Tuning for Handsfree Systems, 80464NT11417A

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT#BIQUADOUTEX=<aF0>[,<aF1>[,<aF2>[,<bF1>[,<bF2>[,<aS0>[,<aS1>[,<aS2>[,<bS1>[,<bS2>]]]]]]]]]

Set command configures the parameters of the two-extended cascaded digital biquad filters $H_{\text{First}}(z)$ x $H_{\text{Second}}(z)$ in Downlink path (receiving).

Note, in the following formulas, the multiplier "2" for parameters <aF1>, <aS1>, <bF1> and <bS1>.

$$H_F(z) = \frac{a_{F0} + 2 \cdot a_{F1} \cdot z^{-1} + a_{F2} \cdot z^{-2}}{1 + 2 \cdot b_{F1} \cdot z^{-1} + b_{F2} \cdot z^{-2}}$$

$$H_S(z) = \frac{a_{S0} + 2 \cdot a_{S1} \cdot z^{-1} + a_{S2} \cdot z^{-2}}{1 + 2 \cdot b_{S1} \cdot z^{-1} + b_{S2} \cdot z^{-2}}$$

Each entered filter parameter is interpreted as signed fixed point number in two's complement format with 15 fractional bits in a 16 bits word: Q15 number format.

Parameters:

Name	Type	Default	Description
<aF0>	integer	28519	Its meaning is described in the document [1].
Value: -32768÷32767 : filter parameter range			
<aF1>	integer	-28519	Its meaning is described in the document [1].
Value: -32768÷32767 : filter parameter range			
<aF2>	integer	28519	Its meaning is described in the document [1].
Value: -32768÷32767 : filter parameter range			
<bF1>	integer	-28242	Its meaning is described in the document [1].
Value: -32768÷32767 : filter parameter range			
<bF2>	integer	24679	Its meaning is described in the document [1].

Value:

-32768÷32767 : filter parameter range

<aS0> integer 23453 Its meaning is described in the document [1].

Value:

-32768÷32767 : filter parameter range

<aS1> integer 23453 Its meaning is described in the document [1].

Value:

-32768÷32767 : filter parameter range

<aS2> integer 23453 Its meaning is described in the document [1].

Value:

-32768÷32767 : filter parameter range

<bS1> integer 22101 Its meaning is described in the document [1].

Value:

-32768÷32767 : filter parameter range

<bS2> integer 16842 Its meaning is described in the document [1].

Value:

-32768÷32767 : filter parameter range



AT#BIQUADOUTEX?

Read command returns the current parameters values in the format:

#BIQUADOUTEX: <aF0>,<aF1>,<aF2>,<bF1>,<bF2>,<aS0>,<aS1>,<aS2>,<bS1>,<bS2>



AT#BIQUADOUTEX=?

Test command returns the supported ranges of parameters values.



- Parameters can be saved in NVM only in audio profiles 1,2 and 3 using **#PSAV** command. For audio profile 0 the values are fixed, the saving is not allowed. Refer to **#PSEL** command for active audio profile selection.
- Use **#PRST** command to set all parameters to the default values.
- Set and read commands return **ERROR** message if current active audio profile is 0.

3.9.5. Echo Canceller Configuration

3.9.5.1. AT#SHSEC - Handset Echo Canceller

It has no effect and is included only for backward compatibility.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#SHSEC=[<mode>]

Parameter:

Name	Type	Default	Description
<mode>	integer	0	dummy parameter

Values:

0 : dummy value

1 : dummy value



AT#SHSEC?

Read command returns the current value of the parameter <mode> in the format:

#SHSEC: <mode>



AT#SHSEC=?

Test command returns the supported values of parameter <mode>.



The setting is saved using the **&W** command.

3.9.5.2. AT#SHFEC - Handsfree Echo Cancellor

This command has no effect and is included only for backward compatibility.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#SHFEC=[<mode>]

This command has no effect and is included only for backward compatibility.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	mode parameter

Values:

- 0 : mode value
- 1 : mode value



AT#SHFEC?

Read command reports the value of parameter <mode>, in the format:

#SHFEC: <mode>



AT#SHFEC=?

Test command returns the supported range of values of parameter <mode>.

3.9.5.3. AT#SHSAGC - Handset Automatic Gain Control

This command enables the Handset Automatic Gain Control.



Audio Tuning for Handsfree Systems, 80464NT11417A

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#SHSAGC=[<mode>]

Set command enables/disables the automatic gain control function on audio handset input.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enables/disables the automatic gain control function

Values:

0 : disable

1 : enable



AT#SHSAGC?

Read command returns the current value of the parameter <mode> in the format:

#SHSAGC: <mode>



AT#SHSAGC=?

Test command returns the supported values of parameter <mode>.



The setting is saved using the **&W** command.

3.9.5.4. AT#SHFAGC - Handsfree Automatic Gain Control

This command has no effect and is included only for backward compatibility.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#SHFAGC=<mode>

Parameter:

Name	Type	Default	Description
<mode>	integer	0	This parameter has no effect and is included only for backward compatibility.

Value:

0,1 : These values have no effect and are included only for backward compatibility.



AT#SHFAGC?

Read command reports the value of parameter <mode>, in the format:

#SHFAGC: <mode>



AT#SHFAGC=?

Test command returns the supported range of values of parameter <mode>.

3.9.5.5. AT#SHSNR - Handset Noise Reduction

This command enables the noise reduction function on audio handset input.



Audio Tuning for Handsfree Systems, 80464NT11417A

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#SHSNR=<mode>

Set command enables/disables the noise reduction function on audio handset input.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enables/disables noise reduction for handset mode

Values:

0 : disable

1 : enable



AT#SHSNR?

Read command returns the current value of the parameter <mode>, in the format:

#SHSNR: <mode>



AT#SHSNR=?

Test command returns the supported values of parameter <mode>.



The setting is saved using the **&W** command.

3.9.5.6. AT#SHFNR - Handsfree Noise Reduction

The command purpose is to enable/disable the Noise Reduction feature on audio Handsfree path.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#SHFNR=<mode>

It has no effect and is included only for backward compatibility.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	Set command enables/disables the noise reduction function on audio handsfree input.

Values:

- 0 : disables noise reduction for handsfree mode
- 1 : enables noise reduction for handsfree mode



Note: <Mode> parameter is saved in NVM issuing AT&W command.



AT#SHFNR?

Read command reports whether the noise reduction function on audio handsfree input is currently enabled or not, in the format:

#SHSNR: <mode>



AT#SHFNR=?

Test command returns the supported range of values of parameter <mode>.

3.9.5.7. AT#SHSANA - Handset Ambient Noise Adaptation

This command enables/disables the ambient noise adaptation function.



Audio Tuning for Handsfree Systems, 80464NT11417A

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#SHSANA=<mode>

Set command enables/disables the ambient noise adaptation function on audio handset input.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enables/disables ambient noise adaptation.

Values:

- 0 : disables ambient noise adaptation for handset mode.
- 1 : enables ambient noise adaptation for handset mode



AT#SHSANA?

Read command reports whether the ambient noise adaptation function on audio handset input is currently enabled or not, in the format:

SHSANA: <mode>



AT#SHSANA=?

Test command returns the supported range of values of parameter <mode>.



The setting is saved in NVM using the **&W** command.

3.9.5.8. AT#SHSDLY - Echo Cancellor Delay

The command enables/disables the ambient noise adaptation function on audio handset input.



Audio Tuning for Handsfree Systems, 80464NT11417A

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#SHSDLY=<mode>

Set command enables/disables the echo canceller delay.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enables/disables echo canceller delay.

Values:

0 : disables

1 : enables



AT#SHSDLY?

Read command returns the current <mode> value, in the format:

#SHSDLY: <mode>



AT#SHSDLY=?

Test command returns the supported range of values of parameter <mode>.



The setting is saved in NVM using the **&W** command.

3.9.5.9. AT#ECHOCFG - Echo Reducer Configuration

The command configures the echo reducer parameters.



[1] Audio Tuning for Handsfree Systems, 80464NT11417A

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	Yes	-	2



AT#ECHOCFG=<par_1>[,<par_2>[,...[,<par_N>]]]

Set command sets the echo reducer parameters values. The command can set:

1. all echo parameters at the same time: <par_1> is the index identifying all the echo parameters
2. a single echo parameter: <par_1> is the index identifying the single echo parameter
3. a group of echo parameters: <par_1>, ... <par_n> are indexes identifying a group of echo parameters

Each echo parameter is identified by an index. The echo reducer parameters set is described in document [1].

After entering **AT#ECHOCFG=...** command, and terminated the command line with <CR>, the module returns a four characters sequence prompt:

<CR><LF><greater_than><space> (see IRA character set: 13, 10, 62, 32)

After the prompt, the command is ready to accepts data. See Additional info section.

Parameters:

Name	Type	Default	Description
<par_1>	integer	-	selects the setting of all echo parameters at the same time, see Additional info section
<par_2>...<par_N>	integer	-	indexes of the echo reducer parameters to be set, see Additional info section

Additional info:

- ▶▶ The command sets all echo parameters at the same time

Set <par_1>=0

Module awaits 68 values. Strings with the first 39 or 62 parameters are also accepted to meet the backward compatibility needs.

Example:

AT#ECHOCFG=0<CR>

> enter all echo reducer parameters values

After the prompt ">", enter the values of all echo reducer parameters. The values must be entered in hexadecimal format with 4 digits.

To complete the edit operation, enter **Ctrl-Z** char (0x1A hex). To exit without completing the operation, enter **ESC** char (0x1B hex).

If data are successfully entered, the module returns the **OK** response, otherwise an error code is reported.

▶▶ The command sets a single echo parameter

Set **<par_1>**=1, or 2, ... or 68
Module awaits only one echo reducer value

Example:

AT#ECHOCFG=3<CR>

> enter the echo parameter value identified by the index 3

▶▶ The command sets a group of echo parameters

Module awaits a group of echo reducer values

Example:

AT#ECHOCFG=19,22,27<CR>

> enter the echo parameters values identify by indexes 19, 22, and 27.

The command accepts a maximum of 32 parameters.



AT#ECHOCFG?

Read command returns the current set of parameters values in the format:

#ECHOCFG: <par_1>,<par_2>,...<par_N>

Full set of registers values dumped in hexadecimal form, 68 words (272 characters).
It is not allowed if active audio profile is 0.



AT#ECHOCFG=?

Test command returns the supported ranges of all parameters values in the format:

#ECHOCFG: <par_i>,<low_i>-<high_i>

To know the meaning of the echo parameters identified by the indexes, see document [1].

Additional info:

- ▶▶ Parameters meanings returned by test command:

Name	Type	Default	Description
<par_i>	integer	-	parameter index
<low_i>	integer	-	lower value of the parameter identified by <par_i> index
<high_i>	integer	-	upper value of the parameter identified by <par_i> index



Parameters can be saved in NVM only in audio profiles 1,2 and 3 using **#PSAV** command. For audio profile 0 the values are fixed, the saving is not allowed.

3.9.6. Embedded DTMF Decoder & TTY

3.9.6.1. AT#DTMFCFG - Embedded DTMF Decoder Configuration

Embedded DTMF decoder configuration. See **#DTMF** command.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#DTMFCFG=<scaling>,<threshold_1>,<threshold_2>[,<std_twist>[,<rev_twist>]]


Set command sets the embedded DTMF decoder.

Parameters:

Name	Type	Default	Description
<scaling>	integer	7	is the scaling factor applied to the PCM samples to manage arithmetic operations.
	Value:	3÷11	: Available range
<threshold_1>	integer	2500	is the numeric threshold used to detect DTMF tones.
	Value:	1000÷2000	: Available range
<threshold_2>	integer	1500	is the numeric threshold used to start DTMF decoding.
	Value:	1000÷2000	: Available range
<std_twist>	integer	9	is the standard twist threshold. It is an optional parameter.
	Value:	0÷20	: Available range
<rev_twist>	integer	5	is the reverse twist threshold. It is an optional parameter.
	Value:	0÷20	: Available range

- i** The default values were chosen after a fine tuning, so every change should be done very carefully to avoid wrong decoding.
- i** Default values are referred to standard DMTF decoder, see **#DTMF=1**.
- i** It is supposed that the module is just powered on and the **#DTMFCFG** command is entered without **<std_twist>** and **<rev_twist>** parameters.
In this case, the read command does not return the setting of the **<std_twist>** and **<rev_twist>** parameters to meet backward compatibility with other module series.
Now, assume that **#DTMFCFG** command is entered again, but using the **<std_twist>** and **<rev_twist>** parameters for the first time; if the read command is entered, it reports the parameters values just used. If subsequently the **<std_twist>** and **<rev_twist>**

parameters are omitted, the read command reports the parameters values entered the last time.

-  The values set by command are not saved and a software or hardware reset restores the default value.



AT#DTMFCFG?

Read command reports the currently selected parameters values in the format:

```
#DTMFCFG:<scaling>,<threshold_1>,<threshold_2>[,<std_twist>[,<rev_twist >]]
```



AT#DTMFCFG=?

Test command reports the ranges of the parameters values.



- Test command:
AT#DTMFCFG=?
#DTMFCFG: (3-11),(1000-20000),(1000-20000),(0-20),(0-20)
OK

3.9.6.2. AT#DTMF - Embedded DTMF Decoder Enabling

This command enables/disables the embedded DTMF decoder.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#DTMF=<mode>

Set command enables/disables the embedded DTMF decoder.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enables/disables the embedded DTMF decoder

Values:

- 0 : disables DTMF decoder
- 1 : enables DTMF decoder and VoLTE messages. For URC see Additional info section.
- 2 : disables DTMF decoder. VoLTE messages are enabled.

Additional info:




▶▶ <mode>=1

The DTMF tone receiving is notified with an unsolicited message through AT interface in the following format:

#DTMFEV: X

Unsolicited field:

Name	Type	Description
<X>	string	DTMF digit

-  The duration of a tone should be not less than 50 ms.
-  When DTMF decoder is enabled, PCM playing and recording are automatically disabled, **#SPCM** will return error.
-  The value set by command is not saved and a software or hardware reset restores the default value. The value can be stored in NVM using **AT&W** command.



AT#DTMF?

Read command returns the currently selected <mode> in the format:

#DTMF: <mode>



AT#DTMF=?

Test command returns the supported values of the parameter **<mode>**.

3.9.6.3. AT#TTY - TeleType Writer

This command enables the TTY functionality.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#TTY=<support>

Set command enables/disables the TTY functionality.

Parameter:

Name	Type	Default	Description
<support>	integer	0	enables/disables TTY functionality

Values:

- 0 : disable
- 1 : enable



AT#TTY?

Read command returns whether the TTY functionalities currently enabled or not, in the format:

#TTY: <support>



AT#TTY=?

Test command reports the supported range of values for parameter <support>.

3.9.7. Digital Voice Interface

3.9.7.1. AT#DVI - Digital Voiceband Interface

Digital Voiceband Interface handling.



[1] Hardware User's Guide of the used module

[2] 3G/4G Digital Voice Interface Application Note, 80000NT10050A

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2



AT#DVI=<mode>[,<dviport>,<clockmode>]

Set command enables/disables the Digital Voiceband Interface. To have information about the pins used by the interface, refer to document [1]. See also document [2].

Parameters:

Name	Type	Default	Description
<mode>	integer	0	enables/disables the DVI
Values:			
0	:	disable DVI	
1	:	enable DVI: audio is forwarded to the DVI block	
2	:	reserved	
<dviport>	integer	2	select DVI port
Value:			
2	:	DVI port, the only available.	
<clockmode>	integer	1	select DVI clock mode
Values:			
0	:	DVI slave	
1	:	DVI master	



AT#DVI?

Read command reports last setting, in the format:

#DVI: <mode>,<dviport>,<clockmode>



AT#DVI=?

Test command reports the range of supported values for parameters <mode>,<dviport> and <clockmode>.



Configure DVI as master using the DVI Port #2 (the only available)
AT#DVI=1,2,1
OK

3.9.7.2. AT#DVIEXT - Digital Voiceband Interface Extension

Digital Voiceband Interface Extension.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Common profile	No	-	2




AT#DVIEXT=<config>[,<samplerate>[,<samplewidth>[,<audiomode>[,<edge>]]]]

Set command configures the Digital Voiceband Interface.

Parameters:

Name	Type	Default	Description
<config>	integer	1	Transmission mode
	Values:		
	0	:	Burst Mode
	1	:	Normal Mode
<samplerate>	integer	0	Sample rate
	Values:		
	0	:	audio scheduler sample rate 8KHz
	1	:	audio scheduler sample rate 16KHz
<samplewidth>	integer	0	Number of bit per sample
	Values:		
	0	:	16 bits per sample
	1	:	18 bits per sample
	2	:	20 bits per sample
	3	:	24 bits per sample
	4	:	32 bits per sample
<audiomode>	integer	1	Mode of audio
	Values:		
	0	:	Mono Mode
	1	:	Dual Mono
<edge>	integer	0	Edge on which bit is transmitted
	Values:		
	0	:	data bit is transmitted on falling edge of clock and sampled on rising edge of clock
	1	:	data bit is transmitted on rising edge of clock and sampled on falling edge of clock

 **<edge>** parameters is valid only in Burst Mode, in Normal Mode shall be 0.

**AT#DVIEXT?**

Read command reports last setting, in the format:

#DVIEXT: <config>,<samplerate>,<samplewidth>,<audiomode>,<edge>

**AT#DVIEXT=?**

Test command reports the range of supported values for parameters:

<config>,<samplerate>,<samplewidth>,<audiomode>,<edge>

3.9.7.3. AT#DVICLK - Digital Voiceband Interface Clock

This set command configures and activates the DVICLK clock signal.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2





AT#DVICLK=<clk>

Parameter:

Name	Type	Default	Description
<clk>	integer	0	enable/disable DVI clock

Values:

- 0 : disable
- 1 : DVI clock activated at 256KHz
- 2 : DVI clock activated at 384KHz
- 3 : DVI clock activated at 512KHz

-  Commands **#DVI**, **#DVIEXT**, **#OAP** can turn off the DVI clock signal or change its frequency.
-  After setting the DVI clock frequency through **#DVICLK** command, a voice call does not modify the DVI clock setting.



AT#DVICLK?

Read command reports last setting, in the format:

#DVICLK: <clk>



AT#DVICLK=?

Test command reports the range of parameter <clk>.

3.9.8. Audio File Management

3.9.8.1. AT#SPCM - PCM Play And Receive

PCM play and receive.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SPCM=<mode>,<dir>[,<format>]

Set command allows user either to send speech sample coming from microphone or downlink audio channel to serial port in PCM format, or to play a PCM stream coming from serial port to speaker or uplink audio channel.

An active speech call is needed when sending/receiving to/from audio channel.

Parameters:




Name	Type	Default	Description
<mode>	integer	1	action to be execute
Values:			
1	:	play PCM stream from serial to selected direction <dir>.	
2	:	send speech from selected direction <dir> to serial.	
3	:	send/receive speech to/from selected direction <dir>	
<dir>	integer	0	select the audio path.
Values:			
0	:	send/receive to/from audio front end	
1	:	send/receive to/from audio channel	
2	:	reserved	
<format>	integer	0	PCM bits format
Values:			
0	:	8 bit	
1	:	16 bit	

Additional info:

- The following table summarizes the status of audio path during a speech call for different configurations and with sidetone disabled. As example: if <mode> = 3 and <dir> = 1 then the speech coming from serial port with selected PCM <format> is sent to uplink and, at the same time, the speech coming from downlink is sent to serial port with selected PCM <format>.

	<mode>=1	<mode>=2	<mode>=3
<dir>=0	Uplink OFF / Downlink ON PCM stream on speaker	Uplink OFF / Downlink OFF PCM stream from microphone	Not supported

<dir>=1	Uplink ON / Downlink OFF PCM stream on Uplink	Uplink OFF / Downlink ON PCM stream from Downlink	Uplink ON / Downlink ON PCM stream to/from Uplink/Downlink
----------------------	---	---	--

-  Execution command switches module in online mode. Module moves back to command mode either after entering the escape sequence +++ or as a consequence of a DTR transition.
-  Using 16 bit it is mandatory to set **+IPR** at least to 230400.
-  When DTMF decoder is enabled, PCM playing and recording are automatically disabled (**#SPCM** will return error).

**AT#SPCM=?**

Test command returns the supported range of parameters values in the following format:

#SPCM: <mode>,<dir>,<format>



- **AT#SPCM=1,0,0**

CONNECT

+++

NO CARRIER

Note: after the **CONNECT**, 8Khz 8bit PCM stream must be sent to serial port

- **AT#SPCM=2,0,0**

CONNECT

+++

NO CARRIER

Note: after the **CONNECT**, 8Khz 8bit PCM stream can be read from serial port

3.10. HW and Radio Control

3.10.1. AT+CBC - Battery Charge

This command allows to read the current Battery Charge status.



- 3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT+CBC

Execution command returns the current Battery Charge status.

Additional info:

- ▶▶ Battery Charge status is shown in the format:
+CBC: <bcs>,<bcl>

Name	Type	Default	Description
<bcs>	integer	N/A	battery status
Values:			
0	:		ME is powered by the battery
1	:		ME has a battery connected, and charger pin is being powered
2	:		ME does not have a battery connected
3	:		Recognized power fault, calls inhibited
<bcl>	integer	N/A	battery charge level, only if <bcs>=0
Values:			
0	:		battery is exhausted, or ME does not have a battery connected
25	:		battery charge remained is estimated to be 25%
50	:		battery charge remained is estimated to be 50%
75	:		battery charge remained is estimated to be 75%
100	:		battery is fully charged

- i** **<bcs>=1** indicates that the battery charger supply is inserted and the battery is being recharged if necessary with it. Supply for ME operations is taken anyway from VBATT pins.
- i** Without battery/power connected on VBATT pins or during a power fault the unit is not working, therefore values **<bcs>=2** and **<bcs>=3** will never appear.
- i** **<bcl>** indicates battery charge level only if battery is connected and charger is not connected.

**AT+CBC=?**

Test command returns parameter values supported as a compound value.



The ME does not make differences between being powered by a battery or by a power supply on the VBATT pins, so it is not possible to distinguish between these two cases.



```
AT+CBC
+CBC: 0,75
OK
```

3.10.2. AT#CBC - Battery and Charger Status

This command returns the current Battery and Charger state.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#CBC

Execution command returns the current Battery and Charger state. The response is in the format:

#CBC: <ChargerState>,<BatteryVoltage>

Additional info:

- ▶▶ The response has its fields described below.

Name	Type	Default	Description
<ChargerState>	integer	0	Battery charger state
Values:			
0	:	charger not connected	
1	:	charger connected and charging	
2	:	charger connected and charge completed	
<BatteryVoltage>	integer	-	battery voltage in units of 10 mV: it is the real battery voltage only if charger is not connected; if the charger is connected this value depends on the charger voltage



AT#CBC=?

Test command returns the **OK** result code.

3.10.3. AT#TEMPCFG - Temperature Monitor Configuration

The command sets the temperature monitor range configuration.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#TEMPCFG=<tempExLowBound>[,<tempOpLowBound>[,<tempOpUpBound>[,<tempExUpBound>]]]

Set command configures the temperature range used by the **#TEMPMON** command.

Parameters:

Name	Type	Default	Description
<tempExLowBound>	integer	-30	the extreme temperature lower limit
	Value:	-40÷0	: the extreme temperature lower limit
<tempOpLowBound>	integer	-10	the operating temperature lower limit
	Value:	-35÷10	: the operating temperature lower limit
<tempOpUpBound>	integer	55	the operating temperature upper limit
	Value:	20÷80	: the operating temperature upper limit
<tempExUpBound>	integer	80	the extreme temperature upper limit
	Value:	25÷85	: the extreme temperature upper limit

- i** The extreme temperature lower limit must not be lower than lower limit (see **#TEMPMON** for temperature limits).
- i** The operating temperature lower limit must be bigger than the extreme temperature lower limit, and not lower than its minimum admitted value (see **#TEMPMON** for temperature limits).
- i** The operating temperature upper limit must be bigger than the operating temperature lower limit, and not lower than its minimum admitted value (see **#TEMPMON** for temperature limits).
- i** The extreme temperature upper limit must be bigger than the operating temperature upper limit (see **#TEMPMON** for temperature limits).
- i** The extreme temperature upper limit must be lower than its upper limit (see **#TEMPMON** for temperature limits).
- i** The temperature correctly set are saved in NVM, so at the next reboot the last temperature set is active instead of the factory default values.
A factory reset restores the factory default values.

**AT#TEMPCFG?**

Read command returns the currently active temperature range in the format:

#TEMPCFG:

<tempExLowBound>,<tempOpLowBound>,<tempOpUpBound>,<tempExUpBound>

**AT#TEMPCFG=?**

Test command returns the supported range of **<tempExLowBound>**, **<tempOpLowBound>**, **<tempOpUpBound>**, **<tempExUpBound>** parameters.



Read and set examples.

- read the currently set values
AT#TEMPCFG?
#TEMPCFG: -30,-10,55,80
OK
- set a new temperature range
AT#TEMPCFG=-40,-15,55,85
OK
- read the currently set values
AT#TEMPCFG?
#TEMPCFG: -40,-15,55,85
OK

3.10.4. AT#GPIO - General Purpose Input/Output Pin Control

Set the value of the general-purpose input/output GPIO pins.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT#GPIO=[<pin>,<mode>[,<dir>[,<save>]]]

Execution command sets the value of the general purpose GPIO pin.

Parameters:

Name	Type	Default	Description
<pin>	integer	N/A	GPIO pin number. The supported range goes from 1 to Max value that is hardware dependent. Use AT#GPIO=? test command to know Max value.
Value:			
1÷Max : GPIO pin identifier			
<mode>	integer	0	sets GPIO pin configuration, its action depends on <dir> value. Refer to Additional info sections.
Value:			
0÷4 : mode identifier			
<dir>	integer	0	sets the GPIO pin in input, output, or alternate functions. Refer to Additional info sections.
Values:			
0 : pin set as input			
1 : pin set as output			
2÷6 : pin set in alternate functions.			
<save>	integer	0	GPIO pin save configuration. <ul style="list-style-type: none"> If <save> is omitted, the configuration is stored in NVM only if user sets ALTx function. If <save> is omitted, and <dir> value is set in output, the configuration is set automatically in input on the next power on.
Values:			
0 : GPIO pin configuration is not saved			
1 : GPIO pin configuration is saved			

Additional info:

- ▶▶ This table shows the GPIOs configurations set by <dir>=0 and <mode> values ranging from 0 to 4.

AT#GPIO=<pin>,<mode>,0

<mode>	Description
0	Set INPUT, any internal pull up/pull down removed.
1	Set INPUT, any internal pull up/pull down removed.
2	Read mode, <dir> can be omitted, see Additional info section below
3	Set INPUT, and internal pull up.
4	Set INPUT, and internal pull down.

- This table shows the GPIOs configurations set by <dir>=1 and <mode> values ranging from 0 to 4.

AT#GPIO=<pin>,<mode>,1

<mode>	Description
0	Set OUTPUT, and GPIO logical value to zero (Low).
1	Set OUTPUT, and GPIO logical value to one (High).
2	Read mode, <dir> can be omitted, see Additional info section below
3	<mode> has no meaning.
4	<mode> has no meaning.

- <mode>=2 selects the read mode. In read mode, <dir> can be omitted.

AT#GPIO=<pin>,2



- If GPIO was previously set to <mode> 0 or 1, the command reports the following message:
#GPIO: <dir>,<stat>
- If GPIO was previously set to <mode> 3 or 4, the command reports the following message:
#GPIO: <dir>,<stat>,<mode>

Name	Type	Default	Description
<stat>	integer	-	the parameter can be: <ul style="list-style-type: none"> • logic value read from pin GPIO<pin> in the case the pin <dir> is set to input. • logic value present in output of the pin GPIO<pin> in the case the pin <dir> is currently set to output. • no meaning value for the pin GPIO<pin> in the case the pin <dir> is set to alternate function or tristate pull down.

- <dir> values from 2 to 6 select an alternate function ranging respectively from ALT1 to ALT5. <mode> must be set to 0 or 1 when an alternate function is selected. The table shows the relationship between ALTx, <dir> and the name of the associated function.

AT#GPIO=<pin>,0,<dir>

ALTx	Functions names (between quotes) associated to ALTx
ALT1 (<dir>=2)	#GPIO maps "Stat_LED" on GPIO_01: AT#GPIO=1,0,2 . See #SLED to configure the STAT_LED GPIO_01 behavior. #GPIO or #DAC can map "DAC_OUT" on GPIO_07. Example: AT#GPIO=7,0,2
ALT2 (<dir>=3)	#GPIO or #ALARMPIN can map "ALARM" on one of the available GPIO. Example: AT#GPIO=<pin>,0,3
ALT3 (<dir>=4)	#GPIO maps "TEMPMON" on one of the available GPIO: AT#GPIO=<pin>,0,4 see #TEMPMON to configure the module temperature monitoring.
ALT4 (<dir>=5)	#GPIO maps "AD_Input" on one of the available GPIO: AT#GPIO=<pin>,0,5 see #GSMAD to configure the antenna detection behavior
ALT5 (<dir>=6)	#GPIO maps "AD_Report" on one of the available GPIO: AT#GPIO=<pin>,0,6 see #GSMAD to configure the antenna detection behavior

-  While using the pins in the alternate function, the GPIO read/write access to that pin is not accessible and must be avoided.
-  The GPIO_02 pin can be used also by **#JDRENH2** command, when it is not used by other functionality.

**AT#GPIO?**

Read command reports, for any GPIO pin, a row showing the current parameters values. Row one shows GPIO pin one, row two shows GPIO pin two, and so on.

If GPIO was previously set to **<mode>=0** or **1**, the format of the returned message is:

#GPIO: <dir>,<stat><CR><LF>

#GPIO: <dir>,<stat><CR><LF>

...

If GPIO was previously set to **<mode>= 3** or **4**, the format of the returned message is:


#GPIO:<dir>,<stat>,<mode><CR><LF>

#GPIO:<dir>,<stat>,<mode><CR><LF>

...

**AT#GPIO=?**

Test command reports the supported range of values of the command parameters **<pin>**, **<mode>**, **<dir>**, and **<save>**.

-  Test command returns only the **<dir>** values 0, 1, and those that are connected to the alternate functions that can be set by the **#GPIO** command, see the related Additional info section, and example section.

3.10.5. AT#ALARMPIN - Alarm Pin Configuration

This command allows to configure the ALARM Pin.



[1] Hardware User's Guide of the used module

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#ALARMPIN=<pin>

Set command allows to set a GPIO pin as ALARM pin.

Configuring a GPIO pin as ALARM pin is equivalent to setting it up with the ALT2 alternate function. Therefore, a GPIO pin can be configured as ALARM pin also through the #GPIO command. To have information on GPIO pins refer to document [1].

Parameter:

Name	Type	Default	Description
<pin>	integer	0	GPIO pin number. Max is the number of GPIO pins provided by the module. For information on the available GPIO pins use the test command.

Values:

0	:	no ALARM pin set
1÷Max	:	GPIO pin number



AT#ALARMPIN?

Read command returns the current value of the parameter <pin> in the format:

#ALARMPIN: <pin>



AT#ALARMPIN=?

Test command returns the supported values of parameter <pin>.

3.10.6. AT#SLED - STAT_LED GPIO Setting

The command configures the behavior of the STAT_LED GPIO.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT#SLED=<mode>[,<onDuration>[,<offDuration>]]

Set command sets the STAT_LED GPIO behavior. The GPIO pin, so configured, gives information on the module registration status.

To configure a GPIO pin as STAT_LED GPIO, the user must enter **AT#GPIO=<pin>,0,<dir>** command to set the GPIO pin as ALT1 alternate function, use the GPIO pin indicated in the **#GPIO** command description. At the next power ON, the GPIO pin is high until the control reads the saved setting in NVM and configures the GPIO as STAT_LED GPIO.

Parameters:

Name	Type	Default	Description
<mode>	integer	2	defines the STAT_LED GPIO behavior.
Values:			
0	:	GPIO tied low	
1	:	GPIO tied high	
2	:	GPIO is handled with specific timings. See Additional info section	
3	:	GPIO is turned ON/OFF alternatively, with period defined by the sum <onDuration> + <offDuration>	
4	:	GPIO is handled with specific timings. See Additional info section	
<onDuration>	integer	10	duration of period in which STAT_LED GPIO is tied high while <mode>=3
Value:			
1÷100	:	in tenth of seconds	
<offDuration>	integer	10	duration of period in which STAT_LED GPIO is tied low while <mode>=3
Value:			
1÷100	:	in tenth of seconds	

Additional info:

- ▶▶ <mode>=2, the timings of STAT_LED GPIO are:
 - not registered: always ON
 - registered in idle: blinking 1 s ON and 2 s OFF
 - registered in idle with power saving: blinking time depends on network condition to minimize power consumption

-
- ▶▶ **<mode>=4**, the timings of STAT_LED GPIO are:
- not registered: blinking 0,5 s ON and 0,5 s OFF
 - registered in idle: blinking 300 ms ON and 2,7 s OFF
 - registered in idle with power saving: blinking time depends on network condition to minimize power consumption
-

**AT#SLED?**

Read command returns the STAT_LED GPIO current setting, in the format:

#SLED: <mode>,<onDuration>,<offDuration>

**AT#SLED=?**

Test command returns the range of available values for parameters **<mode>**, **<onDuration>** and **<offDuration>**.



The setting is saved using the **#SLEDSAV** command.

3.10.7. AT#SLEDSAV - Save STAT_LED GPIO Setting

This command allows to save the current **STAT_LED** GPIO setting.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SLEDSAV

Execution command saves the **STAT_LED** GPIO setting in NVM.



AT#SLEDSAV=?

Test command returns **OK** result code.

3.10.8. AT#E2RI - Event Ring indicator

The command enables/disables the Ring Indicator (RI) pin response to one or more events.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Common profile	No	-	2



AT#E2RI=<eventMask>,<duration>

Set command enables/disables the Ring Indicator pin response to one or more events. If an event has been enabled, a negative going pulse is generated when event happens. The duration of this pulse is determined by the value of <duration>

Parameters:

Name	Type	Default	Description
<eventMask>	hex	-	<p>identifies the list of events to enable</p> <p>The <eventMask> is a bit mask, where each bit, when set/not set, indicates that the corresponding event must be enabled/disabled. 0 disables all events.</p> <ul style="list-style-type: none"> • bit 0 = Power saving mode • bit 1 = Socket listen (same as AT#E2SLRI=<duration>) • bit 2 = OTA firmware upgrade (same as AT#OTASETRI=<duration>) • bit 3 = MT SMS has been received (same as AT#E2SMSRI=<duration>) • bit 4 = +CREG status change • bit 5 = +CGREG status change • bit 6 = #QSS value changes to 2 • bit 7 = MO SMS has been delivered • bit 8 = Jamming Detection and Reporting
<duration>	integer	0	the duration in milliseconds of the pulse generated when event is enabled

Values:

- 0 : event not enabled, duration not specified (this value cannot be set)
- 50÷1150 : pulse duration



Enabling JDR event makes sense only when the Enhanced Jamming Detection & Reporting feature has been previously enabled.

**AT#E2RI?**

Read command reports a line for each event and the duration in ms of the pulse generated, in the format:

#E2RI: <eventMask>,<duration>

**AT#E2RI=?**

Test command returns supported values of parameters **<eventMask>** and **<duration>**

3.10.9. AT#ADC - Read Analog/Digital Converter Input

This command returns the current voltage value of the specified ADC inputs, expressed in mV.



[1] Hardware User's Guide of the used module

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#ADC=[<adc>,<mode>[,<dir>]]

Execution command reads selected <adc> pin voltage, converts it by baseband internal ADC and prints out the result as shown in Additional info section.

Parameters:

Name	Type	Default	Description
<adc>	integer	1	index of input pin
Value:			
1÷n : input pin index. For the number of available ADCs see document [1]			
<mode>	integer	2	required action
Value:			
2 : query ADC value			
<dir>	integer	0	direction. Its interpretation is currently not implemented.
Value:			
0 : no effect			

Additional info:

- ▶▶ Format of the message printed out by the execution command:
#ADC:<value>

Name	Type	Default	Description
<adc>	integer	-	pin voltage expressed in mV.

-  The command returns the last valid measure.



AT#ADC?

Read command reports all pins input voltage in the format:

#ADC:<value>[<CR><LF>#ADC:<value>[...]]

**AT#ADC=?**

Test command reports the supported range of values of the command parameters **<adc>**, **<mode>** and **<dir>**.

3.10.10. AT#DAC - Digital/Analog Converter Control

The command enables/disables the DAC output.



[1] Telit Hardware Design Guide of the used module

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2





AT#DAC=[<enable>,<value>]

Set command enables/disables the DAC output which is mapped on the GPIO_07 pin. The GPIO_07 pin outputs the user configured digital signal that must be filtered by a low pass filter to obtain the average output voltage.

Enable DAC output is equivalent to map the ALT1 alternate function on GPIO_07 pin using the #GPIO command. To have information on the dedicated GPIO refer to document [1].

Parameters:

Name	Type	Default	Description
<enable>	integer	0	enables/disables DAC output.
Values:			
0	:	disables	
1	:	enables	
<value>	integer	0	scale factor of the average output voltage. <enable> parameter must be set to 1. Average output voltage = Max_voltage * value / 1023
Value:			
0÷1023	:	10-bit precision	

-  The frequency of the digital signal present on the GPIO_07 pin is selected internally.
-  DAC output must not be used during power saving state.



AT#DAC?

Read command reports the current values of the parameters, in the format:

#DAC: <enable>,<value>



AT#DAC=?

Test command returns the supported values ranges of the parameters <enable> and <value>.



Enable the DAC output, and set the average output voltage to the 50% of the Max_voltage:

```
AT#DAC=1,511
```

```
OK
```

Disable the DAC output:

```
AT#DAC=0
```

```
OK
```

3.10.11. AT#V24CFG - V24 Output Pins Configuration

This command sets the AT commands serial port interface output pins mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2






AT#V24CFG=<pin>,<mode>[,<save>]

Set command sets the AT commands serial port interface output pins mode.

Parameters:

Name	Type	Default	Description
<pin>	integer	0	AT commands serial port interface hardware pin
Values:			
0	:	DCD (Data Carrier Detect)	
1	:	CTS (Clear To Send)	
2	:	RI (Ring Indicator)	
3	:	DSR (Data Set Ready)	
4	:	DTR (Data Terminal Ready). This is not an output pin, so its state cannot be set through the AT#V24 command	
5	:	RTS (Request To Send). This is not an output pin, so its state cannot be set through the AT#V24 command	
<mode>	integer	0	AT commands serial port interface hardware pins mode
Values:			
0	:	AT commands serial port mode: the V24 pins are controlled by the serial port device driver (default)	
1	:	GPIO mode: the V24 output pins can be managed through the AT#V24 command	
<save>	integer	0	save V24 pin configuration
Values:			
0	:	pin configuration is not saved	
1	:	pin configuration is saved	

-  When <mode>=1, the V24 pins, both output and input, can be set to control an external GNSS receiver through the **AT\$GPSGPIO** command.
-  When the <save> parameter is omitted, the pin configuration is NOT stored.
-  Changing V24 pins configuration may affect the cellular module functionality set through **+CFUN**.



AT#V24CFG?

Read command returns the current configuration for all the pins (both output and input) in the format:

```
#V24CFG: <pin1>,<mode1>[<CR><LF><CR><LF>
#V24CFG: <pin2>,<mode2>[...]]
```

**AT#V24CFG=?**

Test command reports supported range of values for parameters **<pin>**, **<mode>** and **<save>**.

3.10.12. AT#V24 - V24 Output Pins Control

This command sets the state of the output pins of the AT commands serial port interface.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#V24=<pin>[,<state>]

Set command sets the state of the output pins of the AT commands serial port interface, when pins are in GPIO mode (see #V24CFG).

Parameters:

Name	Type	Default	Description
<pin>	integer	0	AT commands serial port interface hardware pin:
Values:			
0	:	DCD (Data Carrier Detect)	
1	:	CTS (Clear To Send)	
2	:	RI (Ring Indicator)	
3	:	DSR (Data Set Ready)	
4	:	DTR (Data Terminal Ready). This is not an output pin: trying to set its state raises the result code "ERROR"	
5	:	RTS (Request To Send). This is not an output pin: trying to set its state raises the result code "ERROR"	
<state>	integer	0	state of AT commands serial port interface output hardware pins (0, 1, 2, 3) when pins are in GPIO mode (see #V24CFG):
Values:			
0	:	Low state	
1	:	High state	

i If <state> is omitted the command returns the actual state of the pin <pin>.



AT#V24?

Read command returns actual state for all the pins (either output and input) in the format:

```
#V24: <pin1>,<state1>[<CR><LF>
#V24: <pin2>,<state2>[...]]
```



AT#V24=?

Test command returns the supported values of parameters <pin> and <state>.

3.10.13. AT#I2CWR - Write to I2C

This command is used to send data to an I2C peripheral connected to module.



[1] Hardware User's Guide of the used module

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#I2CWR=<sdaPin>,<sciPin>,<deviceId>,<registerId>,<len>

Execution command sends data to an I2C peripheral connected to module GPIOs. After the writing activity has been accomplished, the GPIOs will not be restored to the original setting. Use **#GPIO** command to see the status of the used GPIOs. To have information on GPIO pins refer to document [1].

Parameters:

Name	Type	Default	Description
<sdaPin>	integer	-	GPIO number for SDA. To know the range use #I2CWR test command.
<sciPin>	integer	-	GPIO number for SCL. To know the range use #I2CWR test command.
<deviceId>	hex	N/A	address of the I2C device (7 bits). The Least Significant Bit is used for read/write command, but in this #I2CWR implementation, it doesn't matter if the LSB is set to 0 or 1. Address must be written in hexadecimal form without 0x. 10 bit address is also supported.
Value:			
0÷3FF : addressing range extended to 10 bit			
<registerId>	hex	N/A	register to write data to
Value:			
0÷FF : value must be written in hexadecimal form without 0x			
<len>	integer	N/A	number of data to send
Value:			
1÷254 : number of data to send			

Additional info:

- ▶▶ After entering the command, the module returns the prompt ">" and waits for the data to send. To complete the operation, send **Ctrl-Z** char (**0x1A** hex); to exit without writing the message send **ESC** char (**0x1B** hex). Data must be written in hexadecimal form.

If data are successfully sent, the response is **OK**, otherwise an error code is reported.

**AT#I2CWR=?**

Test command returns the range of available values for parameters **<sdaPin>**, **<sclPin>**, **<deviceld>**, **<registerld>**, **<len>**.



Set GPIO_2 as SDA, and GPIO_3 as SCL. Device I2C address is 0x20; 0x10 is the address of the first register where to write I2C data; 14 data bytes will be written starting from register 0x10.

```
AT#I2CWR=2,3,20,10,14
> 00112233445566778899AABBCCDD<ctrl-z>
OK
```


3.10.14. AT#I2CRD - Read from I2C

This command is used to read data from an I2C peripheral connected to module.



[1] Hardware User's Guide of the used module

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#I2CRD=<sdaPin>,<sciPin>,<devicId>,<registerId>,<len>

Execution command reads data from an I2C peripheral connected to module GPIOs. After the reading activity has been accomplished, the GPIOs will not be restored to the original setting. Use #GPIO command to see the status of the used GPIOs. To have information on GPIO pins refer to document [1].

Parameters:

Name	Type	Default	Description
<sdaPin>	integer	-	GPIO number for SDA. To know the range use #I2CRD test command.
<sciPin>	integer	-	GPIO number for SCL. To know the range use #I2CRD test command.
<devicId>	hex	N/A	address of the I2C device (7 bits). The Least Significant Bit is used for read/write command, but in this #I2CCF implementation, it doesn't matter if the LSB is set to 0 or 1. Address must be written in hexadecimal form without 0x. 10 bit address is also supported

Value:

0÷3FF : addressing range extended to 10 bit

<registerId>	hex	N/A	Register to read data from
--------------	-----	-----	----------------------------

Value:

0÷FE : value must be written in hexadecimal form without 0x

<len>	integer	N/A	Number of data to receive <ul style="list-style-type: none"> Data Read from I2C will be dumped in hexadecimal format If data requested are more than data available in the device, dummy data (normally 0x00 or 0xff) will be dumped
-------	---------	-----	--

Value:

1÷254 : number of data to receive



AT#I2CRD=?

Test command returns the range of available values for parameters <sdaPin>, <sciPin>, <devicId>, <registerId>, <len>.



Read 12 bytes from I2C device with address 0x20, starting from register address 0x10. SDA is mapped on GPIO_02, SCL is mapped on GPIO_03.

```
AT#I2CRD=2,3,20,10,12  
#I2CRD: 00112233445566778899AABBCC  
OK
```

3.10.15. AT#I2CCF - Combined Format for I2C Writing and Reading

This command is used to write and read data to/from an I2C device using the I2C Combined Format. The module acts as an I2C master.



[1] Hardware User's Guide of the used module

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#I2CCF=<sdaPin>,<sciPin>,<deviceld>,<lenwr>,<lenrd>

The module, as master, transmits data to the slave and then, reads data from it through two GPIOs. Transfer direction is changed when writing section is ended. After the write/read activity has been accomplished, the GPIOs will not be restored to the original setting. Use #GPIO command to see the status of the used GPIOs. To have information on GPIO pins refer to document [1].

Parameters:

Name	Type	Default	Description
<sdaPin>	integer	-	GPIO number for SDA. To know the range use #I2CCF test command.
<sciPin>	integer	-	GPIO number for SCL. To know the range use #I2CCF test command.
<deviceld>	hex	N/A	address of the I2C device (7 bits). The Least Significant Bit is used for read/write command, but in this #I2CCF implementation, it doesn't matter if the LSB is set to 0 or to 1. Address must be written in hexadecimal form without 0x. 10 bit address is also supported.

Value:

0÷3FF : addressing range extended to 10 bit

<lenwr>	integer	N/A	number of data to write.
---------	---------	-----	--------------------------

Value:

0÷254 : number of data to write.

<lenrd>	integer	N/A	number of data to read.
---------	---------	-----	-------------------------

Value:

0÷254 : number of data to read.

Additional info:

- ▶▶ After entering the command, and if <lenwr> > 0, the module returns the prompt ">" and waits for the data to send. To complete the operation enter **Ctrl-Z** char (**0x1A** hex); to exit without writing the message enter **ESC** char (**0x1B** hex).

Data must be written in hexadecimal form without 0x.

If data are successfully sent, the response is **OK**, otherwise an error code is reported.

**AT#I2CCF=?**

Test command returns the range of available values for parameters <sdPin>, <scIPin>, <deviceld>, <lenwr>, <lenrd>.



- Set GPIO_2 as SDA, GPIO_3 as SCL; Device I2C address is 0x20; First is send data 0x0a; after a "RESTART", 4 data bytes are read.

```
AT#I2CCF=2,3,20,1,4
>0a<ctrl-z>
#I2CCF: abcdef12
OK
```

The sequence is the following:

START - 0x20- 0x0a -RESTART - 0x21 - data read 1 -...- data read 4 - STOP

- Set GPIO_2 as SDA, GPIO_3 as SCL; Device I2C address is 0x20; read data:

```
AT#I2CCF=2,3,20,0,2
#I2CCF: abcd
OK
```

The sequence is the following:

START - 0x21- - data read 1 - data read 2 - STOP

3.10.16. AT#SPIOOPEN - Initializes Modem Serial Port with SPI Protocol

This command opens the SPI port.



[1] Hardware User's Guide of the used module

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SPIOOPEN=<ID>,<speed>,<mode>

This command initializes the provided modem serial port for SPI protocol. The SPI port uses dedicated pins, refer to document [1].

Parameters:

Name	Type	Default	Description
<ID>	integer	3	identifies the SPI port
Value:			
3 : the only supported value			
<speed>	integer	N/A	speed value. For default value see Examples section.
Values:			
1 : 1 MHz			
2 : 3 MHz			
3 : 6 MHz			
4 : 12 MHz			
<mode>	integer	N/A	CPOL and CPH setting. For default value see Examples section.
Values:			
0 : Clock signal is active high and data is sampled in rising edge			
1 : Clock signal is active high and data is sampled in falling edge.			
2 : Clock signal is active low and data is sampled in rising edge			
3 : Clock signal is active low and data is sampled in falling edge			



AT#SPIOOPEN?

Read command Returns last provided Parameters values (0,0,0 as default)



AT#SPIOOPEN=?

Test command reports available values for parameters <ID>, <speed>, and <mode>.



- Enable error reports in verbose format.
AT+CMEE=2
OK
Read the current values. 0,0,0 are the default values.
AT#SPIOPEN?
#SPIOPEN: 0,0,0
OK
Read parameters values ranges
AT#SPIOPEN=?
#SPIOPEN: (3),(1-4),(0-3)
OK
Open the SPI port
AT#SPIOPEN=3,1,0
OK
Read the new setting
AT#SPIOPEN?
#SPIOPEN: 3,1,0
OK
If you try to open again the SPI port, the command returns **ERROR**
AT#SPIOPEN=3,1,0
+CME ERROR: operation not supported
Close the SPI port
AT#SPICLOSE=3
OK
Read the current values. 0,0,0 are the default values
AT#SPIOPEN?
#SPIOPEN: 0,0,0
OK
- Check if SPI port is closed.
AT#SPIOPEN?
#SPIOPEN: 0,0,0
OK
SPI port is closed, try to use a wrong ID value.
AT#SPIOPEN=7,1,0
+CME ERROR: operation not supported
AT#SPIOPEN?
#SPIOPEN: 0,0,0
OK

3.10.17. AT#SPICLOSE - De-Initializes Modem Serial Port for SPI Protocol

This command closes the SPI port.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SPICLOSE=<ID>

This command de-initializes the provided modem serial port for the SPI protocol.

Parameter:

Name	Type	Default	Description
<ID>	integer	0	identifies the SPI port. See Example section.

Values:

- 0 : default value
- 3 : only this value is supported



The command returns **OK** if de-initialization complete, **ERROR** otherwise.



AT#SPICLOSE?

Read command returns the current <ID> value. 0 as default, see Example section.



AT#SPICLOSE=?

Test command reports available values for parameter <ID>.



- Enable error reports in verbose format
AT+CMEE=2
OK
AT#SPIOPEN?
#SPIOPEN: 0,0,0
OK
Open SPI port
AT#SPIOPEN=3,1,0
OK
Read the new setting
AT#SPIOPEN?
#SPIOPEN: 3,1,0
OK
Read current <ID> value parameter.
AT#SPICLOSE?
#SPICLOSE: 3
OK
Read the current values of <ID>, <speed>, and <mode> parameters.
AT#SPIOPEN?
#SPIOPEN: 3,1,0
OK
If you try to close the SPI port using an <ID> \neq 3, the command return **ERROR**.
AT#SPICLOSE=4
+CME ERROR: operation not supported
AT#SPICLOSE=3
OK
AT#SPICLOSE?
#SPICLOSE: 0
OK

3.10.18. AT#SPIRW - Write a Buffer to the SPI and Print the Read Data

The command writes and read from SPI.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SPIRW=<length>

The command writes a buffer to the SPI TX and prints the incoming data received from SPI TX

Parameter:

Name	Type	Default	Description
<length>	integer	1	Once command is issue, the device responds to the command with the prompt '>' and waits for the data to send When <length> bytes have been sent, operation is automatically completed. If data are successfully sent, the module answer with the bytes read from SPI RX channel. The received data can be read on the AT console, the number of received bytes matches to number of sent data

Value:

1÷128 : buffer length



The modem serial port on which the SPI data will be sent, must be initialized previously with an **#SPIOOPEN** command, otherwise it will return **ERROR**.



AT#SPIRW=?

Test command reports available value for parameter <length>

3.10.19. AT#GSMAD - GSM Antenna Detection

Set the behavior of the antenna detection algorithm. To use this command, the module must be provided by a specific circuitry, refer to document [1].



[1] Telit Antenna Detection Application Note, 80000NT10002A

[2] Telit Hardware Design Guide of the used module

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT#GSMAD=<mod>[,<urcmode>[,<interval>[,<detGPIO>[,<repGPIO>]]]]

Set command sets the behavior of antenna detection algorithm. Refer to document [2] to have information on GPIO pins.

Parameters:

Name	Type	Default	Description
<mod>	integer	0	selects the antenna detection mode. Refer to Additional info section.
Values:			
0	:	antenna detection not active	
1	:	periodic activation of the antenna detection	
2	:	instantaneous activation of the antenna detection	
3	:	as <mod>=2, but the command does not return the control until the detection algorithm ended	
<urcmode>	integer	0	selects the URC presentation mode. It has meaning and can be set only if <mod>=1.
Values:			
0	:	disable the antenna detection URC	
1	:	enable the antenna detection URC	
<interval>	integer	120	interval between two consecutive antenna detection algorithm runs. It is expressed in seconds, and has meaning only if <mod>=1.
Value:			
1÷3600	:	seconds	
<detGPIO>	integer	0	defines which GPIO pin is used by the antenna detection algorithm as input. The chosen GPIO must be configured in alternate function, refer to #GPIO command.
Values:			
0	:	no GPIO pin is used	
1÷max	:	max value depends on the module hardware	
<repGPIO>	integer	0	defines which GPIO pin is used by the antenna detection algorithm (as output) to report antenna status. It has

meaning only if **<mod>=1**.
 The chosen GPIO must be configured in alternate function, refer to **#GPIO** command.
<repGPIO> is set to LOW when antenna is connected, otherwise it is set to HIGH.

Values:

0 : no GPIO is used
 1÷max : max value depends on the module hardware

Additional info:

►► **<mod>=1**

The command starts the antenna detection every **<interval>** period, and uses the **<detGPIO>** pin to detect the antenna status. If the algorithm detects an antenna status change and the **<urcmod>=1**, the user is notified by the following URC:

#GSMAD: <presence>

►► **<mod>=2**

The command starts instantaneously the antenna detection, and uses the **<detGPIO>** pin to detect the antenna status. If the algorithm detects an antenna status change and the **<urcmod>=1**, the user is notified by the following URC:

#GSMAD: <presence>

The instantaneous activation does not affect a periodic activation eventually started before. **<mod>=2** is obsolete and is maintained only for backward compatibility. It is suggested to use **<mod>=3**

►► **<mod>=3**

The command starts instantaneously the antenna detection as in **<mod>=2**, but the command does not return the control until the detection algorithm ended. The returned value is the antenna status just detected. The returned message is not affected by the **<urcmode>** value and it format is:


#GSMAD: <presence>
OK

The instantaneous activation does not affect a periodic activation eventually started before.

Unsolicited field:

Name	Type	Description
<presence>	integer	returns information on the antenna status.
Values:		
0	:	antenna connected
1	:	antenna connector short circuited to ground

2	:	antenna connector short circuited to power
3	:	antenna not detected (open circuit)

-  The URC presentation mode parameter (<urcmode>) is related to the current AT instance only (see **+CMUX**). Last <urcmode> settings are saved for every instance as extended profile parameters, thus it is possible to restore them either if the multiplexer control channel is released and set up, back and forth. <urcmode> is the only parameter that is not saved in NVM.

**AT#GSMAD?**

Read command returns the current parameter settings for **#GSMAD** command in the format:
#GSMAD: <mod>,<urcmode>,<interval>,<detGPIO>,<repGPIO>

**AT#GSMAD=?**

Test command reports the supported range of values for parameters <mod>, <urcmode>, <interval>, <detGPIO> and <repGPIO>.



```
AT#GSMAD=1,1,120,2
AT#GSMAD=3,x,x,2
#GSMAD: <presence>
OK
```

This instantaneous activation does not affect the periodic activation started before, on an antenna status change the following URC is notified to the user.

```
#GSMAD: <presence>
```

3.10.20. AT#TEMPMON - Temperature Monitor

This command is used to retrieve the information about the module temperature.



[1] Hardware User's Guide of the used module

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#TEMPMON=<mod>[,<urcMode>[,<action>[,<hystTime>[,<GPIO>]]]]

Set command sets the behavior of the module internal temperature monitoring, reads the temperature measurement, and enables/disables the following messages:

- temperature monitoring URC
- temperature measurement message

both messages have the following format:

#TEMPMEAS: <level>,<value>

The message parameters are described in the Unsolicited fields section.

Parameters:

Name	Type	Default	Description
<mod>	integer	0	select the temperature monitoring mode.
Values:			
0	:		sets the command parameters. The optional parameters have meaning.
1	:		reads the module internal temperature, the command returns the temperature measurement message. The optional parameters have no meaning.
<urcMode>	integer	0	URC presentation mode.
Values:			
0	:		disables the presentation of the temperature monitoring URC.
1	:		enables the presentation of the temperature monitoring URC, whenever the module internal temperature reaches either operating or extreme levels.
<action>	integer	0	actions allowed, expressed as a sum of the values identifying the single actions shown below.
Values:			
0	:		no action
1	:		automatic shut-down when the temperature is beyond the extreme bounds
2	:		RF RX and TX circuits automatically disabled (using +CFUN=4) when operating temperature bounds are reached. When the temperature is back to normal the module is brought back to the previous state, before RF RX and TX disabled.

- 4 : the output pin <GPIO> is tied HIGH when operating temperature bounds are reached; when the temperature is back to normal the output pin <GPIO> is tied LOW. If this <action> is required, it is mandatory to set the <GPIO> parameter too.
- 0÷7 : range of the sum of the actions

<hystTime>	integer	0	hysteresis time: all the actions happen only if the extreme or operating bounds are maintained at least for this period. This parameter is needed and required if <action> is not zero.
-------------------------	---------	---	--



Value:

- 0÷255 : hysteresis time in seconds

<GPIO>	integer	-	GPIO number. It is required when <action> =4 is issued, in this case the chosen GPIO must be configured in alternate function ALT3 through #GPIO command. To have hardware information about GPIO refer to document [1].
---------------------	---------	---	--

Unsolicited fields:

Name	Type	Description
<level>	integer	threshold level
Values:		
	-2	extreme temperature lower bound, see table in Note section
	-1	operating temperature lower bound, see table in Note section
	0	normal temperature
	1	operating temperature upper bound, see table in Note section
	2	extreme temperature upper bound, see table in Note section
<value>	integer	current temperature expressed in Celsius degrees.

-  The URC presentation mode **<urcMode>** is related to the current AT instance only (see **+CMUX**); last **<urcMode>** settings are saved for every instance as extended profile parameters, thus it is possible to restore them either if the multiplexer control channel is released and set up, back and forth.
-  Last **<action>**, **<hystTime>** and **<GPIO>** settings are saved in NVM too, but they are not related to the current **CMUX** instance only (see **+CMUX**).



AT#TEMPMON?

Read command reports the current parameter settings for the command in the format:

#TEMPMON: <urcmode>,<action>[,<hystTime>[,<GPIO>]]



AT#TEMPMON=?

Test command reports the supported range of values for parameters **<mod>**, **<urcmode>**, **<action>**, **<hystTime>** and **<GPIO>**.



The temperature levels are expressed in the table below:

Temperature Bounds	Celsius Degrees
Extreme Temperature Lower Bound	-30
Operating Temperature Lower Bound	-10
Operating Temperature	
Operating Temperature Upper Bound	55
Extreme Temperature Upper Bound	80

3.10.21. AT#RXTOGGLE - Swap RX from Main to Diversity

This command swaps the receiver from the main antenna to the diversity antenna.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2





AT#RXTOGGLE=<toggleEnable>

Parameter:

Name	Type	Default	Description
<toggleEnable>	integer	2	toggle between normal to diversity antenna. As described below, 3G and 4G have two different ranges of <toggleEnable> values, but they have a unique default value: 2.

Values:

- 0 : set the RX to the main antenna, available in 3G and 4G
- 1 : set the RX to the diversity antenna, available in 3G and 4G
- 2 : set the RX to both main and diversity antenna, available in 4G only

-  **#RXTOGGLE** command is only for test purpose, do not use it in Normal Operation. The correct way to use it is shown in the example section.
-  When the module is registered on a 4G network, all the <toggleEnable> values (0,1,2) are available.
When the module is registered on a 3G network, and <toggleEnable> value 0 or 1 has been used, you must reboot the module to have again available <toggleEnable>=2.



AT#RXTOGGLE?

Read command reports the currently selected <toggleEnable> in the format:

#RXTOGGLE: <toggleEnable>



AT#RXTOGGLE=?

Test command reports the supported range of values.



Deregister module from network

```
AT+COPS=2  
OK
```

Select 4G cellular network

```
AT+WS46=28  
OK
```

Set the RX to the diversity antenna

```
AT#RXTOGGLE=1 OK
```

Register to the network

```
AT+COPS = 0 OK
```

Enable network registration unsolicited result code

```
AT+CREG =1 OK
```

Read **<mode>** and **<stat>** parameters

```
AT+CREG? +CREG: 1,1  
OK
```

3.10.22. AT#TESTMODE - Test Mode Configuration

Set module in Test Mode for configuring and testing the POWER level (not signaling mode).

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#TESTMODE=<cmd>

The Test Mode is entered using the following commands according to the network technology:

- **AT#TESTMODE="TM"** for 2G networks
- **AT#TESTMODE="TM"** followed by **AT#TESTMODE="INIT3G"** for 3G networks
- **AT#TESTMODE="TM"** followed by **AT#TESTMODE="INIT4G"** for 4G networks

Only after this set, **AT#TESTMODE** can be used with the other allowed commands. To exit from Test Mode and go back to Operative Mode, enter the command **AT#TESTMODE="OM"**.

Parameter:

Name	Type	Default	Description
<cmd>	string	N/A	identifies one of the commands listed in the Values section, the command is a quoted string. See Additional info section for <cmd> commands related to 2G/3G/4G technologies.

Values:

- "TM" : forces the module in Test Mode
 "OM" : forces the module in Operative Mode

Additional info:

►► 2G commands:

<cmd>	Description
"TCH"	starts the non-stop module transmission. It enables one Tx Slot (Note, edge not supported)
"TCH2"	starts the non-stop module transmission. It enables two TX slots (Note, edge not supported)
"TQ <training_sequence>"	sets the training sequence; <training_sequence> has the range: 0 ... 7
"PL <power_lev>"	sets the Power Control Level for lower and upper bands; <power_lev> has the range: 0 ... 19
"PL2 <power_lev0> <power_lev1>"	sets the Power Control Level for both TX slots; <power_lev0> is related to the first slot and <power_lev1> to the second one; <power_lev0> and <power_lev1> have the range: 0 ... 19
"RL"	read Rx power level
"RXTOGGLE <antenna>"	selects the receiving antenna path depending on <antenna> value: <antenna> = 0 for the

	primary antenna, <antenna> = 1 for the secondary (diversity) antenna.
"ESC"	exits the current non-stop sequence. It must be used to stop TCH/TCH2 transmission
"SetPCSBand <band> "	sets the PCS band: <band> Band 0 850/900/1800 1 850/900/1900
"CH <GSM_ETSIndex> "	sets the ARFCH: <GSM_ETSIndex> Band 1 ... 124 GSM (Standard Band) 975 ... 1023 E GSM (Extended Band) 955 ... 974 R GSM (Railway Band) 512 ... 885 DCS Band (1800 MHz) 512 ... 810 PCS Band (1900 MHz) 128 ... 251 GSM 850 (850 MHz)

▶▶ 3G commands:

<cmd>	Description
"INIT3G"	initialize Radio for 3G transmission
"TX3G"	starts the 3G module transmission if Radio is initialized (default UARFCN UL is 9612 and power is -19.5 dBm)
"PL3G <power> "	change the 3G transmission power. <power> has the range -736 to 384 in sixteenths of dBm.
"CH3G <uarfcn ul> "	change the 3G UARFCN UL on which to transmit or to receive. If TX3G is called previously CH3G sets a UARFCN for transmission, otherwise it will accept a channel for reception. UMTS_UARFCN UL Band 9612 ... 9888 1 9262 ... 9538 2 1312 ... 1513 4 4132 ... 4233 5 2712 ... 2863 8 UMTS_UARFCN DL Band 10562 ... 10838 1 9662 ... 9938 2 1537 ... 1738 4 4357 ... 4458 5 2937 ... 3088 8
"RL3G"	provides the Rx power level for the channel set with "CH3G <uarfcn dl> " command
"RXTOGGLE <antenna> "	selects the receiving antenna path depending on <antenna> value: <antenna> = 0 for the primary antenna, <antenna> = 1 for the secondary (diversity) antenna.
"ESC"	exits the current non-stop sequence. It must be used to stop TX3G transmission.

►► 4G commands:

<cmd>	Description																																																																																		
"INIT4G"	initialize Radio for 4G transmission																																																																																		
"TX4G"	starts the 4G module transmission if Radio is initialized																																																																																		
"PL4G <power>"	change the 4G transmission power <power> has the range -736 to 384 in sixteenths of dBm																																																																																		
"CH4G <earfcn> <bw>"	<p>changes the 4G earfcn ul or dl for transmitting or receiving, and sets the bandwidth:</p> <table border="0"> <tr> <td>LTE_EARFCN UL</td> <td>Band</td> </tr> <tr><td>1800 ... 18599</td><td>1</td></tr> <tr><td>18600 ... 19199</td><td>2</td></tr> <tr><td>19200 ... 19949</td><td>3</td></tr> <tr><td>19950 ... 20399</td><td>4</td></tr> <tr><td>20400 ... 20649</td><td>5</td></tr> <tr><td>20750 ... 21449</td><td>7</td></tr> <tr><td>21450 ... 21799</td><td>8</td></tr> <tr><td>22150 ... 22749</td><td>11</td></tr> <tr><td>23010 ... 23179</td><td>12</td></tr> <tr><td>23180 ... 23279</td><td>13</td></tr> <tr><td>23730 ... 23849</td><td>17</td></tr> <tr><td>24000 ... 24149</td><td>19</td></tr> <tr><td>24150 ... 24449</td><td>20</td></tr> <tr><td>24450 ... 24599</td><td>21</td></tr> <tr><td>26690 ... 27039</td><td>26</td></tr> <tr><td>27210 ... 27659</td><td>28</td></tr> </table> <table border="0"> <tr> <td>LTE_EARFCN DL</td> <td>Band</td> </tr> <tr><td>0 ... 599</td><td>1</td></tr> <tr><td>600 ... 1199</td><td>2</td></tr> <tr><td>1200 ... 1949</td><td>3</td></tr> <tr><td>1950 ... 2399</td><td>4</td></tr> <tr><td>2400 ... 2649</td><td>5</td></tr> <tr><td>2750 ... 3449</td><td>7</td></tr> <tr><td>3450 ... 3799</td><td>8</td></tr> <tr><td>4750 ... 4949</td><td>11</td></tr> <tr><td>5010 ... 5179</td><td>12</td></tr> <tr><td>5180 ... 5279</td><td>13</td></tr> <tr><td>5730 ... 5849</td><td>17</td></tr> <tr><td>6000 ... 6149</td><td>19</td></tr> <tr><td>6150 ... 6449</td><td>20</td></tr> <tr><td>6450 ... 6599</td><td>21</td></tr> <tr><td>8690 ... 9039</td><td>26</td></tr> <tr><td>9210 ... 9659</td><td>28</td></tr> </table> <table border="0"> <tr> <td><bw></td> <td>Band (MHz)</td> </tr> <tr><td>0</td><td>1,4</td></tr> <tr><td>1</td><td>3,0</td></tr> <tr><td>2</td><td>5,0</td></tr> <tr><td>3</td><td>10,0</td></tr> <tr><td>4</td><td>15,0</td></tr> <tr><td>5</td><td>20,0</td></tr> </table>	LTE_EARFCN UL	Band	1800 ... 18599	1	18600 ... 19199	2	19200 ... 19949	3	19950 ... 20399	4	20400 ... 20649	5	20750 ... 21449	7	21450 ... 21799	8	22150 ... 22749	11	23010 ... 23179	12	23180 ... 23279	13	23730 ... 23849	17	24000 ... 24149	19	24150 ... 24449	20	24450 ... 24599	21	26690 ... 27039	26	27210 ... 27659	28	LTE_EARFCN DL	Band	0 ... 599	1	600 ... 1199	2	1200 ... 1949	3	1950 ... 2399	4	2400 ... 2649	5	2750 ... 3449	7	3450 ... 3799	8	4750 ... 4949	11	5010 ... 5179	12	5180 ... 5279	13	5730 ... 5849	17	6000 ... 6149	19	6150 ... 6449	20	6450 ... 6599	21	8690 ... 9039	26	9210 ... 9659	28	<bw>	Band (MHz)	0	1,4	1	3,0	2	5,0	3	10,0	4	15,0	5	20,0
LTE_EARFCN UL	Band																																																																																		
1800 ... 18599	1																																																																																		
18600 ... 19199	2																																																																																		
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4	15,0																																																																																		
5	20,0																																																																																		

"RL4G"	provides the Rx power level for the channel set with "CH4G <earfcn dl>" command
"RXTOGGLE <antenna>"	selects the receiving antenna path depending on <antenna> value: <antenna> = 0 for the primary antenna, <antenna> = 1 for the secondary (diversity) antenna, 2 for both antennas.
"DEINIT4G"	de-initialize Radio for 4G transmission
"ESC"	exits the current non-stop sequence. It must be used to stop TX4G transmission.

- Bands support varies depending on the product. In Test Mode the transmission simultaneously on both 2G or 3G or 4G is not allowed.
- In Test Mode the other AT commands do not work.
- In Test Mode the DTE speed is the same as in OM; it must be saved using **AT&W&P** before switching to TM.
- In Test Mode the multiplexing protocol control channel can not be enabled (see **+CMUX**).
- After issuing **AT#TESTMODE="TM"** or **"OM"**, the module reboots.
- The Test Mode Status is stored in NVM.
- It is not possible to read RX power level during an ongoing TX.



AT#TESTMODE?

Read command reports the currently Test Mode Status in the format:

#TESTMODE: <testModeStatus>

Additional info:

▶▶ Parameter meaning:

Name	Type	Default	Description
<testModeStatus>	integer	0	status

Values:

- 0 : module is in Operative Mode
- 1 : module is in Test Mode



AT#TESTMODE=?

Test command returns the **OK** result code



Set Test Mode
AT#TESTMODE="TM"
OK
Reboot

Initialize Test Mode for 4G operations
AT#TESTMODE="INIT4G"
OK
set B2 with 10MHz bandwidth, download
AT#TESTMODE="CH4G 900 3"
OK

read power level
AT#TESTMODE="RL4G"
-980
OK

set B4 with 5MHz bandwidth, upload
AT#TESTMODE="CH4G 20000 2"
OK

start transmission
AT#TESTMODE="TX4G"
OK

stop transmission
AT#TESTMODE="ESC"
OK

exit from Test Mode
AT#TESTMODE="OM"
OK
Reboot

3.11. Power Down

3.11.1. AT#REBOOT - Module Reboot

Immediate module reboot.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#REBOOT

Execution command reboots immediately the unit.

It can be used to reboot the system after a remote update of the script in order to have the new one running.

- i** If **#REBOOT** follows an AT command that stores some parameters in NVM, it is recommended to insert a delay of at least 5 seconds before to issue **#REBOOT**, to permit the complete NVM storing.
- i** **#REBOOT** is an obsolete AT command; please refer to **#ENHRST** to perform a module reboot.



AT#REBOOT=?

Test command returns **OK** result code.



- Reboot the module
AT#REBOOT
OK
(the module reboots)

3.11.2. AT#ENHRST - Periodic Reset

Enable or Disable the one shot or periodic unit reset

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#ENHRST=<mode>,<delay>

Set commands enables/disables the unit reset after the specified <delay> in minutes



Parameters:

Name	Type	Default	Description
<mode>	integer	0	Enable\Disable mode

Values:

- 0 : disables the unit reset
- 1 : enables the unit reset only one time (one shot reset)
- 2 : enables periodically unit reset

<delay>	integer	-	time interval in minutes after that the unit reboots
---------	---------	---	--

-  The settings are saved automatically in NVM only if old or new <mode> value is 2, i.e. unit set in periodic reset mode. Therefore, any change from 0 to 1 or conversely is not stored in NVM.
-  The command **AT#ENHRST=1,0** causes the immediate module reboot. If it follows an AT command that stores some parameters in NVM, it is strongly recommended to insert a delay of at least 5 sec before issuing it, to permit the complete NVM storing process.



AT#ENHRST?

Read command reports the current parameter settings in the following format:

#ENHRST: <mode>[,<delay>,<remainingTime>]

Additional info:

- ▶▶ Read command parameter for <mode> =1 or 2.

Name	Type	Default	Description
<remainingTime>	integer	-	time in minutes remaining before next reset



AT#ENHRST=?

Test command reports supported range of values for parameters <mode> and <delay>.



Example of **#ENHRST** usage and expected unit behavior.

- **AT#ENHRST=1,60**
...
Module reboots after 60 minutes
- **AT#ENHRST=1,0**
Module reboots immediately
- **AT#ENHRST=2,40**
...
Module reboots after 40 minutes, and after every following power on, it will continue to reboot always after 40 minutes.

3.11.3. AT#SHDN - Software Shutdown

This command turns the module OFF.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SHDN

Execution command causes device detach from the network and shut down. Before definitive shut down an **OK** response is returned.

#SHDN performs a network detach, therefore the switch OFF, sometimes, could take time depending on network condition. During this period any previous activity is terminated and the device will not respond to any further AT command, except the AT commands that return some information local to the device (e.g.: software version, date and time, network status).

To turn the module ON again, the hardware pin ON/OFF must be tied low.



AT#SHDN=?

Test command returns **OK** result code.

3.11.4. AT#FASTSHDN - Fast Shutdown Configuration

This command can be used as a set command to configure a GPIO pin performing a fast shutdown when on it is forced a High to Low level transition. Or can be used as an execute command to force immediately a fast shutdown.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#FASTSHDN[=<enable>,<GPIO>[,<unusedA>[,<unusedB>[,<unusedC>[,<unusedD>]]]]]

Parameters:

Name	Type	Default	Description
<enable>	integer	0	enable/disable the fast shutdown execution via a GPIO pin.
Values:			
		0	: disabled
		1	: enabled
<GPIO>	integer	-	selects the GPIO to execute the fast shutdown. When the selected <GPIO> pin goes from High to Low level and the <enable> is set to 1, the module execute immediately the fast shutdown.
<unusedA>	integer	-	unused parameter
<unusedB>	integer	-	unused parameter
<unusedC>	integer	-	unused parameter
<unusedD>	integer	-	unused parameter

Additional info:

- ▶▶ The execution command **#FASTSHDN<CR><LF>** forces the module to execute immediately the fast shutdown.

- ⓘ The GPIO pin selected by the **#FASTSHDN** command must be used for this purpose only. If you need to use the selected GPIO pin for different activities, it must be free with the following command:

```
#FASTSHDN=0,<GPIO>
```



AT#FASTSHDN?

Read command reports the currently selected configuration in the format:

```
AT#FASTSHDN: <enable>,<GPIO>,0,0,0,0
```

**AT#FASTSHDN=?**

Test command returns the supported range of values for all the parameters.



Enable fast shutdown on GPIO_05

```
AT#FASTSHDN=1,5
```

```
OK
```

```
AT#FASTSHDN?
```

```
#FASTSHDN: 1,5,0,0,0,0
```

```
OK
```

Force immediate fast shutdown

```
AT#FASTSHDN
```

```
OK
```

3.12. Event Monitor

3.12.1. AT#ENAEVMONI - Enable EvMoni Service

This command enables/disables the EVENT MONITOR service.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#ENAEVMONI=<mod>

Parameter:

Name	Type	Default	Description
<mod>	integer	0	enable/disable service

Values:

- 0 : disable service
- 1 : enable service



When the service is active on a specific AT instance, that instance cannot be used for any other scope, except for OTA service that has the highest priority. For example, in the multiplexer request to establish the Instance, the request will be rejected



AT#ENAEVMONI?

Read command returns the current settings of <mode> and the value of <stat> in the format:

#ENAEVMONI: <mod>,<stat>

Additional info:

►► Parameters:

Name	Type	Default	Description
<stat>	integer	0	service status

Values:

- 0 : not active
- 1 : active



AT#ENAEVMONI=?

Test command returns the supported values for the <mod> and <stat> parameters

3.12.2. AT#ENAEVMONICFG - Set EvMoni Service Parameters

This command configures the EvMoni service parameters.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2





AT#ENAEVMONICFG=<instance>[,<URCMod>[,<timeout>]]

Parameters:

Name	Type	Default	Description
<instance>	integer	3	AT instance that will be used by the service to run the AT command
Value:			
1÷5 : AT instance			
<URCMod>	integer	1	enable or disable unsolicited message. The URC format is: #EVMONI: <Text>
Values:			
0 : disable unsolicited message			
1 : enable an unsolicited message when an AT command is executed after an event is occurred			
<timeout>	integer	5	it defines the maximum time for a command execution. If timeout expires the module will be rebooted
Value:			
1÷60 : minutes			

Unsolicited field:

Name	Type	Description
<Text>	string	is the AT Commands list sent on the instance that requested the service activation.

-  The instance used for the EvMoni service is the same used for the SMS AT RUN service. Therefore, when the **#ENAEVMONICFG** sets the **<instance>** parameter, the change is reflected also in the **<instance>** parameter of the **#SMSATRUNCFG** command, and vice versa.
-  The set command returns **ERROR** if the command **#ENAEVMONI?** returns 1 as **<mod>** parameter or the command **#SMSATRUN?** returns 1 as **<mod>** parameter.



AT#ENAEVMONICFG?

Read command returns the current settings of parameters in the format:

#ENAEVMONICFG: <instance>,<urcmod>,<timeout>

**AT#ENAEVMONICFG=?**

Test command returns the supported values of parameters **<instance>**, **<urcmod>**, **<timeout>**.



Example of received URC

#EVMONI: AT+CGMR;+CGSN;+GSN;+CCLK

3.12.3. AT#EVMONI - Event Monitoring

The module provides a set of events that can be configured and monitored using the **#EVMONI** command.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#EVMONI=<label>,<mode>[,<paramType>[,<param>]]

Set command enables/disables the single event monitoring, configures the related parameters and associates the AT command string to execute when the event has occurred.

Parameters:

Name	Type	Default	Description
<label>	string	N/A	String parameter indicating the type of event under monitoring. The label identifying the event must be enclosed between double quotes. For each <label> (or event) is dedicated an Additional info section to describe the command syntax and its behavior.

Values:

VBATT	:	battery voltage monitoring
DTR	:	DTR monitoring
ROAM	:	roaming monitoring
CONTDEACT	:	context deactivation monitoring
RING	:	call ringing monitoring
STARTUP	:	module start-up monitoring
REGISTERED	:	network registration monitoring
GPIO1	:	monitoring on a selected GPIO in the GPIO range
GPIO2	:	monitoring on a selected GPIO in the GPIO range
GPIO3	:	monitoring on a selected GPIO in the GPIO range
GPIO4	:	monitoring on a selected GPIO in the GPIO range
GPIO5	:	monitoring on a selected GPIO in the GPIO range
ADCH1	:	ADC High Voltage monitoring
ADCL1	:	ADC Low Voltage monitoring
DTMF1	:	monitoring on user defined DTMF string
DTMF2	:	monitoring on user defined DTMF string
DTMF3	:	monitoring on user defined DTMF string
DTMF4	:	monitoring on user defined DTMF string
SMSIN	:	monitoring on incoming SMS
CONSUME1	:	used to define an action to be used in consume functionality (see parameter <action_id> in #CONSUMECFG command)
CONSUME2	:	used to define an action to be used in consume functionality (see parameter <action_id> in #CONSUMECFG command)

	CONSUME3	:	used to define an action to be used in consume functionality (see parameter <action_id> in #CONSUMECFG command)
	CONSUME4	:	used to define an action to be used in consume functionality (see parameter <action_id> in #CONSUMECFG command)
	CONSUME5	:	used to define an action to be used in consume functionality (see parameter <action_id> in #CONSUMECFG command)
<mode>	integer	0	disable/enable single event monitoring
	Values:		
	0	:	disable the single event monitoring
	1	:	enable the single event monitoring
<paramType>	integer	0	Indicates the type of parameter contained in <param>. In particular, <paramType>=0 indicates that <param> contains the AT command string to execute when the related event has occurred. Here are the rules to build the AT command string. <ul style="list-style-type: none"> • The string must start with AT or at chars • If the string contains the character ", then it has to be replaced with the 3 characters \22 • The max string length is 96 characters • If it is an empty string, then the AT command is erased Other <paramType> values define the <param> meaning according to the type of event. As stated above, for each event identified by the <label> is dedicated an Additional info section to describe the <paramType> values and the #EVMONI command behavior.
	Values:		
	0	:	indicates that <param> contains the AT command string to execute when the related event has occurred.
	n	:	define the <param> meaning according to the event type. Refer to Additional info section.
<param>	string	-	Its meaning depends on the <label> and <paramType> parameters. Refer to Addition info section.

Additional info:

- ▶▶ <label>=VBATT, battery voltage monitoring.
<paramType> can assume values in the range 0 - 2.

Name	Type	Default	Description
<param>	integer	0	When <paramType>=1, <param> is the battery voltage threshold to monitor.
	Value:		
	0÷500	:	1 unit is 10 mV.
<param>	integer	0	When <paramType>=2, <param> is the time interval starting from the instant in which the voltage battery

goes below the threshold specified with **<paramType>=1**. When the interval is elapsed and the voltage battery is below the threshold, the **#EVMONI** executes the AT command configured with **<paramType>=0**.

Value:
0÷255 : seconds

- ▶▶ **<label>=DTR**, DTR monitoring.
<paramType> can assume values in the range 0 - 2.

Name	Type	Default	Description
<param>	integer	0	When <paramType>=1 , <param> is the DTR status to monitor.

Values:
0 : Low
1 : High

<param>	integer	0	When <paramType>=2 , <param> is the time interval starting when DTR status has the value specified with <paramType>=1 . When the interval is elapsed and the DTR status is equal to the value previously specified, the #EVMONI executes the AT command configured with <paramType>=0 .
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Value:
0÷255 : sec

- ▶▶ **<label>=ROAM**, roaming monitoring.
<paramType> can assume only the value 0.
After roaming, the **#EVMONI** executes the AT command configured with **<paramType>=0**.

- ▶▶ **<label>=CONTDEACT**, context deactivation
<paramType> can assume only the value 0.
After the deactivation of all active contexts, the **#EVMONI** executes the AT command configured with **<paramType>=0**.

- ▶▶ **<label>=RING**, call ringing monitoring.
<paramType> can assume values in the range 0 - 1.

Name	Type	Default	Description
<param>	integer	1	When <paramType>=1 , <param> is the number of call rings after which the event occurs. The event is notified by the execution of the AT command configured with <paramType>=0 .

Value:

1÷50 : numbers of call rings

- ▶▶ **<label>=STARTUP**, module start-up monitoring.
<paramType> can assume only the value 0.
 After module start-up, the **#EVMONI** executes the AT command configured with **<paramType>=0**.

- ▶▶ **<label>=REGISTERED**,
<paramType> can assume only the value 0.
 When the module is started up, and the SMSs have been ordered in the internal memory, the event under monitoring is the network registration (to home network or in roaming). After registration, the **#EVMONI** executes the AT command configured with **<paramType>=0**.

- ▶▶ **<label>=GPIO1, GPIO2, GPIO3, GPIO4, GPIO5** monitoring.
<paramType> can assume values in the range 0 - 3.

Name	Type	Default	Description
<param>	integer	1	When <paramType>=1 , <param> is the GPIO pin number to be monitored. Supported range is from 1 to a value that depends on the hardware.

Value:

1÷max : max depends on the hardware.

<param>	integer	0	When <paramType>=2 , <param> is the GPIO status value to monitor.
----------------------	---------	---	---

Values:

0 : GPIO status LOW

1 : GPIO status HIGH

<param>	integer	0	When <paramType>=3 , <param> is the time interval starting when GPIO pin has the value specified with <paramType>=2 . When the interval is elapsed and GPIO pin value is equal to the value previously specified, the #EVMONI executes the AT command configured with <paramType>=0 .
----------------------	---------	---	--

Value:

0÷255 : sec

- ▶▶ **<label>=ADCH1**, ADC High Voltage monitoring.
<paramType> can assume values in the range 0 - 3.

Name	Type	Default	Description
------	------	---------	-------------

<param>	integer	1	When <paramType>=1 , <param> is the ADC pin number to monitor.
Value:			
1÷max : max depends on the hardware.			
<param>	integer	0	When <paramType>=2 , <param> is the ADC High voltage threshold to monitor.
Value:			
0÷2000 : Expressed in mV			
<param>	integer	0	When <paramType>=3 , <param> is the time interval starting when the selected ADC pin (<paramType>=1) goes above the threshold specified with <paramType>=2 . When the interval is elapsed and the ADC pin level is above the previously specified threshold, the #EVMONI executes the AT command configured with <paramType>=0 .
Value:			
0÷255 : Expressed in sec			

- **<label>=ADCL1**, ADC Low Voltage monitoring.
<paramType> can assume values in the range 0 - 3.

Name	Type	Default	Description
<param>	integer	0	When <paramType> = 1 , <param> is the ADC pin number to monitor.
Value:			
1÷max : max depends on the hardware.			
<param>	integer	0	When <paramType> = 2 , <param> is the ADC Low voltage threshold to monitor.
Value:			
0÷2000 : Expressed mV			
<param>	integer	0	When <paramType>=3 , <param> is the time interval starting when the selected ADC pin (<paramType>=1) goes below the threshold specified with <paramType>=2 . When the interval is elapsed and the ADC pin level is below the previously specified threshold, the #EVMONI executes the AT command configured with <paramType>=0 . Does not matter the fluctuation of the ADC voltage inside the time interval.
Value:			
0÷255 : Expressed in seconds.			

- **<label>=DTMF1, DTMF2, DTMF3, DTMF4** monitoring on user defined DTMF string.

<paramType> can assume values in the range 0 - 2.

Name	Type	Default	Description
<param>	string	-	When <paramType>=1, <param> is the DTMF string. The single DTMF characters have to belong to the range ((0-9),#,*,(AD)); the maximum number of characters in the string is 15
<param>	integer	1000	When <paramType>=2, <param> is the maximum time interval within which a DTMF tone must be detected after the reception of the previous one in order to be considered as belonging to the DTMF string. When the complete DTMF string is received, the event has occurred and the #EVMONI executes the AT command configured with <paramType>=0

Value:

500÷5000 : Expressed in msec

- ▶▶ <label>=SMSIN, monitoring on incoming SMS.
<paramType> can assume values in the range 0 - 1.

Name	Type	Default	Description
<param>	string	-	When <paramType>=1, <param> contains the text string that must be received in an incoming SMS to create the event. In this case, #EVMONI executes the AT command configured with <paramType>=0. The maximum number of characters in the SMS text string is 15. If no text is specified in <param> (empty string), each incoming SMS triggers the event and #EVMONI executes the AT command configured with <paramType>=0.

- ▶▶ <label>=CONSUME1, CONSUME2, CONSUME3, CONSUME4, CONSUME5 used to define an action to be used in consume functionality, see #CONSUMECFG command.
<paramType> can assume only values 0.
When the action identified by the <action_id> parameter of the #CONSUMECFG command occurs, the #EVMONI executes the AT command configured with <paramType>=0.

- ⓘ The DTMF string monitoring is available only if the DTMF decode has been enabled (see #DTMF command)



AT#EVMONI?

Read command returns the current settings for each event in the format:

#EVMONI: <label>,<mode>,<param0>[,<param1>[,<param2>[,<param3>]]]

where <param0>, <param1>, <param2> and <param3> assume the meaning according to the <paramType> and <label> values used in the set command.



AT#EVMONI=?

Test command returns values supported as a compound value.



- Check the default configuration


```

AT#EVMONI?
#EVMONI: "VBATT",0,"",0,0
#EVMONI: "DTR",0,"",0,0
#EVMONI: "ROAM",0,""
#EVMONI: "CONTDEACT",0,""
#EVMONI: "RING",0,"",1
#EVMONI: "STARTUP",0,""
#EVMONI: "REGISTERED",0,""
#EVMONI: "GPIO1",0,"",1,0,0
#EVMONI: "GPIO2",0,"",1,0,0
#EVMONI: "GPIO3",0,"",1,0,0
#EVMONI: "GPIO4",0,"",1,0,0
#EVMONI: "GPIO5",0,"",1,0,0
#EVMONI: "ADCH1",0,"",1,0,0
#EVMONI: "ADCL1",0,"",1,0,0
#EVMONI: "DTMF1",0,"",1000
#EVMONI: "DTMF2",0,"",1000
#EVMONI: "DTMF3",0,"",1000
#EVMONI: "DTMF4",0,"",1000
#EVMONI: "SMSIN",0,""
#EVMONI: "CONSUME1",0,""
#EVMONI: "CONSUME2",0,""
#EVMONI: "CONSUME3",0,""
#EVMONI: "CONSUME4",0,""
#EVMONI: "CONSUME5",0,""
OK

Configure VBATT event
AT#EVMONI="VBATT",0,0,"AT+CGMR"
OK
AT#EVMONI="VBATT",0,1,500
OK
AT#EVMONI="VBATT",0,2,255
OK

Check the VBATT event configuration
AT#EVMONI?
#EVMONI: "VBATT",0,"AT+CGMR",500,255
#EVMONI: "DTR",0,"",0,0
#EVMONI: "ROAM",0,""
#EVMONI: "CONTDEACT",0,""
#EVMONI: "RING",0,"",1
#EVMONI: "STARTUP",0,""
#EVMONI: "REGISTERED",0,""
#EVMONI: "GPIO1",0,"",1,0,0
#EVMONI: "GPIO2",0,"",1,0,0
#EVMONI: "GPIO3",0,"",1,0,0
#EVMONI: "GPIO4",0,"",1,0,0
#EVMONI: "GPIO5",0,"",1,0,0
#EVMONI: "ADCH1",0,"",1,0,0
#EVMONI: "ADCL1",0,"",1,0,0
#EVMONI: "DTMF1",0,"",1000
#EVMONI: "DTMF2",0,"",1000
#EVMONI: "DTMF3",0,"",1000
#EVMONI: "DTMF4",0,"",1000
#EVMONI: "SMSIN",0,""
#EVMONI: "CONSUME1",0,""
#EVMONI: "CONSUME2",0,""
#EVMONI: "CONSUME3",0,""
#EVMONI: "CONSUME4",0,""
#EVMONI: "CONSUME5",0,""
OK

```
- Test command

```
AT#EVMONI=?
#EVMONI: "VBATT",(0,1),(0-2),(0-500),(0-255)
#EVMONI: "DTR",(0,1),(0-2),(0,1),(0-255)
#EVMONI: "ROAM",(0,1),0
#EVMONI: "CONTDEACT",(0,1),0
#EVMONI: "RING",(0,1),(0,1),(1-50)
#EVMONI: "STARTUP",(0,1),0
#EVMONI: "REGISTERED",(0,1),0
#EVMONI: "GPIO1",(0,1),(0-3),(1-10),(0,1),(0-255)
#EVMONI: "GPIO2",(0,1),(0-3),(1-10),(0,1),(0-255)
#EVMONI: "GPIO3",(0,1),(0-3),(1-10),(0,1),(0-255)
#EVMONI: "GPIO4",(0,1),(0-3),(1-10),(0,1),(0-255)
#EVMONI: "GPIO5",(0,1),(0-3),(1-10),(0,1),(0-255)
#EVMONI: "ADCH1",(0,1),(0-3),(1),(0-2000),(0-255)
#EVMONI: "ADCL1",(0,1),(0-3),(1),(0-2000),(0-255)
#EVMONI: "DTMF1",(0,1),(0-2),(500-5000)
#EVMONI: "DTMF2",(0,1),(0-2),(500-5000)
#EVMONI: "DTMF3",(0,1),(0-2),(500-5000)
#EVMONI: "DTMF4",(0,1),(0-2),(500-5000)
#EVMONI: "SMSIN",(0,1),(0,1)
#EVMONI: "CONSUME1",(0,1),0
#EVMONI: "CONSUME2",(0,1),0
#EVMONI: "CONSUME3",(0,1),0
#EVMONI: "CONSUME4",(0,1),0
#EVMONI: "CONSUME5",(0,1),0
OK
```


3.13. Easy Scan

3.13.1. AT#CSURV - Network Survey

The command allows to perform a network survey through band channels.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CSURV=[<s>,<e>]]

Execution command allows to perform a network survey through band channels, starting from channel <s> to channel <e>.

Issuing AT#CSURV<CR>, a full band scan is performed. The command responds with the following string:

Network survey started...

After a while, a list of network survey information text lines, one for each received carrier, is reported. The format of network survey information text lines depends on technology (2G, 3G and 4G) and BCCH (BCCH-Carrier or non BCCH-Carrier).

Lastly, the #CSURV output ends in two ways, depending on the last #CSURVF setting.

If AT#CSURVF=0 or AT#CSURVF=1 the output will end with the string:

- Network survey ended

If AT#CSURVF=2 the output will end with the string:

- Network survey ended (Carrier: <NoARFCN> BCCh: <NoBCCh>)

The network survey information text lines are described in the Additional info sections.

Parameters:

Name	Type	Default	Description
<s>	integer	-	starting channel
<e>	integer	-	ending channel

Additional info:

▶▶ 2G Networks, for BCCH-Carrier

Network survey information text lines:

```
arfcn:<arfcn> bsic:<bsic> rxLev:<rxLev> ber:<ber> mcc:<mcc> mnc:<mnc>
lac:<lac> cellId:<cellId> cellStat:<cellStat> numArfcn <numArfcn>
arfcn:[<arfcn1>..[<arfcn64>]]
[numChannels:<numCha>array:[<ba1>..[<ba32>]]]
[pbcc:<pbcc> [nom:<nom> rac:<rac> spgc:<spgc> pat:<pat> nco:<nco>
t3168:<t3168> t3192:<t3192> drxmax:<drxmax> ctrlAck:<ctrlAck>
bsCVmax:<bsCVmax> alpha:<alpha> pcMeasCh:<pcMeasCh>]]
```

[mstxpwr:<mstxpwr> rxaccmin:<rxaccmin> croffset:<croffset> penaltyt:<penaltyt>
t3212:<t3212> CRH:<CRH>] <CR><LF><CR><LF><CR><LF>

Name	Type	Default	Description
<arfcn>	integer	-	the cell carrier assigned radio channel (BCCH - Broadcast Control Channel)
<bsic>	integer	-	base station identification code; if #CSURVF last setting is 0, <bsic> is a decimal number, else it is at the most a 2-digits octal number
<rxLev>	integer	-	decimal number; it is the reception level (in dBm)
<ber>	integer	-	decimal number; it is the bit error rate (in %)
<mcc>	hex	-	hexadecimal 3-digits number; it is the mobile country code
<mnc>	hex	-	hexadecimal 2-digits/3-digits number; it is the mobile network code
<lac>	integer	-	location area code; if #CSURVF last setting is 0, <lac> is a decimal number, else it is a 4-digits hexadecimal number
<cellId>	integer	-	cell identifier; if #CSURVF last setting is 0, <cellId> is a decimal number, else it is a 4-digits hexadecimal number
<cellStat>	string	N/A	cell status
Values:			
CELL_SUITABLE		:	the cell is a suitable cell
CELL_LOW_PRIORITY		:	the cell is low priority based on the received system information
CELL_FORBIDDEN		:	the cell is forbidden
CELL_BARRED		:	the cell is barred based on the received system information
CELL_LOW_LEVEL		:	the cell <rxLev> is low
CELL_OTHER		:	none of the above (e.g. exclusion timer running, no BCCH available, etc.)
<numArfcn>	integer	-	decimal number; it is the number of valid channels in the Cell Channel Description
<arfcnn>	integer	-	decimal number; it is the arfcn of a valid channel in the Cell Channel Description (n is in the range 1..<numArfcn>)
<numCha>	integer	-	decimal number; it is the number of valid channels in the BCCH Allocation list. The parameter will be present: <ul style="list-style-type: none"> only for serving cell if AT#CSURVEXT=0 for every valid scanned BCCH carrier if AT#CSURVEXT=1 or AT#CSURVEXT=2 or AT#CSURVEXT=3
<ban>	integer	-	decimal number; it is the arfcn of a valid channel in the BA list (n is in the range 1...<numCha>) The parameter will be present: <ul style="list-style-type: none"> only for serving cell if AT#CSURVEXT=0

			<ul style="list-style-type: none"> for every valid scanned BCCH carrier if AT#CSURVEXT=1 or AT#CSURVEXT=2 or AT#CSURVEXT=3
<pbccch>	integer	N/A	packet broadcast control channel The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell
	Values:		
	0	:	pbccch not activated on the cell
	1	:	pbccch activated on the cell
<nom>	integer	N/A	network operation mode The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
	Values:		
	1	:	NOM1
	2	:	NOM2
	3	:	NOM3
<rac>	integer	N/A	routing area code The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
	Value:		
	0÷255	:	RAC
<spgc>	integer	N/A	SPLIT_PG_CYCLE support The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
	Values:		
	0	:	SPLIT_PG_CYCLE is not supported on CCCH on this cell
	1	:	SPLIT_PG_CYCLE is supported on CCCH on this cell
<pat>	integer	N/A	priority access threshold The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
	Values:		
	0	:	PAT
	3÷6	:	PAT
<nco>	integer	N/A	network control order.

			The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
	Value:		
	0÷2	:	NCO
<t3168>	integer	-	timer 3168 The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
<t3192>	integer	-	timer 3192 The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
<drxmax>	integer	-	discontinuous reception max time (in seconds) The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
<ctrlAck>	integer	-	packed control ack. The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
<bsCVmax>	integer	-	blocked sequence countdown max value. The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
<alpha>	integer	-	alpha parameter for power control. The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
<pcMeasCh>	integer	N/A	type of channel which shall be used for downlink measurements for power control. The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
	Values:		
	0	:	BCCH
	1	:	PDCH
<mstxpwr>	integer	-	decimal TX power level The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=3
<rxaccmin>	integer	N/A	decimal RX level access min

			The parameter will be present:
			<ul style="list-style-type: none"> only if AT#CSURVEXT=3
	Value:		
	0÷63	:	RXACCMIN
<croffset>	integer	N/A	decimal Cell Reselection Offset
			The parameter will be present:
			<ul style="list-style-type: none"> only if AT#CSURVEXT=3
	Value:		
	0÷63	:	CRO
<penaltyt>	integer	N/A	decimal Penalty Time
			The parameter will be present:
			<ul style="list-style-type: none"> only if AT#CSURVEXT=3
	Value:		
	0÷31	:	PTIME
<t3212>	integer	-	decimal T3212 Periodic Location Update Timer
			The parameter will be present:
			<ul style="list-style-type: none"> only if AT#CSURVEXT=3
<CRH>	integer	-	decimal Cell Reselection Hysteresis
			The parameter will be present:
			<ul style="list-style-type: none"> only if AT#CSURVEXT=3

►► 2G Networks, for non BCCH-Carrier

Network survey information text lines:

arfcn: <arfcn> rxLev: <rxLev> <CR><LF><CR><LF><CR><LF>

Name	Type	Default	Description
<arfcn>	integer	-	decimal number; it is the RF channel
<rxLev>	integer	-	decimal number; it is the reception level (in dBm)

►► 3G Networks, for BCCH-Carrier

Network survey information text lines:

**uarfcn: <uarfcn> rxLev: <rxLev> mcc: <mcc> mnc: <mnc> scrcode: <scrcode>
 cellId: <cellId> lac: <lac> cellStatus: <cellStat> rscp: <rscp>
 ecio: <ecio> <CR><LF><CR><LF><CR><LF>**

Name	Type	Default	Description
<uarfcn>	integer	-	the cell carrier frequency designated by UTRA Absolute Radio Frequency Channel Number
<rxLev>	integer	-	decimal number; it is the reception level (in dBm)

<mcc>	hex	-	hexadecimal 3-digits number; it is the mobile country code
<mnc>	hex	-	hexadecimal 2-digits/3-digits number; it is the mobile network code
<scrcode>	integer	-	decimal number; it is the scrambling code
<cellId>	integer	-	cell identifier; if #CSURVF last setting is 0, <cellId> is a decimal number, else it is a 8-digits hexadecimal number
<lac>	integer	-	location area code; if #CSURVF last setting is 0, <lac> is a decimal number, else it is a 4-digits hexadecimal number
<cellStat>	string	N/A	string type; it is the cell status

Values:

CELL_SUITABLE	:	the cell is a suitable cell
CELL_LOW_PRIORITY	:	the cell is low priority based on the received system information
CELL_FORBIDDEN	:	the cell is forbidden
CELL_BARRED	:	the cell is barred based on the received system information
CELL_LOW_LEVEL	:	the cell <rxLev> is low
CELL_OTHER	:	none of the above (e.g. exclusion timer running, no BCCH available, etc.)

<rscp>	integer	-	decimal number; it is the RSCP level (in dBm)
<ecio>	integer	-	decimal number; it is the EC/IO ratio level (in dB)

►► 3G Networks, for non BCCH-Carrier

Network survey information text lines.

uarfcn: **<uarfcn>** **rxLev:** **<rxLev>** **<CR><LF><CR><LF><CR><LF>**

Name	Type	Default	Description
<uarfcn>	integer	-	decimal number; it is the RF channel
<rxLev>	integer	-	decimal number; it is the reception level (in dBm)

►► 4G Network, for BCCH-Carrier

Network survey information text lines:

earfcn:**<earfcn>** **rxLev:****<rxLev>** **mcc:****<mcc>** **mnc:****<mnc>** **phyCellId:****<phyCellId>**
cellId:**<cellId>** **tac:****<tac>** **cellStatus:****<cellStatus>** **rsrp:****<rsrp>** **rsrq:****<rsrq>**
bw:**<bw>** **<CR><LF><CR><LF><CR><LF>**

Name	Type	Default	Description
<earfcn>	integer	-	the cell carrier frequency designated by EUTRA Absolute Radio Frequency Channel Number

<rxLev>	integer	-	decimal number; it is the reception level (in dBm). In SW versions up to 20.00.xx2 included, it is unused and set to 0
<mcc>	hex	-	hexadecimal 3-digits number; it is the mobile country code
<mnc>	hex	-	hexadecimal 2-digits number; it is the mobile network code
<phyCellId>	mixed	-	decimal number; it is the physical cell id; if #CSURVF last setting is 0, <phyCellId> is a decimal number, else it is a 8-digits hexadecimal number
<cellId>	mixed	-	cell identifier; if #CSURVF last setting is 0, <cellId> is a decimal number, else it is a 8-digits hexadecimal number
<tac>	mixed	-	tracking area code; if #CSURVF last setting is 0, <tac> is a decimal number, else it is a 4-digits hexadecimal number
<cellStatus>	string	N/A	string type; it is the cell status

Values:

CELL_SUITABLE	:	the cell is a suitable cell
CELL_LOW_PRIORITY	:	the cell is low priority based on the received system information.
CELL_FORBIDDEN	:	the cell is forbidden.
CELL_BARRED	:	the cell is barred based on the received system information
CELL_LOW_LEVEL	:	the cell <rxLev> is low
CELL_OTHER	:	none of the above e.g. exclusion timer running, no BCCH available...etc.

<rsrp>	integer	-	decimal number; it is the RSRP level (in dBm)
<rsrq>	integer	-	decimal number; it is the RSRQ level (in dB)
<bw>	string	-	decimal number; it is downlink the bandwidth (in MHz). In SW versions up to 20.00.xx2 included, it is unused and set to 0

►► 4G Network, for non BCCH-Carrier

Network survey information text lines:

earfcn:<earfcn> rxLev:<rxLev>

Name	Type	Default	Description
<earfcn>	integer	-	decimal number; it is the RF channel
<rxLev>	integer	-	decimal number; it is the reception level (in dBm)

►► **#CSURV** end output parameters if **AT#CSURVF=2:**

Network survey ended (Carrier: <NoARFCN> BCCh: <NoBCCh>)

Name	Type	Default	Description
<NoARCFN>	integer	-	number of scanned frequencies
<NoBCCH>	integer	-	number of found BCCH



Notes and module limits

- i** This command execution takes a long time especially if the full band scan is performed.
- i** The module must be configured in **+COPS: 2** mode.
- i** Only BCCH-carriers are reported, non BCCH-carriers are never reported.
- i** If present, the parameters:
 <s> - starting channel
 <e> - ending channel
 are only allowed in fixed couples indicating a band.

i 2G Networks

<s>,<e> fixed couples and the corresponding band, if supported by the product:

0,124	GSM900
975,1023	GSM900
512,885	DCS1800
128,251	GSM850
512,810	PCS1900
0,1023	all supported GSM bands

<ber> is always 0.0.

<numArfcn> is always 0.

<arfcnn> is always empty.

<numCha> is always 0.

<ban> is always empty.

GPRS parameters like <pbccch> are present in output only if GPRS is supported in the cell but their value is not available and will be always 0.

Parameters like <mstxpwr> are present in output only for **AT#CSURVEXT=3** setting but their value is not available and will be always 0.

i 3G Networks

<s>,<e> fixed couples and the corresponding band, if supported by the product:


10562,10838	UMTS BAND I
9662,9938	UMTS BAND II
1537,1738	UMTS BAND IV
4357,4458	UMTS BAND V
4387,4413	UMTS BAND VI
2937,3088	UMTS BAND VIII
712,763	UMTS BAND XIX
0,65535	all supported UMTS bands

i 4G Networks

<s>,<e> fixed couples and the corresponding band, if supported by the product:

0, 599	LTE BAND 1
600,1199	LTE BAND 2
1200,1949	LTE BAND 3
1950,2399	LTE BAND 4
2400,2649	LTE BAND 5
2750,3449	LTE BAND 7

3450,3799	LTE BAND 8
4750,4949	LTE BAND 11
5010,5179	LTE BAND 12
5180,5279	LTE BAND 13
5730,5849	LTE BAND 17
6000,6149	LTE BAND 19
6150,6449	LTE BAND 20
6450,6599	LTE BAND 21
8690,9039	LTE BAND 26
0,65534	all supported LTE bands

-  Consistent scan results are available only if, depending on technology, RXLev or RSCP are better than -100 dBm.



- full scan example
AT#CSURV
Network survey started...
arfcn: 36 bsic: 49 rxLev: -77 ber: 0.00 mcc: 222 mnc: 10 lac: 20060 cellId: 27162
cellStatus: CELL_SUITABLE numArfcn: 0 arfcn: numCha: 0 array: pbcch: 0
nom: 0 rac: 0 spgc: 0 pat: 0 nco: 0 t3168: 0 t3192: 0 drxmax: 0 ctrlAck: 0
bsCVmax: 0 alpha: 0 pcMeasCh: 0 mstxpwr: 0 rxaccmin: 0 croffset: 0 penaltyt:
0 t3212:0 CRH: 0
uarfcn: 10588 rxLev: -92 mcc: 222 mnc: 88 scr code: 54 cellId: 19406101 lac:
24065 cellStatus: CELL_SUITABLE rscp: -101 ecio: -9.0
Network survey ended
OK

3.13.2. AT#CSURVC - Network Survey (Numeric Format)

The command allows to perform a network survey through band channels. The information provided by #CSURVC is the same as that provided by #CSURV. The difference is that the output of #CSURVC is in numeric format only.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CSURVC[=<s>,<e>]]

Execution command allows to perform a network survey through band channels, starting from channel <s> to channel <e>.

Issuing **AT#CSURV<CR>**, a full band scan is performed. The command responds with the following string:

Network survey started...

After a while, a list of network survey information text lines, one for each received carrier, is reported. The format of network survey information text lines depends on technology (2G, 3G and 4G) and BCCH (BCCH-Carrier or non BCCH-Carrier).

Lastly, the #CSURV output ends in two ways, depending on the last #CSURVF setting.

If **AT#CSURVF=0** or **AT#CSURVF=1** the output will end with the string:

- **Network survey ended**

If **AT#CSURVF=2** the output will end with the string:

- **Network survey ended (Carrier: <NoARFCN> BCCh: <NoBCCh>)**

The network survey information text lines are described in the Additional info sections.

Parameters:

Name	Type	Default	Description
<s>	integer	-	starting channel
<e>	integer	-	ending channel

Additional info:

▶▶ 2G Networks, for BCCH-Carrier

Network survey information text lines:

```
<arfcn>,<bsic>,<rxLev>,<ber>,<mcc>,<mnc>,<lac>,<cellId>,<cellStat>,<numArfcn>[,<arfcn1>..[,<arfcn64>]][,<numCha>[,<ba1>..[,<ba32>]]][,<pbccch>[,<nom>,<rac>,<spgc>,<pat>,<nco>,<t3168>,<t3192>,<drxmax>,<ctrlAck>,<bsCVmax>,<alpha>,<pcMeasCh>][,<mstxpwr>,<rxaccmin>,<croffset>,<penaltyt>,<t3212>,<CRH>]<CR><LF><CR><LF><CR><LF>
```

Name	Type	Default	Description
------	------	---------	-------------

<arfcn>	integer	-	the cell carrier assigned radio channel (BCCH - Broadcast Control Channel)
<bsic>	integer	-	base station identification code; if #CSURVF last setting is 0, <bsic> is a decimal number, else it is at the most a 2-digits octal number
<rxLev>	integer	-	decimal number; it is the reception level (in dBm)
<ber>	integer	-	decimal number; it is the bit error rate (in %)
<mcc>	hex	-	hexadecimal 3-digits number; it is the mobile country code
<mnc>	hex	-	hexadecimal 2-digits/3-digits number; it is the mobile network code
<lac>	integer	-	location area code; if #CSURVF last setting is 0, <lac> is a decimal number, else it is a 4-digits hexadecimal number
<cellId>	integer	-	cell identifier; if #CSURVF last setting is 0, <cellId> is a decimal number, else it is a 4-digits hexadecimal number
<cellStat>	string	N/A	cell status
Values:			
	CELL_SUITABLE	:	the cell is a suitable cell
	CELL_LOW_PRIORITY	:	the cell is low priority based on the received system information
	CELL_FORBIDDEN	:	the cell is forbidden
	CELL_BARRED	:	the cell is barred based on the received system information
	CELL_LOW_LEVEL	:	the cell <rxLev> is low
	CELL_OTHER	:	none of the above (e.g. exclusion timer running, no BCCH available, etc.)
<numArfcn>	integer	-	decimal number; it is the number of valid channels in the Cell Channel Description
<arfcnn>	integer	-	decimal number; it is the arfcn of a valid channel in the Cell Channel Description (n is in the range 1.. <numArfcn>)
<numCha>	integer	-	decimal number; it is the number of valid channels in the BCCH Allocation list. The parameter will be present: <ul style="list-style-type: none"> only for serving cell if AT#CSURVEXT=0 for every valid scanned BCCH carrier if AT#CSURVEXT=1 or AT#CSURVEXT=2 or AT#CSURVEXT=3
<ban>	integer	-	decimal number; it is the arfcn of a valid channel in the BA list (n is in the range 1.. <numCha>) The parameter will be present: <ul style="list-style-type: none"> only for serving cell if AT#CSURVEXT=0 for every valid scanned BCCH carrier if AT#CSURVEXT=1 or AT#CSURVEXT=2 or AT#CSURVEXT=3
<pbccch>	integer	N/A	packet broadcast control channel The parameter will be present:

			<ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell
	Values:		
	0	:	pbccch not activated on the cell
	1	:	pbccch activated on the cell
<nom>	integer	N/A	network operation mode The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
	Values:		
	1	:	NOM1
	2	:	NOM2
	3	:	NOM3
<rac>	integer	N/A	routing area code The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
	Value:		
	0÷255	:	RAC
<spgc>	integer	N/A	SPLIT_PG_CYCLE support The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
	Values:		
	0	:	SPLIT_PG_CYCLE is not supported on CCCH on this cell
	1	:	SPLIT_PG_CYCLE is supported on CCCH on this cell
<pat>	integer	N/A	priority access threshold The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
	Values:		
	0	:	PAT
	3÷6	:	PAT
<nco>	integer	N/A	network control order. The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
	Value:		

	0÷2	:	NCO
<t3168>	integer	-	timer 3168 The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
<t3192>	integer	-	timer 3192 The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
<drxmax>	integer	-	discontinuous reception max time (in seconds) The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
<ctrlAck>	integer	-	packed control ack. The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
<bsCVmax>	integer	-	blocked sequence countdown max value. The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
<alpha>	integer	-	alpha parameter for power control. The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
<pcMeasCh>	integer	N/A	type of channel which shall be used for downlink measurements for power control. The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=2 or AT#CSURVEXT=3 and if GPRS is supported in the cell and <pbccch> is 0.
	Values:		
	0	:	BCCH
	1	:	PDCH
<mstxpwr>	integer	-	decimal TX power level The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=3
<rxaccmin>	integer	N/A	decimal RX level access min The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=3
	Value:		
	0÷63	:	RXACCMIN

<croffset>	integer	N/A	decimal Cell Reselection Offset The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=3
Value: 0÷63 : CRO			
<penaltyt>	integer	N/A	decimal Penalty Time The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=3
Value: 0÷31 : PTIME			
<t3212>	integer	-	decimal T3212 Periodic Location Update Timer The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=3
<CRH>	integer	-	decimal Cell Reselection Hysteresis The parameter will be present: <ul style="list-style-type: none"> only if AT#CSURVEXT=3

▶▶ 2G Networks, for non BCCH-Carrier

Network survey information text lines:

<arfcn>,<rxLev><CR><LF><CR><LF><CR><LF>

Name	Type	Default	Description
<arfcn>	integer	-	decimal number; it is the RF channel
<rxLev>	integer	-	decimal number; it is the reception level (in dBm)

▶▶ 3G Networks, for BCCH-Carrier

Network survey information text lines:

**<uarfcn>,<rxLev>,<mcc>,<mnc>,<scrcode>,<cellId>,<lac>,<cellStat>,<rscp>,<ecio>
<CR><LF><CR><LF><CR><LF>**

Name	Type	Default	Description
<uarfcn>	integer	-	the cell carrier frequency designated by UTRA Absolute Radio Frequency Channel Number
<rxLev>	integer	-	decimal number; it is the reception level (in dBm)
<mcc>	hex	-	hexadecimal 3-digits number; it is the mobile country code
<mnc>	hex	-	hexadecimal 2-digits/3-digits number; it is the mobile network code
<scrcode>	integer	-	decimal number; it is the scrambling code

<cellId>	integer	-	cell identifier; if #CSURVF last setting is 0, <cellId> is a decimal number, else it is a 8-digits hexadecimal number
<lac>	integer	-	location area code; if #CSURVF last setting is 0, <lac> is a decimal number, else it is a 4-digits hexadecimal number
<cellStat>	string	N/A	string type; it is the cell status
Values:			
CELL_SUITABLE	:		the cell is a suitable cell
CELL_LOW_PRIORITY	:		the cell is low priority based on the received system information
CELL_FORBIDDEN	:		the cell is forbidden
CELL_BARRED	:		the cell is barred based on the received system information
CELL_LOW_LEVEL	:		the cell <rxLev> is low
CELL_OTHER	:		none of the above (e.g. exclusion timer running, no BCCH available, etc.)
<rscp>	integer	-	decimal number; it is the RSCP level (in dBm)
<ecio>	integer	-	decimal number; it is the EC/IO ratio level (in dB)

▶▶ 3G Networks, for non BCCH-Carrier

Network survey information text lines.

<uarfcn>,<rxLev><CR><LF><CR><LF><CR><LF>

Name	Type	Default	Description
<uarfcn>	integer	-	decimal number; it is the RF channel
<rxLev>	integer	-	decimal number; it is the reception level (in dBm)

▶▶ 4G Network, for BCCH-Carrier

Network survey information text lines:

<earfcn>,<rxLev>,<mcc>,<mnc>,<phyCellId>,<cellId>,<tac>,<cellStatus>,<rscp>,<rscp>,<bw><CR><LF><CR><LF><CR><LF>

Name	Type	Default	Description
<earfcn>	integer	-	the cell carrier frequency designated by EUTRA Absolute Radio Frequency Channel Number
<rxLev>	integer	-	decimal number; it is the reception level (in dBm). In SW versions up to 20.00.xx2 included, it is unused and set to 0
<mcc>	hex	-	hexadecimal 3-digits number; it is the mobile country code
<mnc>	hex	-	hexadecimal 2-digits number; it is the mobile network code
<phyCellId>	mixed	-	decimal number; it is the physical cell id; if #CSURVF last setting is 0, <phyCellId> is a decimal number, else it is a 8-digits hexadecimal number

<cellId>	mixed	-	cell identifier; if #CSURVF last setting is 0, <cellId> is a decimal number, else it is a 8-digits hexadecimal number
<tac>	mixed	-	tracking area code; if #CSURVF last setting is 0, <tac> is a decimal number, else it is a 4-digits hexadecimal number
<cellStatus>	string	N/A	string type; it is the cell status
Values:			
	CELL_SUITABLE	:	the cell is a suitable cell
	CELL_LOW_PRIORITY	:	the cell is low priority based on the received system information.
	CELL_FORBIDDEN	:	the cell is forbidden.
	CELL_BARRED	:	the cell is barred based on the received system information
	CELL_LOW_LEVEL	:	the cell <rxLev> is low
	CELL_OTHER	:	none of the above e.g. exclusion timer running, no BCCH available...etc.
<rsrp>	integer	-	decimal number; it is the RSRP level (in dBm)
<rsrq>	integer	-	decimal number; it is the RSRQ level (in dB)
<bw>	string	-	decimal number; it is downlink the bandwidth (in MHz). In SW versions up to 20.00.xx2 included, it is unused and set to 0

▶▶ 4G Network, for non BCCH-Carrier

Network survey information text lines:

<earfcn>,**<rxLev>**

Name	Type	Default	Description
<earfcn>	integer	-	decimal number; it is the RF channel
<rxLev>	integer	-	decimal number; it is the reception level (in dBm)

▶▶ **#CSURV** end output parameters if **AT#CSURVF=2**:

Network survey ended (Carrier: **<NoARFCN>** BCCh: **<NoBCCh>**)

Name	Type	Default	Description
<NoARFCN>	integer	-	number of scanned frequencies
<NoBCCH>	integer	-	number of found BCCH



Notes and module limits

- i** This command execution takes a long time especially if the full band scan is performed.
- i** The module must be configured in **+COPS: 2** mode.
- i** Only BCCH-carriers are reported, non BCCH-carriers are never reported.
- i** If present, the parameters:
 <s> - starting channel
 <e> - ending channel
 are only allowed in fixed couples indicating a band.

i 2G Networks

<s>,<e> fixed couples and the corresponding band, if supported by the product:

0,124	GSM900
975,1023	GSM900
512,885	DCS1800
128,251	GSM850
512,810	PCS1900
0,1023	all supported GSM bands

<ber> is always 0.0.

<numArfcn> is always 0.

<arfenn> is always empty.

<numCha> is always 0.

<ban> is always empty.

GPRS parameters like <pbccch> are present in output only if GPRS is supported in the cell but their value is not available and will be always 0.

Parameters like <mstxpwr> are present in output only for **AT#CSURVEXT=3** setting but their value is not available and will be always 0.

i 3G Networks

<s>,<e> fixed couples and the corresponding band, if supported by the product:

10562,10838	UMTS BAND I
9662,9938	UMTS BAND II
1537,1738	UMTS BAND IV
4357,4458	UMTS BAND V
4387,4413	UMTS BAND VI
2937,3088	UMTS BAND VIII
712,763	UMTS BAND XIX
0,65535	all supported UMTS bands

i 4G Networks

<s>,<e> fixed couples and the corresponding band, if supported by the product:

0, 599	LTE BAND 1
600,1199	LTE BAND 2
1200,1949	LTE BAND 3
1950,2399	LTE BAND 4
2400,2649	LTE BAND 5
2750,3449	LTE BAND 7

3.13.3. AT#CSURVF - Network Survey Format

The command configures the numbers format used in the messages related to the surveying of the network bands channels.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CSURVF=[<format>]

Set command configures the numbers format in each information text line of the network survey message (Easy Scan®).

Parameter:

Name	Type	Default	Description
<format>	integer	0	format of the numbers in each network survey information text line

Values:

- 0 : Decimal
- 1 : Hexadecimal values, no text
- 2 : Hexadecimal values with text



AT#CSURVF?

Read command reports the current format of the numbers in each network survey information text line, as follows:

#CSURVF: <format>



AT#CSURVF=?

Test command reports the supported range of values for the parameter <format>.

3.13.4. AT#CSURVNLF - Network Survey CR LF Removing

This command enables/disables the automatic <CR><LF> removing from each network survey information text line.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CSURVNLF=[<value>]

Parameter:

Name	Type	Default	Description
<value>	integer	0	enables/disables the automatic <CR><LF> removing from each network survey information text line

Values:

- 0 : disables <CR><LF> removing; they will be present in the information text line
- 1 : enables <CR><LF> removing from information text line



AT#CSURVNLF?

Read command reports whether the automatic <CR><LF> removing from each network survey information text line is currently enabled or not, in the format:

<value>



AT#CSURVNLF=?

Test command reports the range of values for parameter <value>.

3.13.5. AT#CSURVEXT - Extended Network Survey

This command enables/disables extended network survey.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CSURVEXT=[<value>]

Parameter:

Name	Type	Default	Description
<value>	integer	0	enable/disable extended network survey

Values:

- 0 : disables extended network survey
- 1 : enables extended network survey; all the network survey execution commands (#CSURV, #CSURVC) display the BAList for every valid scanned BCCh carrier
- 2 : enables extended network survey; all the network survey execution commands (#CSURV, #CSURVC) display the BAList for every valid scanned BCCh carrier and, if GPRS is supported in the cell, they report some GPRS information carried by the System Information 13 of the BCCh
- 3 : enables more extended network survey; all the network survey execution commands (#CSURV, #CSURVC). It displays transmit power level, receiving level access min, Cell Reselection Offset, Penalty Time, T3212 Periodic Location Update Timer and Cell Reselection Offset



AT#CSURVEXT?

Read command reports whether extended network survey is currently enabled or not, in the format:

#CSURVEXT: <value>



AT#CSURVEXT=?

Test command reports the range of values for parameter <value>.



#CSURVEXT configuration has effect on 2G cells only.

3.14. Jamming Detection and Report

3.14.1. AT#JDRENH2 - Enhanced Jamming Detection and Report

This command enables/disables jamming detection, and reports the relative result to the user.



[1] Hardware User's Guide of the used module

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#JDRENH2=<mode>[,<sat2G>,<sat3G>,<carrN>,<pRxLevT2G>,<pEcN0T3G>,<pRscpT3G>[,<spare>[,<spare>[,<spare>[,<spare>]]]]]

Set command performs the following activities:

- enables the detection of the jamming eventually present in the module coverage.
- selects one of the following two reports mode or both: on dedicated GPIO, by means of the URC, or GPIO + URC.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	enable/disable jamming detection and select reporting mode
Values:			
0	:	disable jamming detection	
1	:	enable jamming detection, and report its condition on a GPIO pin, see Additional info section	
2	:	enable jamming detection, and report its condition with an URC, see Additional info section	
3	:	enable jamming detection, and report its condition as <mode>=1 and <mode>=2	
4	:	enable jamming detection, and report its condition with an URC every 3 sec, see <mode>=2	
5	:	enable jamming detection, and report its condition as <mode>=1 and <mode>=4	
6	:	not used	
<sat2G>	integer	45	is the starting absolute threshold of RSSI 2G Network. After a frequency scan in 2G bands, if the measured power of a carrier is greater than <sat2G> threshold, that carrier is counted as possible jammed carrier.
Value:			
0÷63	:	threshold values	
<sat3G>	integer	35	is the starting absolute threshold of RSSI 3G Network. After a frequency scan in 3G bands, if the measured power of a carrier is greater than <sat3G> threshold, that carrier is counted as possible jammed carrier.

	Value:		
	0÷63	:	threshold values
<carrN>	integer	100	is the minimum number of possible jammed carriers to consider that the module is under jamming condition
	Value:		
	0÷200	:	number of carriers
<pRxLevT2G>	integer	15	set the threshold of RxLev in 2G Network. The RxLev_Thr threshold is calculated as shown below: $RxLev_Thr = RxLev_Av * (1 + (<pRxLevT2G>/100))$ where: RxLev_Av is the average of the last 10 RxLev measures.
	Value:		
	0÷100	:	values used to compute RxLev_Thr threshold
<pEcN0T3G>	integer	70	Set the threshold of EcN0 in 3G Network. The EcN0_Thr threshold is calculated as shown below: $EcN0_Thr = EcN0_Av * (1 - (<pEcN0T3G>/100))$ where: EcN0_Av is the average of the last 10 EcN0 measures.
	Value:		
	0÷100	:	values used to compute EcN0_Thr threshold
<pRscpT3G>	integer	20	Set the threshold of RSCP in 3G Network. The RSCP_Thr threshold is calculated as shown below: $RSCP_Thr = RSCP_Av * (1 - (<pRscpT3G>/100))$ where: RSCP_Av is the average of the last 10 RSCP measures.
	Value:		
	0÷100	:	values used to compute RSCP_Thr threshold

Additional info:

▶▶ **<mode>=1**

The jamming condition is reported on pin GPIO_02 (JDR):

- GPIO_02 (JDR) = Low, Normal Operating Condition
- GPIO_02 (JDR) = High, Jammed Condition

To have information on GPIO_02 pin, refer to document [1]. GPIO_02 pin can be used also by other functionality, see **#GPIO** command.

▶▶ **<mode>=2**

the jamming condition is reported with a single URC on serial line, in the format:

#JDR: <status>

Unsolicited field:

Name	Type	Description
<status>	string	jamming condition status, <mode>=2

Values:

JAMMED : jamming condition detected

OPERATIVE : Normal Operating condition restored. Status shown only after a jamming condition has occurred



AT#JDRENH2?

Read command reports the current parameters values, in the format:

#JDRENH2:<mode>,<sat2G>,<sat3G>,<carrN>,<pRxLevT2G>,<pEcN0T3G>,<pRscpT3G>,0,0,0,0



AT#JDRENH2=?

Test command reports the supported range of the parameters values.

3.14.2. AT#JDR4GCFG - LTE Jamming Detection Threshold Configuration

The command configures the LTE Jamming Detection thresholds.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#JDR4GCFG=<P_RSRP_T4G>,<P_RSRQ_T4G>,<P_RSSNR_T4G>[,<UNUSED_1>[,<UNUSED_2>[,<UNUSED_3>[,<UNUSED_4>[,<UNUSED_5>[,<UNUSED_6>]]]]]]]

Set command allows to configure the LTE Jamming Detection thresholds. After configuration, use the #JDRENH2 command to enable/disable LTE jamming detection and select reporting mode.

Parameters:

Name	Type	Default	Description
<P_RSRP_T4G>	integer	30	set the threshold of RSRP. The threshold (RSRP_Thr) is calculated as: $\text{RSRP_Thr} = \text{RSRP_Av} * (1 + (\text{<P_RSRP_T4G>} / 100))$ where RSRP_Av is the average of the last 8 RSRP measures Value: 0÷100 : threshold of RSRP
<P_RSRQ_T4G>	integer	90	set the threshold of RSRQ. The threshold (RSRQ_Thr) is calculated as: $\text{RSRQ_Thr} = \text{RSRQ_Av} * (1 - (\text{<P_RSRQ_T4G>} / 100))$ where RSRQ_Av is the average of the last 8 RSRQ measures Value: 0÷100 : threshold of RSRQ
<P_RSSNR_T4G>	integer	0	set the threshold of RSSNR. The threshold (RSSNR_Thr) is calculated as $\text{RSSNR_Thr} = \text{RSSNR_Av} * (1 + (\text{<P_RSSNR_T4G>} / 100))$ where RSSNR_Av is the average of the last 8 RSSNR measures Value: 0÷100 : threshold of RSSNR
<UNUSED_1>	mixed	-	reserved for future use
<UNUSED_2>	mixed	-	reserved for future use
<UNUSED_3>	mixed	-	reserved for future use
<UNUSED_4>	mixed	-	reserved for future use
<UNUSED_5>	mixed	-	reserved for future use
<UNUSED_6>	mixed	-	reserved for future use

i If <P_RSSNR_T4G> is 0 then ignore RSSNR in 4G/LTE jamming detection.

**AT#JDR4GCFG?**

Read command returns the current settings in the format:

#JDR4GCFG: <P_RSRP_T4G>,<P_RSRQ_T4G>,<P_RSSNR_T4G>,0,0,0,0,0

**AT#JDR4GCFG=?**

Test command returns the range of supported values for all the parameters.

3.15. Packet Domain

3.15.1. AT+CGCLASS - GPRS Mobile Station Class

This command sets the GPRS class.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CGCLASS=[<class>]

Set command sets the GPRS class according to <class> parameter.

Parameter:

Name	Type	Default	Description
<class>	string	N/A	GPRS class

Values:

- A : UMTS (factory default)
- B : GSM/GPRS
- CG : class C in GPRS only mode (GPRS only)
- CC : class C in circuit switched only mode (GSM only)



AT+CGCLASS?

Read command returns the current value of the GPRS class in the format:

+CGCLASS: <class>



AT+CGCLASS=?

Test command reports the range for the parameter <class>.

3.15.2. AT+CGQREQ - Quality of Service Profile (Requested)

Set command allows to specify a Quality of Service Profile (requested) that is used when the terminal sends an Activate PDP Context Request message to the network. It specifies a profile for the context identified by the (local) context identification parameter, <cid>.



3GPP TS 27.007
3GPP TS 03.060
3GPP TS 23.060

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CGQREQ

- If a value is omitted for a particular class then this class, is not checked
- AT+CGQREQ=<cid>** is a special set command syntax that delates the PDP context identified by <cid> index.



AT+CGQREQ?

Read command returns the current settings for each defined context in the format:

**+CGQREQ:<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>[<CR><LF>
+CGQREQ:<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>[...]]**

- If no PDP context has been defined, it has no effect and **OK** result code is returned.



AT+CGQREQ=?

Test command returns as a compound value the type of the current PDP context and the supported values for the sub parameters in the format:

**+CGQREQ: <PDP_Type>,
(list of supported <precedence>s),(list of supported <delay>s),
(list of supported <reliability>s),(list of supported <peak>s),
(list of supported <mean>s)**

Additional info:

- ▶▶ PDP type meaning.

Name	Type	Default	Description
<PDP_Type>	string	-	specifies the type of packet data protocol (see +CGDCONT command) Only the "IP" <PDP_Type> is currently supported.



```
AT+CGQREQ?  
+CGQREQ: 1,0,0,0,0,0  
OK
```

```
AT+CGQREQ=?  
+CGQREQ: "IP",(0-3),(0-4),(0-5),(0-9),(0-18,31)  
OK
```

3.15.3. AT+CGDCONT - Define PDP Context

Set command specifies PDP context parameter values for a PDP context identified by the (local) context identification parameter, <cid>.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CGDCONT=[<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>[,<IPv4AddrAlloc>[,<emergencyInd>[,<P_CSCF_discovery>[,<IM_CN_Sign_Flag>]]]]]]]]]]]

Parameters:

Name	Type	Default	Description
<cid>	integer	N/A	PDP Context Identifier specifies a PDP context definition.
		Value:	
	1÷max	:	max value is returned by the test command.
<PDP_type>	string	N/A	Packet Data Protocol type specifies the type of packet data protocol
		Values:	
	"IP"	:	Internet Protocol
	"IPV6"	:	Internet Protocol version 6
	"IPV4V6"	:	Virtual introduced to handle dual IP stack UE capability.
<APN>	string	-	Access Point Name is a logical name that is used to select the GGSN or the external packet data network. If the value is empty ("") or omitted, then the subscription value will be requested
<PDP_addr>	string	-	identifies the terminal in the address space applicable to the PDP. The allocated address may be read using the +CGPADDR command.
<d_comp>	integer	0	Numeric parameter that controls PDP data compression.
		Value:	
	0	:	PDP data compression off
<h_comp>	integer	0	controls PDP header compression.
		Values:	
	0	:	PDP header compression off (default if value is omitted)
	1	:	PDP header compression on
	2	:	RFC1144 (applicable for SNDCCP only)
	3	:	RFC2507

	4	:	RFC3095 (applicable for PDCP only)
<IPv4AddrAlloc>	integer	0	controls how the MT/TA requests to get the IPv4 address information
	Values:		
	0	:	IPv4 Address Allocation through NAS Signaling
	1	:	IPv4 Address Allocated through DHCP
<emergencyInd>	integer	0	used to indicate whether the PDP context is for emergency bearer services or not
	Values:		
	0	:	PDP context is not for emergency bearer services (default)
	1	:	PDP context is for emergency bearer services
<P_CSCF_discovery>	integer	0	parameter that influences how the MT/TA requests to get the P-CSCF address, see 3GPP TS 24.229 [89] annex B and annex L
	Values:		
	0	:	preference of P-CSCF address discovery not influenced by +CGDCONT
	1	:	preference of P-CSCF address discovery through NAS Signalling
<IM_CN_Sign_Flag>	integer	0	parameter used to indicate to the network whether the PDP context is for IM CN subsystem-related signalling only or not.
	Values:		
	0	:	UE indicates that the PDP context is not for IM CN subsystem-related signaling only
	1	:	UE indicates that the PDP context is for IM CN subsystem-related signaling only

- i** A special form of the set command, **AT+CGDCONT=<cid>**, causes the values for context number **<cid>** to become undefined.



AT+CGDCONT?

Read command returns the current settings for each defined context in the format:

+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>,<IPv4AddrAlloc>,<emergencyInd>,<P_CSCF_discovery>,<IM_CN_Sign_Flag><CR><LF>

+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>,<IPv4AddrAlloc>,<emergencyInd>,<P_CSCF_discovery>,<IM_CN_Sign_Flag>[...]

- i** Parameters from **<IPv4AddrAlloc>** to **<IM_CN_Sign_Flag>** are shown in the read command only if different from default.

 **AT+CGDCONT=?**

Test command returns values supported as a compound value.



```
AT+CGDCONT?  
+CGDCONT: 1,"IPV4V6","",",",0,0  
OK
```

```
AT+CGDCONT=?  
+CGDCONT: (1-15),"IP" ,,,(0),(0-4),(0,1),(0,1),(0,1),(0,1)  
+CGDCONT: (1-15),"IPV6" ,,,(0),(0-4),(0,1),(0,1),(0,1),(0,1)  
+CGDCONT: (1-15),"IPV4V6" ,,,(0),(0-4),(0,1),(0,1),(0,1),(0,1)  
OK
```

3.15.4. AT+CGQMIN - Quality of Service Profile (Minimum Acceptable)

Set command allows to specify a minimum acceptable profile which is checked by the terminal against the negotiated profile returned in the Activate PDP Context Accept message.



3GPP TS 27.007
3GPP TS 03.060
3GPP TS 23.060



SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CGQMIN=[<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]]]

Parameters:

Name	Type	Default	Description
<cid>	integer	-	PDP context identification (see +CGDCONT command)
<precedence>	integer	0	precedence class Value: 0÷max : use test command to know the values range
<delay>	integer	0	delay class Value: 0÷max : use test command to know the values range
<reliability>	integer	0	reliability class Value: 0÷max : use test command to know the values range
<peak>	integer	0	peak throughput class Value: 0÷max : use test command to know the values range
<mean>	integer	0	mean throughput class Value: 0÷max : use test command to know the values range

-  If a value is omitted for a class, then this class is not checked.
-  A special form of the set command, **AT+CGQMIN=<cid>** causes the requested profile for context number <cid> to become undefined.

**AT+CGQMIN?**

Read command returns the current settings for each defined context in the format:

+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>[<CR><LF>

+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean>[...]]



If no PDP context has been defined, it has no effect and **OK** result code is returned

**AT+CGQMIN=?**

Test command returns as a compound value the type of the current PDP context and the supported values for the sub parameters in the format:

**+CGQMIN: <PDP_Type>,
(list of supported <precedence>s),(list of supported <delay>s),
(list of supported <reliability>s),(list of supported <peak>s),
(list of supported <mean>s)**

Additional info:

▶▶ PDP type meaning.

Name	Type	Default	Description
<PDP_Type>	string	-	specifies the type of packet data protocol, see +CGDCONT command Only the "IP" <PDP_Type> is currently supported.



```
AT+CGQMIN?
+CGQMIN: 1,0,0,0,0,0
OK
```



```
AT+CGQMIN=?
+CGQMIN: "IP",(0-3),(0-4),(0-5),(0-9),(0-18,31)
OK
```

		8700÷16000	:	custom bitrate
<guarBitRateUL>	integer	0		configure guaranteed bit rate in Up Link (Kbits/s). This parameter should be provided if the <traffClass> is specified as conversational or streaming.
	Values:			
		0	:	subscribed value
		1÷568	:	custom bitrate
		576÷8640	:	custom bitrate
<guarBitRateDL>	integer	0		configure the guaranteed bit rate Down Link (Kbits/s). This parameter should be provided if the <traffClass> is specified as conversational or streaming.
	Values:			
		0	:	subscribed value
		1÷568	:	custom bitrate
		576÷8640	:	custom bitrate
		8700÷16000	:	custom bitrate
<deliverOrder>	integer	2		SDU delivery order
	Values:			
		0	:	disable
		1	:	enable
		2	:	subscribed value
<maxSDUsize>	integer	0		maximum SDU size in octets
	Values:			
		0	:	subscribed value
		10÷1500	:	custom size
		1502	:	custom size
		1510	:	custom size
		1520	:	custom size
<SDUerrRatio>	string	0E0		SDU error ratio mEe = m*10-e , for example 1E2 means 1*10-2
	Values:			
		0E0	:	means 0*10-0
		1E1	:	means 1*10-1
		1E2	:	means 1*10-2
		7E3	:	means 7*10-3
		1E3	:	means 1*10-3
		1E4	:	means 1*10-4
		1E5	:	means 1*10-5
		1E6	:	means 1*10-6

<resBitErrRatio>	string	0E0	residual bit error ratio mEe = m*10-e , for example 1E2 mean 1*10-2
	Values:		
	0E0	:	means 0*10-0
	5E2	:	means 5*10-2
	1E2	:	means 1*10-2
	5E3	:	means 5*10-3
	4E3	:	means 4*10-3
	1E3	:	means 1*10-3
	1E4	:	means 1*10-4
	1E5	:	means 1*10-5
	1E6	:	means 1*10-6
	6E8	:	means 6*10-8
<delErrSDUs>	integer	3	delivery of erroneous SDUs
	Values:		
	0	:	disable
	1	:	enable
	2	:	no detect
	3	:	subscribed value
<tranDelay>	integer	0	transfer delay (ms)
	Values:		
	0	:	subscribed value
	10÷150	:	custom delay
	200÷950	:	custom delay
	100÷4000	:	custom delay
<traffHandPrio>	integer	0	traffic handling priority
	Values:		
	0	:	subscribed value
	1÷3	:	custom priority
<sourStatiDesc>	integer	0	characteristics of the source of the submitted SDUs for a PDP context. This parameter should be provided if the <traffClass> is specified as conversational or streaming
	Values:		
	0	:	characteristics of SDUs is unknown
	1	:	characteristics of SDUs corresponds to a speech source
<signInd>	integer	0	signalling content of submitted SDUs for a PDP context. This parameter should be provided if the <traffClass> is specified as interactive.

Values:

- 0 : PDP context is not optimized for signalling
- 1 : PDP context is optimized for signalling <PDP_type> (see +CGDCONT command)

-  A special form of the Set command, **+CGEQREQ=<cid>** causes the requested profile for context number <cid> to become undefined.
-  The set command can modify the 2G QoS according to standard [2], see **+CGQREQ** command.



AT+CGEQREQ?

Read command returns the current settings for each defined context in the format:

```
[+CGEQREQ:<cid>,<traffClass>,<maxBitRateUL>,<maxBitRateDL>,<guarBitRateUL>,<guarBitRateDL>,<deliverOrder>,<maxSDUsize>,<SDUerrRatio>,<resBitErrRatio>,<delErrSDUs>,<tranDelay>,<traffHandPrio>,<sourStatiDescr>,<signInd> <CR><LF [+CGEQREQ:...]
```

If no PDP context has been defined it has no effect, and **OK** result code is returned.

Parameters are described as for the set command.



AT+CGEQREQ=?

Test command returns as a compound value the type of the current PDP context and the supported values for the subparameters in the format:

```
+CGEQREQ:<PDP_Type>,<traffClass>,<maxBitRateUL>,<maxBitRateDL>,<guarBitRateUL>,<guarBitRateDL>,<deliverOrder>,<maxSDUsize>,<SDUerrRatio>,<resBitErrRatio>,<delErrSDUs>,<tranDelay>,<traffHandPrio>,<sourStatiDescr>,<signInd>
```

<PDP_Type> parameter specifies the Packet Data Protocol type, see **+CGDCONT** command.

-  Only the "IP" Packet Data Protocol type is supported.

3.15.6. AT+CGEQNEG - 3G Quality of Service Profile (Negotiated)

This command allows the TE to retrieve the negotiated 3G quality of service returned in the Activate PDP Context Accept/Modify message.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CGEQNEG=[<cid>[,<cid>[,...]]]

Execution command returns the negotiated 3G QoS profile for the specified context identifiers, <cid>s. The QoS profile consists of a number of parameters, each of which may have a separate value. The format of the returned message is:

```
[+CGEQNEG:<cid>,<traffClass>,<maxBitRateUL>,<maxBitRateDL>,<guarBitRateUL>,<guarBitRateDL>,<deliverOrder>,<maxSDUsize>,<SDUerrRatio>,<resBitErrRatio>,<delErrSDUs>,<tranDelay>,<traffHandPrio>,<CR><LF>
[+CGEQNEG:...]
```

See **+CGEQREQ** command to have information on the parameters meaning.

Parameter:

Name	Type	Default	Description
<cid>	integer	N/A	identifies the PDP Context

Value:

1÷max : max value is returned by the test command.



AT+CGEQNEG=?

Test command returns a list of <cid>s associated with active contexts.

3.15.7. AT+CGPADDR - Show PDP Address

This command returns a list of PDP addresses for the specified context identifiers.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CGPADDR=[<cid>[,...]]

Execution command returns a list of PDP addresses for the specified context identifiers.

Parameter:

Name	Type	Default	Description
<cid>	integer	-	specifies a PDP context definition, see +CGDCONT command. If no <cid> specified, the addresses for all defined contexts are returned.

Additional info:

- ▶▶ The command returns a row of information for every <cid> whose context has been defined. No row is returned for a <cid> whose context has not been defined. Here is the response format:

```
+CGPADDR: <cid>,<PDP_addr><CR><LF>
```

```
+CGPADDR: <cid>,<PDP_addr><CR><LF>
```

...

Name	Type	Default	Description
<PDP_addr>	string	-	identifies the terminal in an address space applicable to the PDP. The address may be static or dynamic:

- for a static address, it will be the one set by the **+CGDCONT** command when the context was defined
- for a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>; <PDP_addr> is omitted if none is available



AT+CGPADDR=?

Test command returns a list of defined <cid>.



```
AT#SGACT=3,1
#SGACT: xxx.yyy.zzz.www
OK
```

```
AT+CGPADDR=3
+CGPADDR: 3,"xxx.yyy.zzz.www"
OK
```

```
AT+CGPADDR=?
+CGPADDR: (3)
OK
```

3.15.8. AT+CGCMOD - Modify PDP Context

The execution command is used to modify the specified PDP context(s) with respect to QoS profiles.


SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CGCMOD=[<cid_n>[,...]]

Parameter:

Name	Type	Default	Description
<cid_n>	integer	-	generic PDP context identifier.

-  If no parameters are specified (no <cid_n> specified), the command modifies all active contexts.



AT+CGCMOD=?

Test command returns a list of <cid_n>s associated with active contexts.

3.15.9. AT#AUTOATT - Auto-Attach Property

This command configures the TE PS auto-attach property

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2





AT#AUTOATT=[<auto>]

Parameter:

Name	Type	Default	Description
<auto>	integer	1	auto-attach setting

Values:

- 0 : disables PS auto-attach property
- 1 : enables PS auto-attach property: after the command #AUTOATT=1 has been issued (and at every following startup) the terminal will automatically try to attach to the PS.

-  If the parameter <auto> is omitted, the command will not have any effect.
-  For Verizon products setting **AT#AUTOATT** returns **OK** but has no effect.



AT#AUTOATT?

Read command reports whether the auto-attach property is currently enabled or not, in the format:

#AUTOATT: <auto>



AT#AUTOATT=?

Test command reports available values for parameter <auto>.

3.15.10. AT#MSCLASS - Multislot Class Control

Set command sets the GPRS multislot class.


SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#MSCLASS=[<class>[,<autoattach>]]

Parameters:

Name	Type	Default	Description
<class>	integer	33	GPRS (EGPRS) multislot class.
Values:			
	1÷12	:	class
	30÷33	:	class
	35÷38	:	class
<autoattach>	integer	0	specify when the new multislot class will be enabled.
Values:			
	0	:	the new multislot class is enabled only at the next detach/attach or after a reboot.
	1	:	the new multislot class is enabled immediately, automatically forcing a detach / attach procedure.

-  DTM multislot class is automatically chosen with maximum allowed value for every GPRS (EGPRS) subset.



AT#MSCLASS?

Read command reports the current value of the multislot class in the format:

#MSCLASS: <class>



AT#MSCLASS=?

Test command reports the range of available values for both parameters **<class>** and **<autoattach>**.

3.15.11. AT#GAUTH - PPP Data Connection Authentication Type

This command sets the authentication type used in PDP Context Activation during PPP-GPRS connections.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2




AT#GAUTH=[<type>]

Parameter:

Name	Type	Default	Description
<type>	integer	1	authentication type used in PDP Context Activation during PPP-GPRS connections

Values:

- 0 : no authentication
- 1 : PAP authentication
- 2 : CHAP authentication

-  if the settings on the server side (the host application) of the PPP are not compatible with the #GAUTH setting, then the PDP Context Activation will use no authentication.



AT#GAUTH?

Read command reports the current authentication type, in the format:

#GAUTH: <type>



AT#GAUTH=?

Test command returns the range of supported values for parameter <type>.

3.15.12. AT#GPPPCFG - PPP-GPRS Parameters Configuration

This command permits to set parameters for a PPP-GPRS connection


SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#GPPPCFG=<hostIPAddress>[,<unused_A>[,<unused_B>]]

Parameters:

Name	Type	Default	Description
<hostIPAddress>	string	-	Host IP Address assigned to the PPP server side (host application). It can be any valid IP address in the format: xxx.xxx.xxx.xxx.
<unused_A>	integer	-	unused parameter
<unused_B>	integer	-	unused parameter

-  If **<hostIPAddress>**="000.000.000.000" (factory default) host address is not included in the IPCP Conf Req, host address choice is left to the peer (host application)



AT#GPPPCFG?

Read command reports the current PPP-GPRS connection parameters in the format:

#GPPPCFG: <hostIPAddress>,<unused_A>,<unused_B>

The default values of the unused parameters are returned for backward compatibility only.



AT#GPPPCFG=?

Test command returns the default values of the unused parameters for backward compatibility only.

#GPPPCFG: (25),(0)

		1÷568	:	Kbits/s
		576÷8640	:	Kbits/s

<guarBitRateDL>	integer	0		configure the guaranteed bit rate in Down Link (Kbits/s).
------------------------------	---------	---	--	---

Values:

0	:	Kbits/s
1÷568	:	Kbits/s
576÷8640	:	Kbits/s
8700÷16000	:	Kbits/s

<deliverOrder>	integer	0		SDU delivery order.
-----------------------------	---------	---	--	---------------------

Values:

0	:	No - SDU
1	:	Yes - SDU

<maxSDUsize>	integer	0		maximum SDU size in octets.
---------------------------	---------	---	--	-----------------------------

Values:

0	:	size in octets
10÷1500	:	size in octets
1502	:	size in octets
1510	:	size in octets
1520	:	size in octets

<SDUerrRatio>	string	0E0		SDU error ratio. mEe = $m \cdot 10^{-e}$, for example 1E2 mean $1 \cdot 10^{-2}$.
----------------------------	--------	-----	--	--

Values:

0E0	:	means $0 \cdot 10^{-0}$
1E1	:	means $1 \cdot 10^{-1}$
1E2	:	means $1 \cdot 10^{-2}$
7E3	:	means $7 \cdot 10^{-3}$
1E3	:	means $1 \cdot 10^{-3}$
1E4	:	means $1 \cdot 10^{-4}$
1E5	:	means $1 \cdot 10^{-5}$
1E6	:	means $1 \cdot 10^{-6}$


<resBitErrRatio>	string	0E0		residual bit error ratio mEe = $m \cdot 10^{-e}$, for example 1E2 mean $1 \cdot 10^{-2}$
-------------------------------	--------	-----	--	--

Values:

0E0	:	means $0 \cdot 10^{-0}$
5E2	:	means $5 \cdot 10^{-2}$
1E2	:	means $1 \cdot 10^{-2}$
5E3	:	means $5 \cdot 10^{-3}$

4E3 : means 4×10^{-3}
 1E3 : means 1×10^{-3}
 1E4 : means 1×10^{-4}
 1E5 : means 1×10^{-5}
 1E6 : means 1×10^{-6}
 6E8 : means 6×10^{-8}

<delErrSDUs>	integer	0	delivery of erroneous SDUs.
Values:			
0 : no delivery			
1 : yes			
2 : no detect			
<tranDelay>	integer	0	transfer delay (ms)
Values:			
0 : delay (ms)			
10÷150 : delay (ms)			
200÷950 : delay (ms)			
1000-4000 : delay (ms)			
<traffHandPrio>	integer	1	traffic handling priority
Values:			
1 : priority level			
2 : priority level			
3 : priority level			
<sourStatiDesc>	integer	0	characteristics of the source of the submitted SDUs for a PDP context. This parameter should be provided if the <traffClass> is specified as conversational or streaming
Values:			
0 : characteristics of SDUs is unknown			
1 : characteristics of SDUs corresponds to a speech source			
<signInd>	integer	0	signalling content of submitted SDUs for a PDP context. This parameter should be provided if the <traffClass> is specified as interactive
Values:			
0 : PDP context is not optimized for signalling			
1 : PDP context is optimized for signalling			

-  A special form of the Set command, **AT+CGEQMIN=<cid>** causes the requested profile for context number <cid> to become undefined.
 The current settings are stored in NVM.
 Set command can modify the 2G QoS according to standard [1], see **+CGQMIN**.



AT+CGEQMIN?

Read command returns the current settings for each defined context in the format:

```
[+CGEQMIN:<cid>,<traffClass>,<maxBitRateUL>,<maxBitRateDL>,<guarBitRateUL>,<guarBitRateDL>,<deliverOrder>,<maxSDUsize>,<SDUerrRatio>,<resBitErrRatio>,<delErrSDUs>,<tranDelay>,<traffHandPrio>,<sourStatiDescr>,<signInd> <CR><LF>
[+CGEQMIN:...]]
```

If no PDP context has been defined, it has no effect and **OK** result code is returned.
 Parameters are described as for the set command.



AT+CGEQMIN=?

Test command returns as a compound value the type of the current PDP context and the supported values for the subparameters in the format:

```
+CGQMIN:<PDP_Type>,<traffClass>,<maxBitRateUL>,<maxBitRateDL>,<guarBitRateUL>,<guarBitRateDL>,<deliverOrder>,<maxSDUsize>,<SDUerrRatio>,<resBitErrRatio>,<delErrSDUs>,<tranDelay>,<traffHandPrio>,<sourStatiDescr>,<signInd>
```

<PDP_Type> parameter specifies the Packet Data Protocol type, see **+CGDCONT** command.

-  Only the "IP" Packet Data Protocol type is supported.

3.15.14. AT+CGCONTRDP - PDP Context Read Dynamic Parameters

The execution command returns the relevant information for a PDP Context established by the network.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CGCONTRDP=[<p_cid>]

The execution command returns the relevant information on a PDP Context established by the network with the context identifier <p_cid>. If the parameter <p_cid> is omitted, the information for all established PDP contexts is returned. The response message has the following format:

```
+CGCONTRDP:<p_cid>,<bearerId>,<apn>[,<ip&subnet>[,<gw_addr>[,<DNS_prim>
[,<DNS_sec>[, <P_CSCF_prim>[,<P_CSCF_sec>]]]]]]][<CR><LF>
+CGCONTRDP:<p_cid>,<bearerId>,<apn>[, <ip&subnet_mask>[,<gw_addr>[,<DNS_prim>
[,<DNS_sec>[, <P_CSCF_prim>[,<P_CSCF_sec>]]]]]] [...]]
```

If the context cannot be found an **ERROR** response is returned.

The response message parameters are described in the Additional info section.

Parameter:

Name	Type	Default	Description
<p_cid>	integer	-	identifies a non secondary PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands.

Additional info:

- ▶▶ List of the meaning of the response message parameters.

Name	Type	Default	Description
<berrerrId>	integer	-	identifies the bearer, EPS Bearer in EPS and NSAPI in UMTS/GPRS.
<apn>	string	-	logical name used to select the GGSN or the external packet data network.
<ip&subnet>	string	-	IP address and subnet mask of the MT. The string is given as dot-separated numeric (0-255) parameters on the form. For more information, see next Additional info section.
<gw_addr>	string	-	Gateway address of the MT. The string is given as dot-separated numeric (0-255) parameters.
<DNS_prim>	string	-	IP address of the primary DNS Server.
<DNS_sec>	string	-	IP address of the secondary DNS Server.
<P_CSCF_prim>	string	-	IP address of the primary P-CSCF Server.
<P_CSCF_sec>	string	-	IP address of the secondary P-CSCF Server.

-
- Referring to **<ip&subnet>** parameter:
the string is given as dot-separated numeric (0-255) parameters. The format is:



for IPv4:

"a1.a2.a3.a4.m1.m2.m3.m4"

for IPv6:

"a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.
m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12. m13.m14.m15.m16"

When **+CGPIAF** is supported, its settings can influence the format of this parameter returned with the execute form of **+CGCONTRDP**.

-  The dynamic part of the PDP context will only exist if established by the network. The test command returns a list of **<p_cid>**s associated with active contexts.
-  If the MT has dual stack capabilities, two lines of information are returned per **<p_cid>**. First one line with the IPv4 parameters followed by one line with the IPv6 parameters.



AT+CGCONTRDP=?

Return the list of **<p_cid>**s associated with active contexts.

3.15.15. AT+CGEQOS - Define EPS Quality of Service

The command specifies the EPS Quality of Service parameters.



[1] 3GPP TS 23.203

[2] 3GPP TS 24.301

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT+CGEQOS=[<cid>[,<QCI> [,<DL_GBR>,<UL_GBR> [,<DL_MBR>,<UL_MBR>]]]]

Set command specifies the EPS Quality of Service parameters.

A special form of the set command, **+CGEQOS= <cid>** causes the values for context number **<cid>** to become undefined.

Parameters:

Name	Type	Default	Description
<cid>	integer	-	it specifies a particular EPS Traffic Flows definition in EPS
<QCI>	integer	9	it specifies a class of EPS QoS, see standard [1].
Values:			
0	:	QCI is selected by network	
1÷4	:	value range for guaranteed bit rate Traffic Flows	
5÷9	:	value range for non-guaranteed bit rate Traffic Flows	
<DL_GBR>	integer	-	it indicates DL GBR in case of GBR QCI. The value is in Kbit/s. This parameter is omitted for a non-GBR QCI, see standard [2].
<UL_GBR>	integer	-	indicates UL GBR in case of GBR QCI. The value is in Kbit/s. This parameter is omitted for a non-GBR QCI, see standard [2].
<DL_MBR>	integer	-	it indicates DL MBR in case of GBR QCI. The value is in Kbit/s. This parameter is omitted for a non-GBR QCI, see standard [2].
<UL_MBR>	integer	-	it indicates UL MBR in case of GBR QCI. The value is in Kbit/s. This parameter is omitted for a non-GBR QCI, see standard [2].

Additional info:

►► Possible Response(s):
+CME ERROR: <err>



AT+CGEQOS?

Read command returns the current settings for each defined QoS.

```
+CGEQOS: <cid>,  
<QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>][<CR>>LF>+CGEQOS: <cid>,  
<QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>][...]]
```

**AT+CGEQOS=?**

Test command returns the ranges of the supported parameters:

+CGEQOS: (list of supported <cid>s),(list of supported <QCI>s), (list of supported <DL_GBR>s),
(list of supported <UL_GBR>s), (list of supported <DL_MBR>s),(list of supported <UL_MBR>s)

3.15.16. AT+CGEQOSRDP - EPS Quality of Service Read Dynamic Parameters

The command returns the parameters related to the Quality of Service.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT+CGEQOSRDP=[<cid>[,...]]




The execution command returns the Quality of Service parameters of the established PDN connection associated to the provided context identifier **<cid>**. The format of the returned message is:

```
+CGEQOSRDP:<cid>,<QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>] [<CR>>LF>
+CGEQOSRDP:<cid>,<QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>] [...]]
```

See **+CGEQOS** command to have information on the meaning of the returned parameters.

Parameter:

Name	Type	Default	Description
<cid>	integer	-	It specifies a particular Traffic Flows definition in EPS and a PDN connection definition in UMTS/GPRS.

-  If the context cannot be found an **ERROR** response is returned.
-  If the parameter **<cid>** is omitted, the Quality of Service parameters for all established PDN connections are returned.
-  **<DL_GBR>**, **<UL_GBR>**, **<DL_MBR>**, **<UL_MBR>** parameters are omitted for a non-GBR QCI.



AT+CGEQOSRDP=?

The test command returns a list of **<cid>**s associated with active contexts.

Parameters of both network and MT/TA initiated PDN connections will be returned.

3.15.17. AT+CGPIAF - Printing IP Address Format

This command selects the printout format of the IPv6 address.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CGPIAF=[<IPv6_AddressFormat>,<IPv6_SubnetNotation>,<IPv6_LeadingZeros>,<Pv6_CompressZeros>]]]]

Parameters:

Name	Type	Default	Description
<IPv6_AddressFormat>	integer	0	selects the IPv6 address format. Relevant for all AT command parameters that can hold an IPv6 address.
Values:			
0	:		use IPv4-like dot-notation. IP addresses, and subnetwork mask if applicable, are dot-separated.
1	:		use IPv6-like colon-notation. IP address, and subnetwork mask if applicable and when given explicitly, are separated by a space.
<IPv6_SubnetNotation>	integer	0	selects the subnet-notation for remote address and subnet mask. Setting does not apply if IPv6 address format <IPv6_AddressFormat>=0 .
Values:			
0	:		both IP address, and subnet mask are started explicitly, separated by a space.
1	:		the printout format is applying /(forward slash) subnet-prefix Classless Inter-Domain Routing (CIDR) notation.
<IPv6_LeadingZeros>	integer	0	selects whether leading zeros are omitted or not. Setting does not apply if IPv6 address format <IPv6_AddressFormat>=0 .
Values:			
0	:		leading zeros are omitted.
1	:		leading zeros are included.
<Pv6_CompressZeros>	integer	0	selects whether 1-n instances of 16-bit- zero values are replaced by only "::". This applies only once. Setting does not apply if IPv6 address format <IPv6_AddressFormat>=0 .
Values:			
0	:		no zero compression.
1	:		use zero compression.

**AT+CGPIAF?**

Read command returns the current parameter setting.

**AT+CGPIAF=?**

Test command returns values supported as compound values.



```
AT+CGPIAF=0,0,0,0  
OK
```

```
AT#SGACT=1,1  
#SGACT: 252.1.171.171.205.205.239.224.0.0.0.0.0.1  
OK
```

```
AT+CGPIAF=1,0,0,0  
OK
```

```
AT#SGACT=1,1  
#SGACT: FC01:ABAB:CD:CD:EFE0:0:0:0:1  
OK
```

3.15.18. AT+CEVDP - Voice Domain Preference

This set command selects the voice domain preference.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT+CEVDP=<domain>

Parameter:

Name	Type	Default	Description
<domain>	string	N/A	voice domain preference. The default value depends on product and the support of VoLTE.

Values:

- 1 : CS voice only
- 2 : CS voice preferred, IMS PS voice as secondary
- 3 : IMS PS voice preferred, CS as secondary
- 4 : IMS PS voice only



AT+CEVDP?

Read command returns the selected domain in the format:

+CEVDP: <domain>



AT+CEVDP=?

Test command returns the supported range of values of the parameter <domain>.

3.15.19. AT+CGACT - PDP Context Activate or Deactivate

This command activates or deactivates the specified PDP context(s).



3GPP TS 27.007



SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CGACT=[<state>[,<cid>[,<cid>][,....]]]

Parameters:

Name	Type	Default	Description
<state>	integer	N/A	activate/deactivate the PDP context
Values:			
0	:	deactivate	
1	:	activate	
<cid>	integer	-	specifies a PDP context definition (see +CGDCONT command)

-  Only three <cid>s can be activated at the same time.
-  if no <cid>s are specified, the activation form of the command activates the first three defined contexts. The deactivation form deactivates all the active contexts.



AT+CGACT?

Read command returns the current activation state for all the defined PDP contexts in the format:

```
+CGACT: <cid>,<state>[<CR><LF>
+CGACT: <cid>,<state>[...]]
```



AT+CGACT=?

Test command reports information on the supported PDP context activation states <state>.



```
AT+CGACT=1,1
OK
```

```
AT+CGACT?
+CGACT: 1,1
OK
```

3.15.20. AT+CGEREP - Packet Domain Event Reporting

This command enables or disables the presentation of unsolicited result codes.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Specific profile	No	-	2



AT+CGEREP=[<mode>[,<bfr>]]

Set command enables/disables sending of unsolicited result codes in case of certain events occurring in the module or in the network. The URC formats and related events are shown in the Additional info sections.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	controls the processing of URCs specified with this command.

Values:

- 0 : buffer unsolicited result codes in the TA. If TA result code buffer is full, the oldest one can be discarded. No codes are forwarded to the TE.
- 1 : discard unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode); otherwise forward them directly to the TE.
- 2 : buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE when TA-TE link becomes available; otherwise forward them directly to the TE.

<bfr>	integer	0	controls the effect on buffered codes when <mode> 1 or 2 is entered.
-------	---------	---	--

Values:

- 0 : TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered.
- 1 : TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1 or 2 is entered (OK response shall be given before flushing the codes)

Additional info:

- ▶▶ A network request for PDP context activation occurred when the TA was unable to report it to the TE with a **+CRING** unsolicited result code and was automatically rejected.

+CGEV: REJECT <PDP_type>, <PDP_addr>

- ▶▶ The network has requested a context reactivation. The <cid> that was used to reactivate the context is provided if known to TA.

+CGEV: NW REACT <PDP_type>, <PDP_addr>, [<cid>]

- ▶▶ The network has forced a context deactivation. The **<cid>** that was used to activate the context is provided if known to TA.

+CGEV: NW_DEACT <PDP_type>, <PDP_addr>, [<cid>]

- ▶▶ The mobile equipment has forced a context deactivation. The **<cid>** that was used to activate the context is provided if known to TA.

+CGEV: ME_DEACT <PDP_type>, <PDP_addr>, [<cid>]

- ▶▶ The mobile equipment has forced a PS detach. This implies that all active contexts have been deactivated. These are not reported separately.

+CGEV: ME_DETACH

- ▶▶ The network has forced a PS detach. This implies that all active contexts have been deactivated. These are not reported separately.

+CGEV: NW_DETACH

- ▶▶ The mobile equipment has forced a change of MS class. The highest available class is reported (see **+CGCLASS**).

+CGEV: ME_CLASS <class>

Unsolicited fields:

Name	Type	Description
<PDP_type>	string	Packet Data Protocol type, which specifies the type of packet data protocol
<PDP_addr>	string	identifies the terminal in the address space applicable to the PDP
<cid>	integer	PDP Context Identifier



AT+CGEREP?

Read command returns the current **<mode>** and **<bfr>** settings, in the format:

+CGEREP: <mode>,<bfr>



AT+CGEREP=?

Test command reports the supported range of values for the **+CGEREP** command parameters.

3.15.21. AT+CGREG - GPRS Network Registration Status

The command enables/disables the network registration unsolicited result code (URC) and selects its presentation format.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT+CGREG=[<mode>]

Set command enables/disables the network registration unsolicited result code and selects one of the two available formats:

short format: **+CGREG:<stat>**

long format: **+CGREG:<stat>[,<lac>,<ci>[,<AcT>,<rac>]]**

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enables/disables the network registration unsolicited result code (URC), and selects one of the two formats.

- The URC short format is displayed every time there is a change in the network registration status.
- The URC long format is displayed every time there is a change of the network cell.

Values:

- 0 : disable the network registration unsolicited result code
- 1 : enable the network registration unsolicited result code, and selects the short format
- 2 : enable the network registration unsolicited result code, and selects the long format (includes the network cell identification data)


Unsolicited fields:

Name	Type	Description
<stat>	integer	network registration status of the module

Values:

- 0 : not registered, terminal is not currently searching a new operator to register to
- 1 : registered, home network
- 2 : not registered, but terminal is currently searching a new operator to register to
- 3 : registration denied
- 4 : unknown
- 5 : registered, roaming

<lac>	string	Location Area Code when <AcT>=0...6 Tracking Area Code when <AcT>=7
<ci>	string	cell ID in hexadecimal format
<AcT>	integer	access technology of the registered network. Values: 0 : GSM 2 : UTRAN 3 : GSM w/EGPRS 4 : UTRAN w/HSDPA 5 : UTRAN w/HSUPA 6 : UTRAN w/HSDPA and HSUPA 7 : E-UTRAN
<rac>	hex	routing area code (one byte) in hexadecimal format.

-  **<lac>**, **<ci>**, **<AcT>**, and **<rac>** network information is reported by URC only if **<mode>=2**, and the module is registered on some network cell.



AT+CGREG?

Read command returns the current value of **<mode>**, the registration status **<stat>**, and the network information (**<lac>**, **<ci>**, **<AcT>**, and **<rac>**) according to the used **<mode>** parameter value.

+CGREG: <mode>,<stat>[,<lac>,<ci>[,<AcT>,<rac>]]

<lac>, **<ci>**, **<AcT>**, and **<rac>** network information is reported only if **<mode>=2** and the module is registered on some network cell.



AT+CGREG=?

Test command returns supported values for parameter **<mode>**.

3.15.22. AT+CGATT - PS Attach or Detach

This execution command is used to register (attach) the terminal to or deregister (detach) the terminal from the Packet Domain service.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT+CGATT=<state>

Parameter:

Name	Type	Default	Description
<state>	integer	N/A	state of PS attachment

Values:

- 0 : detached
- 1 : attached



AT+CGATT?

Read command returns the current PS state in the format:

+CGATT: <state>



AT+CGATT=?

Test command returns the values range of the <state> parameter.



```
AT+CGATT?
+CGATT: 0
OK
```

```
AT+CGATT=?
+CGATT: (0,1)
OK
```

```
AT+CGATT=1
OK
```

3.16. IPEasy

3.16.1. AT#SGACT - Context Activation

This command enables/disables the context activation.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SGACT=<cid>,<stat>[,<userId>[,<pwd>]]

Set command is used to activate or deactivate either the GSM context or the specified PDP context. Moreover it binds or unbinds Easy IP application to the specified PDP context (or GSM context).

Parameters:

Name	Type	Default	Description
<cid>	integer	N/A	PDP context identifier
Values:			
0	:		specifies the GSM context (not yet available)
1÷max	:		numeric parameter which specifies a PDP context definition. The max value is returned by the test command
<stat>	integer	0	this parameter activates/disactivates the PDP context specified
Values:			
0	:		deactivate the context
1	:		activate the context
<userId>	string	-	userId, used only if the context requires it
<pwd>	string	-	password, used only if the context requires it



It is strongly recommended to use the same command (e.g. #SGACT) to activate the context, deactivate it and interrogate about its status.

Context activation/deactivation returns **ERROR** if there is not any socket associated to it (see #SCFG).



In LTE network, default PDP context (<cid> = 1) is activated by piggybacking on LTE attach procedure and maintained until detached from NW. This command with <cid> = 1 is just binding or unbinding application to the default PDP context.



AT#SGACT?

Read command returns the state of all the contexts that have been defined in the format:

```
#SGACT: <cid>,<stat><CR><LF>
```

...

```
#SGACT: <cid_max>,<stat_max>
```



Each row in the read command's answer is optional.



AT#SGACT=?

Test command reports the range for the parameters <cid> and <stat>.

3.16.2. AT#SGACTAUTH - PDP Context Authentication Type

This command sets the authentication type for IP Easy

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SGACTAUTH=<type>

Set command sets the authentication type for IP Easy, it has effect on the authentication mode used by #SGACT command.

Parameter:

Name	Type	Default	Description
<type>	integer	1	authentication type for IP Easy

Values:

- 0 : no authentication
- 1 : PAP authentication
- 2 : CHAP authentication



AT#SGACTAUTH?

Read command reports the current IP Easy authentication type, in the format:

#SGACTAUTH: <type>



AT#SGACTAUTH=?

Test command returns the supported values for parameter <type>.

3.16.3. AT#SGACTCFG - PDP Automatic Context Activation-Reactivation

This command configures the automatic activation/reactivation of the specified PDP context

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#SGACTCFG=<cid>,<retry>[,<delay>[,<urcmode>]]

Set command enables/disables the automatic activation/reactivation of the specified PDP context, sets the maximum number of attempts and the delay between an attempt and the next one. The context is automatically activated after every PS attach or after a network PDP context deactivation if at least one IPEasy socket is configured for that context, see #SCFG command.

Parameters:

Name	Type	Default	Description
<cid>	integer	-	PDP context identifier. To know the range see +CGDCONT command.
<retry>	integer	0	specifies the maximum number of context activation attempts in case of activation failure. 0 disables the automatic activation/reactivation of the context. It is the default value if the set command is not used, see Example section.
Value:			
1÷15 : number of attempts.			
<delay>	integer	180	specifies the delay in seconds between an attempt and the next one. 180 is the default value if the set command is not used, see Example section.
Value:			
180÷3600 : delay in seconds			
<urcmode>	integer	0	URC presentation mode.
Values:			
0 : disables URC			
1 : enables URC, see Additional info section.			

Additional info:




▶▶ <urcmode>=1

enables the URC after an automatic activation/reactivation of the local IP address obtained from the network. It has meaning only if <retry>≠0.
The format of the URC message is:

#SGACT: <ip_address>

Unsolicited field:

Name	Type	Description
<ip_address>	string	local IP address obtained from the network.

-  The URC presentation mode <urcmode> is related to the current AT instance only. Last <urcmode> setting is saved for every instance as extended profile parameter, thus it is possible to restore it even if the multiplexer control channel is released and set up, back and forth.
-  <retry > and <delay> setting are global parameters saved in NVM.
-  If the automatic activation is enabled on a context, then it is not allowed to modify by the command #SCFG the association between the context itself and the socket connection identifier; all the other parameters of command #SCFG are modifiable while the socket is not connected.

**AT#SGACTCFG?**

Read command reports the states of all configured PDP contexts, in the format:

#SGACTCFG: <cid₁>,<retry₁>,<delay₁>, < urcmode >CR><LF>

...

#SGACTCFG: <cid_n>,<retry_n>,<delay_n>,< urcmode >

**AT#SGACTCFG=?**

Test command reports the values ranges of the parameters.



- **AT+CGDCONT=1,"IP","Access_Point_Name"**
OK

```
AT+CGDCONT?  
+CGDCONT: 1,"IP","Access_Point_Name","",0,0  
OK
```

```
AT#SCFG=6,1,300,90,600,50  
OK
```

```
AT#SCFG?  
#SCFG: 1,1,300,90,600,50  
#SCFG: 2,1,300,90,600,50  
#SCFG: 3,1,300,90,600,50  
#SCFG: 4,2,300,90,600,50  
#SCFG: 5,2,300,90,600,50  
#SCFG: 6,1,300,90,600,50  
OK
```

```
AT#SGACTCFG?  
#SGACTCFG: 1,0,180,0  
OK
```

```
AT#SGACTCFG=1,15,3600,1  
OK
```

```
AT#SGACTCFG?  
#SGACTCFG: 1,15,3600,1  
OK
```

Reboot the module

```
AT#SGACTCFG?  
#SGACTCFG: 1,15,3600,0  
OK
```


3.16.4. AT#SGACTCFGEXT - Extended PDP Context Configuration

This command manages the extended configuration of context activation.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#SGACTCFGEXT=<cid>,<abortAttemptEnable>[,<unused>,<unused>,<unused>]]]

Set command is used to enable new features related to context activation.

Parameters:

Name	Type	Default	Description
<cid>	integer	-	PDP context identifier. To know the range see +CGDCONT command.
<abortAttemptEnable>	integer	0	enables/disables abort during context activation attempt.
Values:			
0 : old behavior: no abort possible while attempting context activation			
1 : abort during context activation attempt is possible by sending a byte on the serial port			
<unused>	mixed	N/A	unused parameter
Value:			
0 : dummy value			
<unused>	mixed	N/A	unused parameter
Value:			
0 : dummy value			
<unused>	mixed	N/A	unused parameter
Value:			
0 : dummy value			

- i** <abortAttemptEnable>=1 takes effect on successive PDP context activation attempt through **#SGACT** command. While waiting for **AT#SGACT=<cid>,1** response, it is possible to abort attempt by sending a byte and get back AT interface control (**NO CARRIER** indication).
- i** If we receive delayed **CTXT ACTIVATION ACCEPT** after abort, network will be automatically informed of our aborted attempt through relative protocol messages (**SM STATUS**) and will also close on its side. Otherwise, if no **ACCEPT** is received after abort, network will be informed later of our PDP state through other protocol messages (routing area update for instance).
- i** The command is not effective while the context is already open.

**AT#SGACTCFGEXT?**

Read command reports the state of all the five contexts, in the format:

```
#SGACTCFGEXT: <cid1>,< abortAttemptEnable1 >,0,0,0<CR><LF>
```

...

```
#SGACTCFGEXT: <cidn>,< abortAttemptEnablen >,0,0,0<CR><LF>
```

**AT#SGACTCFGEXT=?**

Test command reports supported range of values for all parameters.



- See #SGACTCFG command
AT#SGACTCFG?
#SGACTCFG: 1,15,3600,0
OK

AT#SGACTCFGEXT?
#SGACTCFGEXT: 1,0,0,0,0
OK

AT#SGACTCFGEXT=1,1,0,0,0
OK

AT#SGACTCFGEXT?
#SGACTCFGEXT: 1,1,0,0,0
OK

 Reboot the module

AT#SGACTCFGEXT?
#SGACTCFGEXT: 1,1,0,0,0
OK

3.16.5. AT#CGPADDR - Show PDP Address

This command returns a list of PDP addresses for the specified context identifiers.



3GPP TS 27.007

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#CGPADDR=[<cid>[,...]]

Execution command returns a list of PDP addresses for the specified context identifiers.

Parameter:

Name	Type	Default	Description
<cid>	integer	N/A	identifies a PDP context definition. If no <cid> is specified, the addresses for all defined contexts are returned. The format of the contexts addresses list returned by the command is described in the Addition info section.

Value:

1÷5 : identifies the PDP context, refer to +CGDCONT command

Additional info:

- ▶▶ The command returns a row of information for every <cid> whose context has been defined. No row is returned for a <cid> whose context has not been defined. Here is the response format:

```
#CGPADDR: <cid>,<address><CR><LF>
```

```
#CGPADDR: <cid>,<address><CR><LF>
```

```
...
```

Name	Type	Default	Description
<cid>	integer	-	identifies a context. See Set section.
<address>	string	-	identifies the address.

The address may be static or dynamic. For a static address, it will be the one set by the +CGDCONT command when the context was defined. For a dynamic address it will be the one assigned during the last PDN connection activation that used the context definition referred to by <cid>.

If no address is available, the empty string ("") is represented as <address>.



The command returns only one row of information for every specified <cid>, even if the same <cid> is present more than once.

**AT#CGPADDR=?**

Test command returns a list of defined <cid>.



```
AT#SGACT=0,1
#SGACT: xxx.yyy.zzz.www
OK
```

```
AT#CGPADDR=0
#CGPADDR: 0,"xxx.yyy.zzz.www"
OK
```

```
AT#CGPADDR=?
#CGPADDR: (0)
```

3.16.6. AT#SCFG - Socket Configuration

The command sets the configuration for the socket.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2




AT#SCFG=<connId>,<cid>,<pktSz>,<maxTo>,<connTo>,<txTo>

Set command sets the socket configuration parameters.

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier
Value:			
1÷conMax	:		socket connection identifier. conMax value is returned by test command
<cid>	integer	N/A	context identifier
Values:			
0	:		GSM context
1÷cidMax	:		PDP context. cidMax value is returned by test command
<pktSz>	integer	300	packet size in bytes to be used by the TCP/UDP/IP stack for data sending.
Values:			
0	:		select automatically default value
1÷1500	:		packet size in bytes
<maxTo>	integer	90	exchange timeout in seconds (or socket inactivity timeout); if there's no data exchange within this timeout period the connection is closed.
Values:			
0	:		no timeout
1÷65535	:		timeout
<connTo>	integer	600	connection timeout in tenths of seconds. If we cannot establish a connection to the remote within this timeout period, an error is raised.
Value:			
10÷1200	:		timeout
<txTo>	integer	50	data sending timeout in tenths of seconds. After this period data is sent even if data length is less than max packet size.
Values:			
0	:		no timeout
1÷255	:		timeout in tenths of seconds

256	:	timeout value of 10 ms
257	:	timeout value of 20 ms
258	:	timeout value of 30 ms
259	:	timeout value of 40 ms
260	:	timeout value of 50 ms
261	:	timeout value of 60 ms
262	:	timeout value of 70 ms
263	:	timeout value of 80 ms
264	:	timeout value of 90 ms

-  If DNS resolution is required, max DNS resolution time (20 sec) has to be considered in addition to **<connTo>**.

**AT#SCFG?**

Read command returns the current socket configuration parameters values for all the six sockets, in the format:

```
#SCFG: <connId,>,<cid>,<pktsz>,<maxTo>,<connTo>,<txTo><CR><LF>
```

```
#SCFG: <connId,>,<cid>,<pktsz>,<maxTo>,<connTo>,<txTo><CR><LF>
```

```
...
```

```
#SCFG: <connIdconMax>,<cid>,<pktsz>,<maxTo>,<connTo>,<txTo>
```

**AT#SCFG=?**

Test command returns the range of supported values for all the parameters.

**AT#SCFG?**

```
#SCFG: 1,1,300,90,600,50
```

```
#SCFG: 2,2,300,90,600,50
```

```
#SCFG: 3,2,250,90,600,50
```

```
#SCFG: 4,1,300,90,600,50
```

```
...
```

```
...
```

```
OK
```

3.16.7. AT#SCFGEXT - Socket Configuration Extended

This command sets the socket configuration extended parameters.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#SCFGEXT=<connId>,<srMode>,<recvDataMode>,<keepalive>[,<ListenAutoRsp>[,<sendDataMode>]]

Set command sets the socket configuration extended parameters.

Parameters:

Name	Type	Default	Description
<connId>	integer	1	socket connection identifier
Value:			
1÷conMax	:	socket connection identifier.	conMax value is returned by test command
<srMode>	integer	0	SRING unsolicited mode, see Additional info section.
Values:			
0	:	Normal	
1	:	Data amount	
2	:	Data view	
3	:	Data view with UDP datagram information	
<recvDataMode>	integer	0	Data view mode for received data in command mode (#SRECV or <srMode> = 2)
Values:			
0	:	Text mode	
1	:	Hexadecimal mode	
<keepalive>	integer	0	Set the TCP Keepalive value in minutes
Values:			
0	:	deactivated	
1÷240	:	keepalive time in minutes	
<ListenAutoRsp>	integer	0	set the listen auto-response mode, that affects the commands #SL and #SLUDP
Values:			
0	:	deactivated	
1	:	activated	
<sendDataMode>	integer	0	Data mode for sending data in command mode (#SEND)
Values:			

- 0 : data represented as text
- 1 : Data represented as sequence of hexadecimal numbers (from 00 to FF). Each octet of the data is given as two IRA character long.

Additional info:

►► These are the **SRING** formats, depending on **<srMode>** setting:

if **<srMode>** = 0 (Normal):

SRING: **<connId>**

if **<srMode>** = 1 (Data amount):

SRING: **<connId>,<recData>**



if **<srMode>** = 2 (Data view):

SRING: **<connId>,<recData>,<data>**

if **<srMode>** = 3 (Data view with UDP datagram information):

SRING: **<sourceIP>,<sourcePort>,<connId>,<recData>,<dataLeft>,<data>**

Name	Type	Default	Description
<recData>	integer	-	amount of data received on the socket connection number <connId>
<data>	mixed	-	data received displayed following <recvDataMode> value
<sourceIP>	string	-	IP address of the source of data
<sourcePort>	string	-	IP port of the source of data
<dataLeft>	integer	-	number of bytes left in the UDP datagram

-  Keepalive is available only on TCP connections.
-  For the behavior of **#SL** and **#SLUDP** in case of auto response mode or in case of no auto response mode, see the description of the two commands.



AT#SCFGEXT?

Read command returns the current socket extended configuration parameters values for all the six sockets, in the format:

#SCFGEXT: **<connId>,<srMode>,<dataMode>,<keepalive>,<ListenAutoRsp>,0<CR><LF>**

...

#SCFGEXT:**<connId_{conMax}>,<srMode>,<dataMode>,<keepalive>,<ListenAutoRsp>,0<CR><LF>**



AT#SCFGEXT=?

Test command returns the range of supported values for all the sub parameters.



- Socket 1 set with data view string, text data mode, a keepalive time of 30 minutes and listen auto-response set.
Socket 3 set with data amount string, hex recv data mode, no keepalive and listen auto-response not set.
Socket 4 set with hex recv and send data mode.

```
AT#SCFGEXT?  
#SCFGEXT: 1,2,0,30,1,0  
#SCFGEXT: 2,0,0,0,0,0  
#SCFGEXT: 3,1,1,0,0,0  
#SCFGEXT: 4,0,1,0,0,1  
...  
...  
OK
```

3.16.8. AT#SCFGEXT2 - Socket Configuration Extended 2

Set command sets the socket configuration extended parameters for features not included in #SCFGEXT command.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#SCFGEXT2=<connId>,<bufferStart>[,<abortConnAttempt>[,<unused_B>[,<unused_C>[,<noCarrierMode>]]]]]

Parameters:

Name	Type	Default	Description
------	------	---------	-------------

<connId>	integer	N/A	socket connection identifier
-----------------------	---------	-----	------------------------------

Value:

1÷conMax : socket connection identifier. conMax value is returned by test command

<bufferStart>	integer	0	select one of the two data sending timeout methods, the first one defined "old" the second one "new".
----------------------------	---------	---	---

The "old" data sending timeout method is set - by default - by #SCFG command, which sets also the <txTo> data sending timeout value.

With #SCFGEXT2 command, you can set either the "old" or the "new" data sending timeout method. If the "new" method is selected, the "old" one is automatically disabled.

Values:

0 : select "old" method: start transmission timer only first time if new data are received from the serial port

1 : select "new" method: restart transmission timer when new data is received from serial port

<abortConnAttempt>	integer	0	enable the abort of an ongoing connection attempt started by #SD or #SKTD commands and before the reception of the CONNECT message (in online mode) or OK message (in command mode).
---------------------------------	---------	---	--

The connection attempt timeout (<connTo>) is set by #SCFG command. In addition, if DNS resolution is required, max DNS resolution time (20 sec) must be added to <connTo>.

When the connection attempt is aborted, the control is returned to the AT interface, and the **ERROR** message is displayed.

Values:

0 : disable the connection attempt abort

	1	:	enable the connection attempt abort
<unused_B>	integer	-	reserved for future use
<unused_C>	integer	-	reserved for future use
<noCarrierMode>	integer	0	select the NO CARRIER message format received when the socket is closed.


Values:

- 0 : no additional information is attached to NO CARRIER message
- 1 : NO CARRIER: <connId> message
- 2 : NO CARRIER: <connId>, <cause> message. Refer to Additional info section

Additional info:

- ▶▶ <noCarrierMode>=2 selects the following **NO CARRIER** message format:
NO CARRIER: <connId>, <cause>

Name	Type	Default	Description
<cause>	integer	-	is the socket disconnection cause. Refer to #SLASTCLOSURE command to know its values and meanings.

-  The check if new data have been received from serial port is done with a granularity directly related to <txTo> parameter which is set by **#SCFG** command.



AT#SCFGEXT2?

Read command returns the current socket extended configuration of the sockets. The format is:

```
#SCFGEXT2:<connId>,<bufferStart>,<abortConnAttempt>,0,0,<noCarrierMode><CR><LF>
...
#SCFGEXT2:<connId<sub>conMax</sub>>,<bufferStart>,<abortConnAttempt>,0,0,<noCarrierMode><CR><LF>
OK
```



AT#SCFGEXT2=?

Test command returns the range of supported values for all parameters.



Set the new transmission timer behavior for <connId>=1 and <connId>=2 sockets.

```
AT#SCFGEXT2=1,1  
OK
```

```
AT#SCFGEXT2=2,1  
OK
```

Check the current extended configuration of the sockets

```
AT#SCFGEXT2?  
#SCFGEXT2: 1,1,0,0,0,0  
#SCFGEXT2: 2,1,0,0,0,0  
#SCFGEXT2: 3,0,0,0,0,0  
#SCFGEXT2: 4,0,0,0,0,0  
...  
...  
OK
```

Check the current configuration of the sockets

```
AT#SCFG?  
#SCFG: 1,1,300,90,600,50  
#SCFG: 2,1,300,90,600,50  
#SCFG: 3,1,300,90,600,50  
#SCFG: 4,2,300,90,600,50  
....  
....  
OK
```

Change the <txTo> data sending timeout of the <connId>=1 socket.

```
AT#SCFG=1,1,300,90,600,30  
OK
```

3.16.9. AT#SD - Socket Dial

Execution command opens a remote connection via socket.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SD=<connId>,<txProt>,<rPort>,<IPAddr>[,<closureType>[,<IPort>[,<connMode>]]]

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier.
Value:			
1÷max	:	socket connection identifier value (max is returned by the Test command)	
<txProt>	integer	N/A	transmission protocol.
Values:			
0	:	TCP	
1	:	UDP	
<rPort>	integer	N/A	remote host port to contact
Value:			
1÷65535	:	remote host port number	
<IPAddr>	string	-	IP address of the remote host: <ul style="list-style-type: none"> any valid IP address in the format: "xxx.xxx.xxx.xxx" any host name to be solved with a DNS query
<closureType>	integer	0	socket closure behavior <u>only for TCP</u> when remote host has closed. The parameter has no effects for UDP connections.
Values:			
0	:	local host closes immediately	
255	:	local host closes after an AT#SH or immediately in case of an abortive disconnect from remote	
<IPort>	integer	N/A	UDP connections local port <u>only for UDP</u> connections. The parameter has no effects for TCP connections.
Value:			
1÷65535	:	UDP local port number	
<connMode>	integer	0	connection mode.
Values:			
0	:	online mode connection	
1	:	command mode connection	

- i** If we set **<connMode>** to online mode connection and the command is successful, we enter in online data mode and we see the intermediate result code **CONNECT**. After the **CONNECT** we can suspend the direct interface to the socket connection (NB the socket stays open) using the escape sequence (**+++**): the module moves back to command mode and we receive the final result code **OK** after the suspension. After such a suspension, it is possible to resume it in every moment (unless the socket inactivity timer timeouts, see **#SCFG**) by using the **#SO** command with the corresponding **<connId>**.
- i** If we set **<connMode>** to command mode connection and the command is successful, the socket is opened and we remain in command mode and we see the result code **OK**.
- i** If there are input data arrived through a connected socket and not yet read because the module entered command mode before reading them (after an escape sequence or after **#SD** has been issued with **<connMode>** set to command mode connection), these data are buffered and we receive the **SRING** URC (**SRING** presentation format depends on the last **#SCFGEXT** setting). It is possible to read these data afterwards issuing **#SRECV**. Under the same hypotheses it is possible to send data while in command mode issuing **#SEND**.
- i** Resume of the socket(**#SO**) after suspension or closure(**#SH**) has to be performed on the same instance on which the socket was opened through **#SD**, since the suspension has occurred on the instance itself.
- i** **<closureType>** 255 takes effect on a command mode connection (**<connMode>** set to 1 or online mode connection suspended with **+++**) only if **#SCFGEXT3 <closureEnabling>** parameter has been previously enabled.
- i** If PDP context has not properly opened through **#SGACT** (for instance: wrongly **+CGACT** command has been used), then **+CME ERROR: 556 (context not opened)** is got.



AT#SD=?

Test command reports the range of values for all the parameters.



Examples of socket dial in online and command mode.

Open socket 1 in online mode

```
AT#SD=1,0,80,"www.google.com",0,0,0
```

CONNECT

...

...

Open socket 1 in command mode

```
AT#SD=1,0,80,"www.google.com",0,0,1
```

OK

3.16.10. AT#SO - Socket Restore

Execution command resumes the direct interface to a socket connection which has been suspended by the escape sequence.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#SO=<connId>

Parameter:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier

Value:

1÷conMax : socket connection identifier. conMax value is returned by test command



AT#SO=?

Test command reports the range of values for <connId> parameter

3.16.11. AT#SH - Socket Shutdown

The set command closes a socket.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SH=<connId>

Parameter:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier to be closed

Value:

1÷conMax : socket connection identifier. conMax value is returned by test command



Socket cannot be closed in states "resolving DNS" and "connecting", see #SS command.



AT#SH=?

Test command reports the range for parameter <connId>

3.16.12. AT#SL - Socket Listen

The command opens/closes socket listening.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SL=<connId>,<listenState>,<listenPort>[,<closureType>]

Set command opens/closes a socket listening for an incoming TCP connection on a specified port. The **#SCFGEXT** command affects the behavior of the **#SL** command as described in the Additional info section.

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier
Value:			
1÷conMax	:	socket connection identifier. conMax value is returned by test command	
<listenState>	integer	0	listening action
Values:			
0	:	close socket listening	
1	:	start socket listening	
<listenPort>	integer	N/A	local listening port
Value:			
1÷65535	:	local listening port value	
<closureType>	integer	0	socket closure behavior for TCP when remote host has closed
Values:			
0	:	local host closes immediately	
255	:	local host closes after an #SH or immediately in case of an abortive disconnect from remote	

Additional info:

- ▶▶ When the set command is successfully entered, it returns the result code **OK**.
If the **<ListenAutoRsp>** flag has not been set through the **#SCFGEXT** command (for the specific **<connId>**), then, when a TCP connection request comes on the input port, if the sender is not filtered by internal firewall (see **#FRWL**), the following URC is received:
+SRING : <connId>
Afterwards, **#SA** command can be used to accept the connection or **#SH** command to refuse it.
- ▶▶ When the set command is successfully entered, it returns the result code **OK**.

If the **<ListenAutoRsp>** flag has been set through the **#SCFGEXT** command (for the specific **<connId>**), then, when a TCP connection request comes on the input port, if the sender is not filtered by the internal firewall (see command **#FRWL**), the connection is automatically accepted.
The **CONNECT** indication is given and the module enters ONLINE mode.

- i** If the socket is closed by the network the following URC is received:
#SL: ABORTED
- i** When **<listenState>=0** (close socket listening), **<listenPort>** parameter does not care.
- i** **<closureType>=255** takes effect on a COMMAND mode connection (when connection is accepted with **AT#SA=<connId>,1**, or when the ONLINE mode connection is suspended with **+++**) only if **<closureEnabling>** parameter of **#SCFGEXT3** has been previously enabled.

**AT#SL?**

Read command returns all the actual listening TCP sockets.

**AT#SL=?**

Test command returns the range of supported values of the parameters.



Open a socket listening for TCP on port 3500.

AT#SL=1,1,3500

OK

3.16.13. AT#SLUDP - Socket Listen UDP

This command opens/closes a socket listening for an incoming UDP connection on a specified port.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2



AT#SLUDP=<connId>,<listenState>,<listenPort>

Execution command opens/closes a socket listening for an incoming UDP connection on a specified port.

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier
Value:			
1÷conMax	:	socket connection identifier. conMax value is returned by test command	
<listenState>	integer	0	indicates the action that will be performed
Values:			
0	:	closes socket listening	
1	:	starts socket listening	
<listenPort>	integer	1	local listening port
Value:			
1÷65535	:	available port numbers	

- i** If the ListenAutoRsp flag has not been set through the command **#SCFGEXT** (for the specific connId), then, when an UDP connection request comes on the input port, if the sender is not filtered by internal firewall (see **#FRWL**), an URC is received:

+SRING : <connId>

Afterwards we can use **#SA** to accept the connection or **#SH** to refuse it.

If the ListenAutoRsp flag has been set, then, when an UDP connection request comes on the input port, if the sender is not filtered by the internal firewall (see command **#FRWL**), the connection is automatically accepted: the **CONNECT** indication is given and the modem goes into online data mode.

If the socket is closed by the network the following URC is received:

#SLUDP: ABORTED

- i** when closing the listening socket <listenPort> is a don't care parameter

**AT#SLUDP?**

Read command returns all the actual listening UDP sockets.

**AT#SLUDP=?**

Test command returns the range of supported values for all the sub parameters.



Next command opens a socket listening for UDP on port 3500.

```
AT#SLUDP=1,1,3500
```

```
OK
```

3.16.14. AT#SA - Socket Accept

Execution command accepts an incoming socket connection.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SA=<connId>[,<connMode>]

Execution command accepts an incoming socket connection after an URC

SRING: <connId>

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	Socket connection identifier.

Value:



1÷max : Socket connection identifier value (max is returned by the Test command)

<connMode>	integer	0	Connection mode, as for command #SD.
------------	---------	---	--------------------------------------

Values:

0 : online mode connection

1 : command mode connection

-  The **SRING** URC has to be a consequence of a **#SL** issue.
-  Setting the command before to having received a **SRING** will result in an **ERROR** indication, giving the information that a connection request has not yet been received.



AT#SA=?

Test command reports the range of values for all the parameters.

3.16.15. AT#SSEND - Send Data in Command Mode

This command is used to send data through a connected socket.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SSEND=<connId>

Execution command permits, while the module is in command mode, to send data through a connected socket.

After entering **AT#SSEND=...** command, and terminated the command line with **<CR>**, the module returns the following four characters sequence prompt, and waits for data to send:




<CR><LF><greater_than><space> (see IRA character set: 13, 10, 62, 32)

To send the entered data, enter Ctrl-Z char (0x1A hex); to abort the operation enter ESC char (0x1B hex).

If data are successfully sent, the command returns **OK**. If data sending fails for some reason, an error code is reported.

Parameter:

Name	Type	Default	Description
<connId>	integer	N/A	select the socket on which send data
Value:			
1÷conMax	:	socket connection identifier. conMax value is returned by test command	

-  The maximum number of bytes to send is 1500 bytes; trying to send more data will cause the surplus to be discarded and lost.
-  It is possible to use **#SSEND** only if the connection was opened by **#SD**, else the ME is raising an error.
-  A byte corresponding to BS char (0x08) is treated with its corresponding meaning; therefore previous byte will be cancelled (and BS char itself will not be sent).



AT#SSEND=?

Test command returns the range of supported values for parameter **<connId>**.



```
Send data through socket number 2
AT#SSEND=2
>Test<CTRL-Z>
OK
```

3.16.16. AT#SSENDX - Send Data in Command Mode extended

This command allows to send data through a connected socket including all possible octets (from 0x00 to 0xFF).

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SSENDX=<connId>,<bytesToSend>

Execution command permits, while the module is in command mode, to send data through a connected socket including all possible octets (from 0x00 to 0xFF).

After entering **AT#SSENDX=...** command, and terminated the command line with **<CR>**, the module returns the following four characters sequence prompt, and waits for data to send:



<CR><LF><greater_than><space> (see IRA character set: 13, 10, 62, 32)

When **<bytesToSend>** bytes have been sent, operation is automatically completed.

If data are successfully sent, the command returns **OK**. If data sending fails for some reason, an error code is reported.

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier
Value:			
1÷conMax	:	socket connection identifier. conMax value is returned by test command	
<bytesToSend>	integer	N/A	number of bytes to be sent
Value:			
1÷maxBytes	:	maxBytes is the maximum number of bytes that can be sent and it is reported by the test command	

-  It's possible to use **#SSENDX** only if the connection was opened by **#SD**, else the modem returns an error.
-  All special characters are sent like a generic byte. For example, 0x08 is not interpreted as a BS (BackSpace) but it is simply sent through the socket.



AT#SSENDX=?

Test command returns the range of supported values for parameters **<connId>** and **<bytesToSend>**.



Open the socket in command mode:

```
AT#SD=1,0,<port>,"IP address",0,0,1  
OK
```

Enter the command specifying total number of bytes as second parameter:

```
AT#SSEND=1,256
```

```
> ..... ;      Terminal echo of bytes sent is displayed here  
OK
```

All possible bytes (from 0x00 to 0xFF) are sent on the socket as generic bytes.

3.16.17. AT#SRECV - Socket Receive Data in Command Mode

The command permits the user to read data arrived through a connected socket when the module is in command mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SRECV=<connId>,<maxByte>[,<UDPIInfo>]

Execution command permits the user to read data arrived through a connected socket but buffered and not yet read because the module entered command mode before reading them; the module is notified of these data by a **SRING: URC**, whose presentation format depends on the last **#SCFGEXT** setting.

Parameters:

Name	Type	Default	Description
<connId>	integer	NA	socket connection identifier
Value:			
1÷conMax	:	socket connection identifier.	conMax value is returned by test command
<maxByte>	integer	NA	max number of bytes to read
Value:			
1÷1500	:	max number of bytes to read	
<UDPIInfo>	integer	0	enables/disables the visualization of UDP datagram information.
Values:			
0	:	UDP information disabled	
1	:	UDP information enabled, see Additional info section.	

Additional info:

- ▶▶ If <UDPIInfo> is set to 1 (**AT#SRECV=<connId>,<maxBytes>,1**), the command returns a message having the following format:

#SRECV: <remoteIP>,<remotePort><connId>,<recData>,<dataLeft>

Name	Type	Default	Description
<remoteIP>	string	-	remote ip address
<remotePort>	string	-	remote port address
<recData>	integer	-	received data
<dataLeft>	integer	-	remaining bytes in the datagram.



Issuing **#SRECV** when there is no buffered data raises an error.

**AT#SRECV=?**

Test command returns the range of supported values for parameters **<connId>** **<maxByte>** and **<UDPIInfo>**.

3.16.18. AT#SSENDUDP - Send UDP Data to a Specific Remote Host

This command allows to send data over UDP to a specific remote host.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SSENDUDP=<connId>,<remoteIP>,<remotePort>

This command allows, while the module is in command mode, to send data over UDP to a specific remote host. UDP connection has to be previously completed with a first remote host through **#SLUDP** / **#SA**. Then, if module receives data from this or another host, it is able to send data to it. Like command **#SSEND**, the device responds with ">" prompt and waits for the data to send.

Parameters:

Name	Type	Default	Description
<connId>	integer	1	socket connection identifier
Value:			
	1÷conMax	:	socket connection identifier. conMax value is returned by test command
<remoteIP>	string	-	IP address of the remote host in dotted decimal notation, string type: "xxx.xxx.xxx.xxx"
<remotePort>	integer	1	remote host port
Value:			
	1÷65535	:	host port number

- i** After **SRING** that indicates incoming UDP data and issuing **#SRECV** to receive data itself, through **#SS** is possible to check last remote host (IP/Port).
- i** If successive resume of the socket to online mode is performed (**#SO**), connection with first remote host is restored as it was before.



AT#SSENDUDP=?

Test command reports the supported range of values for parameters **<connId>**, **<remoteIP>** and **<remotePort>**.



Starts listening on <LocPort> (previous setting of firewall through **#FRWL** has to be done)

```
AT#SLUDP=1,1,<LocPort>  
OK
```

```
SRING: 1          UDP data from a remote host available
```

```
AT#SA=1,1  
OK
```

```
SRING: 1
```

```
AT#SI=1  
#SI: 1,0,0,23,0   23 bytes to read  
OK
```

```
AT#SRECV=1,23  
#SRECV:1,23  
message from first host  
OK
```

```
AT#SS=1  
#SS: 1,2,<LocIP>,<LocPort>,<RemIP1>,<RemPort1>  
OK
```

```
AT#SENDUDP=1,<RemIP1>,<RemPort1>  
>response to first host  
OK
```

```
SRING: 1          UDP data from a remote host available
```

```
AT#SI=1  
#SI: 1,22,23,24,0 24 bytes to read  
OK
```

```
AT#SRECV=1,24  
#SRECV:1,24  
message from second host  
OK
```

```
AT#SS=1  
#SS: 1,2,<LocIP>,<LocPort>,<RemIP2>,<RemPort2>  
OK
```

Remote host has changed, we want to send a response:

```
AT#SENDUDP=1,<RemIP2>,<RemPort2>  
>response to second host  
OK
```

3.16.19. AT#SSENDUDPEXT - Send UDP Data to a Specific Remote Host EXTENDED

This command permits, while the module is in command mode, to send data over UDP to a specific remote host including all possible octets (from 0x00 to 0xFF)

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT#SSENDUDPEXT=<connId>,<bytestosend>,<remoteIP>,<remotePort>

Set command permits, while the module is in command mode, to send data over UDP to a specific remote host including all possible octets (from 0x00 to 0xFF).

As indicated about #SSENDUDP, UDP socket has to be previously opened through #SLUDP / #SA, then we are able to send data to different remote hosts.

Like #SENDEXT, the device responds with the prompt '>' and waits for the data to send, operation is automatically completed when <bytestosend> have been sent.

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier
Value:			
1÷conMax	:		socket connection identifier. conMax value is returned by test command
<bytestosend>	integer	N/A	bytes to be sent
Value:			
1÷1500	:		number of bytes to be sent
<remoteIP>	string	-	IP address of the remote host in dotted decimal notation ("xxx.xxx.xxx.xxx")
<remotePort>	integer	N/A	remote host port
Value:			
1÷65535	:		host port number



AT#SSENDUDPEXT=?

Test command reports the supported range of values for parameters <connId>,<bytestosend>,<remoteIP> and <remotePort>

3.16.20. AT#SLASTCLOSURE - Detect the Cause of a Socket Disconnection

The command detects the cause of a socket disconnection.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SLASTCLOSURE=<connId>

Execution command reports the socket disconnection cause.

Parameter:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier

Value:

1÷conMax : socket connection identifier. conMax value is returned by test command

Additional info:

- ▶▶ The execution command reports the disconnection cause of the selected socket. The format of the returned message is:

#SLASTCLOSURE: <connId>,<cause>

Name	Type	Default	Description
<cause>	hex	0	socket disconnection cause.

Values:

- 0 : not available (socket has not yet been closed)
- 1 : remote host TCP connection close due to FIN/END: normal remote disconnection decided by the remote application
- 2 : remote host TCP connection close due to RST, all other cases in which the socket is aborted without indication from peer (for instance because peer doesn't send ack after maximum number of retransmissions/peer is no more alive). All these cases include all the "FATAL" errors after recv or send on the TCP socket (named as different from EWOULDBLOCK)
- 3 : socket inactivity timeout
- 4 : network deactivation (PDP context deactivation from network)

- i** Any time socket is re-opened, last disconnection cause is reset. Command report 0 (not available).
- i** User closure cause (**#SH**) is not considered and if a user closure is performed after remote disconnection, remote disconnection cause remains saved and is not overwritten.

-
- i** If more consecutive closure causes are received, the original disconnection cause is saved.
(For instance: if a TCP FIN is received from remote and later a TCP RST because we continue to send data, FIN cause is saved and not overwritten)
 - i** Also in case of **<closureType> (#SD)** set to 255, if the socket has not yet been closed by user after the escape sequence, **#SLASTCLOSURE** indicates remote disconnection cause if it has been received.
 - i** In case of UDP, cause 2 indicates abnormal (local) disconnection. Cause 3 and 4 are still possible.
(Cause 1 is obviously never possible)
 - i** In case of command mode connection and remote closure with subsequent inactivity timeout closure without retrieval of all available data (**#SRECV** or **SRING** mode 2), it is indicated cause 1 for both possible FIN and RST from remote.

**AT#SLASTCLOSURE=?**

Test command reports the supported range for parameter **<connId>**

3.16.21. AT#SS - Socket Status

This command reports the current sockets status.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SS[=<connId>]

Execution command reports the current sockets status.

Parameter:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier

Value:

1÷conMax : socket connection identifier. conMax value is returned by test command

Additional info:

- The response format, for the selected socket, is:
#SS: <connId>,<state>,<locIP>,<locPort>,<remIP>,<remPort>

Name	Type	Default	Description
<connId>	integer	-	socket connection identifier, see <connId> parameter
<state>	integer	0	actual state of the socket
Values:			
0 : socket closed			
1 : socket with an active data transfer connection			
2 : socket suspended			
3 : socket suspended with pending data			
4 : socket listening			
5 : socket with an incoming connection. Waiting for the user accept or shutdown command			
6 : socket resolving DNS			
7 : socket connecting			
<locIP>	string	-	IP address associated by the context activation to the socket
<locPort>	integer	-	two meanings: <ul style="list-style-type: none"> the listening port if we put the socket in listen mode the local port for the connection if we use the socket to connect to a remote machine
<remIP>	string	-	when we are connected to a remote machine this is the remote IP address

<remPort>	string	-	it is the port we are connected to on the remote machine
------------------------	--------	---	--

- i** Issuing **#SS** command without **<connId>** socket identifier, it returns information about status of all sockets. For each socket, the format of the returned message is:

#SS: <connId_{nnnnnn}



AT#SS=?

Test command reports the range for **<connId>** parameter.



Get information about all sockets.

AT#SS

#SS: 1,3,91.80.90.162,61119,88.37.127.146,10510

#SS: 2,4,91.80.90.162,1000

#SS: 3,0

#SS: 4,0

#SS: 5,3,91.80.73.70,61120,88.37.127.146,10509

...

OK

Socket 1: opened from local IP 91.80.90.162/local port 61119 to remote IP 88.37.127.146/remote port 10510 is suspended with pending data.

Socket 2: listening on local IP 91.80.90.162/local port 1000.

Socket 5: opened from local IP 91.80.73.70/local port 61120 to remote IP 88.37.127.146/remote port 10509 is suspended with pending data.

Get information only about socket number 2.

AT#SS=2

#SS: 2,4,91.80.90.162,1000

OK

3.16.22. AT#SI - Socket Info

This command is used to get socket information.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SI[=<connId>]

Execution command returns information about all sockets data traffic.

Parameter:

Name	Type	Default	Description
<connId>	integer	NA	socket connection identifier. Refer to Additional info sections to have information about the use of the <connId> parameter

Value:

1÷conMax : socket connection identifier. conMax value is returned by test command

Additional info:

- ▶▶ If the execution command is used with the <connId> socket identifier, it returns data traffic information on the selected socket. The format of the returned message is:

#SI: <connId>,<sent>,<received>,<buff_in>,<ack_waiting>

Name	Type	Default	Description
<sent>	integer	-	total amount (in bytes) of data sent since the last time the socket connection identified by <connId> has been opened
<received>	integer	-	total amount (in bytes) of received data since the last time the socket connection identified by <connId> has been opened
<buff_in>	integer	-	total amount (in bytes) of data just arrived through the socket connection identified by <connId> and currently buffered, not yet read
<ack_waiting>	integer	-	total amount (in bytes) of sent and "not yet acknowledged data" since the last time the socket connection identified by <connId> has been opened. The data "not yet acknowledged" are available only for TCP connections. For UDP connections <ack_waiting> value is always 0.

- ▶▶ If the AT#SI command is used without the <connId> socket identifier, it returns data traffic information on all sockets. For each socket, the format of the returned message is:

#SI: <connId_n>,<sent_n>,<received_n>,<buff_in_n>,<ack_waiting_n>

**AT#SI=?**

Test command reports the range of **<connId>** parameter.



- Get information about data traffic of all sockets.

```
AT#SI  
#SI: 1,123,400,10,50  
#SI: 2,0,100,0,0  
#SI: 3,589,100,10,100  
#SI: 4,0,0,0,0  
#SI: 5,0,0,0,0
```

```
...  
OK
```

- Assume that sockets 1,2,3 are opened and having some data traffic. To get traffic information only for the socket **<connId>=1** enter the following command:

```
AT#SI=1  
#SI: 1,123,400,10,50  
OK
```

Socket **<connId>=1** has 123 bytes sent, 400 bytes received, 10 bytes waiting to be read and 50 bytes waiting to be acknowledged from the remote side.

3.16.23. AT#SIEXT - Socket Info Extended

This command returns the information about socket data traffic.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SIEXT[=<connId>]

Set command is used to get information about a certain socket data traffic; execution command to get information about all sockets data traffic. The response is in the format:

#SIEXT: <connId>,<reTx>,<oos>,<rsrvd1>,<rsrvd2>

Parameter:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier

Value:

1÷conMax : socket connection identifier. conMax value is returned by test command

Additional info:

▶▶ The response parameters are described below.

Name	Type	Default	Description
<connId>	integer	-	socket connection identifier, as indicated before
<reTx>	integer	-	overall amount of retransmissions of outgoing packets since the last time the socket connection identified by <connId> has been opened
<oos>	string	-	ingoing out of sequence packets (packets which sequence number is greater than the next expected one) overall amount, calculated since the last time the socket connection identified by <connId> has been opened
<rsrvd1>	integer	-	reserved fields for future development of new statistics, currently set to 0
<rsrvd2>	integer	-	reserved fields for future development of new statistics, currently set to 0

- i** Parameters associated with a socket identified by <connId> are cleared when the socket itself is connected again (#SD or #SA after #SL). Until then, if previous connection has been established and closed, old values are yet available.
- i** Both <reTx> and <oos> parameters are available only for TCP connections; their value is always 0 for UDP connections
- i** Issuing AT#SIEXT command without <connId> socket identifier, it returns data traffic information on all sockets. For each socket, the format of the returned message is:

#SIEXT: <connId_n>,<reTx_n>,<oos_n>,<rsrvd1_n>,<rsrvd2_n><CR><LF>

**AT#SIEXT=?**

Test command reports the range for parameter **<connId>**.

3.16.24. AT#ST - Socket Type

Socket Type

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#ST[=<connId>]

Set command reports the current type of the socket (TCP/UDP) and its direction (Dialer/Listener)

Parameter:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier

Value:

1÷conMAX : socket connection identifier. conMax value is returned by test command

Additional info:

▶▶ The response format is:

#ST: <connId>,<type>,<direction>

Name	Type	Default	Description
<type>	integer	N/A	socket type

Values:

0 : No socket
1 : TCP socket
2 : UDP socket

<direction>	integer	N/A	direction of the socket
-------------	---------	-----	-------------------------

Values:

0 : None
1 : Dialer
2 : Listener

▶▶ Issuing **#ST** command without <connId> socket identifier, it returns information about type of all sockets. For each socket, the format of the returned message is:

#ST: <connId_n>,<type_n>,<direction_n><CR><LF>

**AT#ST=?**

Test command reports the range for parameter **<connId>**.



Examples for single socket and for all sockets

- For single socket

```
AT#ST=3  
#ST: 3,2,1
```

Socket 3 is an UDP dialer

- for all socket

```
AT#ST  
#ST: 1,0,0  
#ST: 2,0,0  
#ST: 3,2,1  
#ST: 4,2,2  
#ST: 5,1,1
```

...

Socket 1 is closed.

Socket 2 is closed.

Socket 3 is an UDP dialer

Socket 4 is an UDP listener

Socket 5 is a TCP dialer

3.16.25. AT#PADCMD - PAD Command Features

This command sets features of the pending data flush to socket, opened with #SD command.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#PADCMD=<mode>

Set command for features of the pending data flush to socket, opened with #SD command.



Parameter:

Name	Type	Default	Description
<mode>	integer	N/A	enable/disable forwarding

Values:

0 : Bit 1: disable forwarding

1 : Bit 1: enable forwarding

-  Forwarding depends on character defined by #PADFWD.
-  Other bits are reserved.



AT#PADCMD?

Read command reports the currently selected <mode> in the format:

#PADCMD: mode



AT#PADCMD=?

Test command reports the supported range of values for parameter <mode>.

3.16.26. AT#PADFWD - PAD Forward Character

PAD forward character

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#PADFWD=<char>[,<mode>]

Set command sets the char that immediately flushes pending data to socket opened by AT#SD command

Parameters:

Name	Type	Default	Description
<char>	integer	1	specifies the ascii code of the char used to flush data
Value:			
0÷255	:	ascii code of the char used to flush data	
<mode>	integer	0	flush mode
Values:			
0	:	normal mode	
1	:	reserved	



Use AT#PADCMD to enable the socket char-flush activity



AT#PADFWD?

Read command reports the currently selected <char> and <mode> in the format:

#PADFWD: <char>,<mode>



AT#PADFWD=?

Test command reports the supported range of values for parameters <char> and <mode>

3.16.27. AT#BASE64 - Base64 Encoding/Decoding of Socket Sent/Received Data

This command is used to enable or disable base64 encoding and decoding data of a socket.



RFC 2045 - MIME
RFC 3548

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2






AT#BASE64=<connId>,<enc>,<dec>[,<unused_B>[,<unused_C>]]

Set command enables base64 encoding and decoding of data sent/received to/from the socket in online or in command mode.

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier
Value:			
1=conMax	:	socket connection identifier.	conMax value is returned by test command
<enc>	integer	0	selects the encoding standard. The data received from serial port are base64 encoded according to the <enc> parameter and forwarded to the <connId> socket.
Values:			
0	:	no encoding of data received from serial port.	
1	:	base64 encoding compliant to RFC 2045 - MIME standard	
2	:	base64 encoding compliant to RFC 3548 standard	
<dec>	integer	0	selects the decoding standard. The data received from the <connId> socket, are decoded according to the <dec> parameter and forwarded to the serial port.
Values:			
0	:	no decoding of data received from socket <connId>	
1	:	base64 decoding compliant to RFC 2045 - MIME standard	
2	:	base64 decoding compliant to RFC 3548 standard	
<unused_B>	integer	-	reserved for future use
<unused_C>	integer	-	reserved for future use

- i** If **<enc>** and/or **<dec>** are/is set to 1, the encoded stream is represented in lines of no more than 76 characters each. Lines are sequences of octets and ended by <CR><LF> characters. The line format is compliant to RFC 2045 - MIME standard.

-  If **<enc>** and/or **<dec>** are/is set to 2, the encoded stream does not have **<CR><LF>** characters compliant to RFC 3548 standard.
-  The **#BASE64** command can change current **<enc>/<dec>** settings for a socket already opened, either in command mode or in online mode. Before changing the setting, the connection must be suspended. In online mode it is mandatory to set **AT#SKIPESC=1**.
-  Assume that the open connection is in command mode, the **#SENDEXT** command is used to send data, and the **<enc>=1** encoding feature is enabled. If plain data to send exceed maximum value allowed by **#SENDEXT** command, the plain data must be divided in chunks. The chunks must be a multiple of 57 bytes, except the last one that notify the EOF condition (Base64 encoding rule).
 The length of the encoded line = $(57 \text{ bytes} \times 4) / 3 + \text{<CR><LF>} = 76 + 2 = 78 \text{ bytes}$
 The same rule is valid for the received encoded data stream. Assume that **<dec>=1**, and **#SRECV** command is using to read the amount of the received data, the **<maxByte>** bytes returned by the command is that of the plain data, therefore less than of the encoded data received.

**AT#BASE64?**

Read command returns the current **<enc>/<dec>** settings for all sockets. For each socket, the format of the returned message is:

#BASE64:<connId_n><enc_n>,<dec_n>,0,0<CR><LF>

**AT#BASE64=?**

Test command returns the range of supported values of all parameters.



Skip the escape sequence, its transmission is not enabled

```
AT#SKIPESC=1  
OK
```

Open a remote connection in online mode

```
AT#SD=<connId>,<txProt>,<rPort>,<IPAddr>  
CONNECT
```

data sent without modifications (default)

.....

+++ (suspension)

OK

Encode data coming from serial port.

```
AT#BASE64=<connId>,1,0  
OK
```

Resume suspended socket

```
AT#SO=<connId>  
CONNECT
```

data received from serial port are base64 encoded and sent to the socket

.....

+++ (suspension)

OK

Decode data coming from socket.

```
AT#BASE64=<connId>,0,1  
OK
```

Resume suspended socket

```
AT#SO=<connId>  
CONNECT
```

data received from socket are base64 decoded and sent to the serial port

.....

+++ (suspension)

OK

3.16.28. AT#FRWL - Firewall Setup

This command controls the internal firewall settings.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#FRWL=[<action>,<ip_addr>,<net_mask>]

Set command controls the internal firewall settings

Parameters:

Name	Type	Default	Description
<action>	integer	4	command action
Values:			
0	:	remove selected chain	
1	:	add an ACCEPT chain	
2	:	remove all chains (DROP everything); <ip_addr> and <net_mask> have no meaning in this case.	
3	:	enable firewall and save this setting in NVM	
4	:	disable firewall and save this setting in NVM	
<ip_addr>	string	-	remote address to be added into the ACCEPT chain; it can be any valid IP address in the format: xxx.xxx.xxx.xxx
<net_mask>	string	-	mask to be applied on the <ip_addr>; it can be any valid IP address mask in the format: xxx.xxx.xxx.xxx

Additional info:

►► Firewall criterion

The firewall applies for incoming (listening) connections only. Its general policy is DROP, therefore all packets that are not included into an ACCEPT chain rule will be silently discarded.

When a packet comes from the IP address incoming_IP, the firewall chain rules will be scanned for matching with the following criteria:

$\text{incoming_IP} \& \text{<net_mask>} = \text{<ip_addr>} \& \text{<net_mask>}$

If criterion is matched, then the packet is accepted and the rule scan is finished; if criteria are not matched for any chain the packet is silently dropped



AT#FRWL?

Read command reports the list of all ACCEPT chain rules registered in the Firewall settings in the format:

#FRWL: <ip_addr>,<net_mask>,<status>

#FRWL: <ip_addr>,<net_mask>,<status>

...

OK

Additional info:

- ▶▶ The parameters returned by read command are described below:

Name	Type	Default	Description
<status>	integer	0	firewall status

Values:

- 0 : not enabled
- 1 : enabled



AT#FRWL=?

Test command returns the allowed values for parameter **<action>**.



- Let assume we want to accept connections only from our devices which are on the IP addresses ranging from

197.158.1.1 to 197.158.255.255

We need to add the following chain to the firewall:

```
AT#FRWL=1,"197.158.1.1","255.255.0.0"
OK
```

3.16.29. AT#FRWLIPV6 - Firewall Setup for IPV6 Addresses

This command controls the internal firewall settings for IPV6 addresses.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#FRWLIPV6=[<action>[,<ipAddr>[,<netMask>]]]

Execution command permits to add/remove a chain to/from the internal firewall for IPV6 addresses.

Parameters:

Name	Type	Default	Description
<action>	integer	4	command action
Values:			
	0	:	remove selected chain
	1	:	add an ACCEPT chain
	2	:	remove all chains (DROP everything)
	3	:	enable firewall and save this setting in NVM
	4	:	disable firewall and save this setting in NVM
<ipAddr>	string	-	remote address to be added into the ACCEPT chain. It can assume any valid IP address in the format xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx or in the format yyyy:yyyy:yyyy:yyyy:yyyy:yyyy:yyyy:yyyy.
<netMask>	string	-	mask to be applied on the <ipAddr> parameter value. It can assume any valid IP address in the format xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx or in the format yyyy:yyyy:yyyy:yyyy:yyyy:yyyy:yyyy:yyyy

- i** If <action> value is 2, then <ipAddr> and <netMask> have no meaning.
- i** The firewall applies for incoming (listening) connections only.
- i** Firewall general policy is DROP, therefore all packets that are not included into an ACCEPT chain rule will be silently discarded.
When a packet comes from the IP address **incoming_IP**, the firewall rules will be scanned for matching with the following criterion:
incoming_IP & <netMask> = <ipAddr> & <netMask>
If the criterion is verified, then the packet is accepted and the scanning of the rules is finished; if the criterion is not verified for any chain, then the packet is discarded.

**AT#FRWLIPV6?**

Read command reports the list of all ACCEPT chain rules registered in the firewall settings in the format:

```
#FRWLIPV6: <ipAddr>,<netMask>,<status>
```

```
#FRWLIPV6: <ipAddr>,<netMask>,<status>
```

```
...
```

```
OK
```

Additional info:

- ▶▶ The parameters returned by read command are described below:

Name	Type	Default	Description
<status>	integer	0	firewall status

Values:

0 : not enabled

1 : enabled

**AT#FRWLIPV6=?**

Test command returns the supported values of parameter <action>.

3.16.30. AT#E2SLRI - Socket Listen Ring Indicator

This command enables the Ring Indicator pin response to a Socket Listen connect.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Common profile	No	-	2



AT#E2SLRI=[<n>]

Set command enables/disables the Ring Indicator pin response to a Socket Listen connect and, if enabled, the duration of the negative going pulse generated on receipt of connect.

Parameter:

Name	Type	Default	Description
<n>	integer	0	RI enabling

Values:

- 0 : RI disabled for Socket Listen connect
- 50÷1150 : RI enabled for Socket Listen connect; a negative going pulse is generated on receipt of connect and <n> is the duration in ms of this pulse



AT#E2SLRI?

Read command reports whether the Ring Indicator pin response to a Socket Listen connect is currently enabled or not, in the format:

#E2SLRI: <n>



AT#E2SLRI=?

Test command returns the allowed values for parameter <n>.

3.16.31. AT#ICMP - Ping Support

The command enable/disables ICMP ping.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#ICMP=<mode>

Set command enables/disables the ICMP Ping support.

Parameter:

Name	Type	Default	Description
<mode>	integer	N/A	ICMP mode selection. The default value depends on the product you are using.

Values:

- 0 : disable ICMP Ping support
- 1 : enable firewalled ICMP Ping support: the module is sending a proper ECHO_REPLY only to a subset of IP Addresses pinging it; this subset of IP Addresses has been previously specified through #FRWL command.
- 2 : enable free ICMP Ping support; the module is sending ECHO_REPLY to every IP Address pinging it.

 <mode>=2 takes no effects if IPv6 fragmentation is used, hence PINGs are discarded.



AT#ICMP?

Read command returns whether the ICMP Ping support is currently enabled or not, in the format:

#ICMP: <mode>



AT#ICMP=?

Test command reports the supported range of values for the <mode> parameter.

3.16.32. AT#PING - Send PING Request

This command is used to send ping to a IP address.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2



AT#PING=<IPAddr>[,<retryNum>[,<len>[,<timeout>[,<ttl>]]]]

Execution command is used to send Ping Echo Request messages and to receive the corresponding Echo Reply. Before sending PING Request, the PS context must be activated by **AT#SGACT=x,1** command. The context **x** is set by **#PROTOCOLCFG** command.

Once the single Echo Reply message is received, a string like that is displayed:



#PING: <replyId>,<Ip Address>,<replyTime>,<ttl>

Parameters:

Name	Type	Default	Description
<IPAddr>	string	-	address of the remote host, string type. This parameter can be either: - any valid IP address in the format: "xxx.xxx.xxx.xxx" - any host name to be solved with a DNS query
<retryNum>	integer	4	the number of Ping Echo Request to send Value: 1÷64 : Ping Echo Request number
<len>	integer	32	the length of Ping Echo Request message Value: 32÷1460 : Ping Echo Request length
<timeout>	integer	50	the timeout, in 100 ms units, waiting a single Echo Reply Value: 1÷600 : timeout, in 100 ms units
<ttl>	integer	128	time to live Value: 1÷255 : time to live

Unsolicited fields:

Name	Type	Description
<replyId>	integer	Echo Reply number
<IpAddress>	string	IP address of the remote host
<replyTime>	integer	time, in 100 ms units, required to receive the response
<ttl>	integer	time to live of the Echo Reply message

-
-  when the Echo Request timeout expires (no reply received on time) the response will contain **<replyTime>** set to 600 and **<tTl>** set to 255.
 -  To receive the corresponding Echo Reply is not required to enable separately **#ICMP**
-

**AT#PING=?**

Test command reports the supported range of values for the **#PING** command parameters.



```
AT#PING="www.telit.com"  
#PING: 01,"81.201.117.177",6,50  
#PING: 02,"81.201.117.177",5,50  
#PING: 03,"81.201.117.177",6,50  
#PING: 04,"81.201.117.177",5,50  
OK
```

3.16.33. AT#QDNS - Query DNS

The command executes a DNS query

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#QDNS[=<host name>]

Execution command executes a DNS query to solve the host name into an IP address. If the DNS query is successful, then the IP address will be reported in the result code as follows:

#QDNS: <host name>,<IP address>

Parameter:

Name	Type	Default	Description
<host name>	string	-	Host name string

Additional info:

- ▶▶ IP address in the result code

Name	Type	Default	Description
<IP address>	string	-	IP address in format "xxx.xxx.xxx.xxx"

- i** The command activates the PDP context if it was not previously activated. In this case the context is deactivated after the DNS query.
- i** This command requires that the authentication parameters are correctly set, and the PS network is present.
- i** This command is available only on the first AT instance (see **#PORTCFG**) or on the first virtual port of CMUX and works on the first socket connection identifier (connId 1) and the corresponding PDP context identifier (cid) configured in **AT#SCFG**.



AT#QDNS=?

Test command returns the **OK** result code.

3.16.34. AT#CACHEDNS - DNS Response Caching

This command is related to DNS and DNS response caching.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CACHEDNS=[<mode>]




Set command enables caching a mapping of domain names to IP addresses, as does a resolver library.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enables/disables caching

Values:

- 0 : caching disabled; it cleans the cache too
- 1 : caching enabled

-  The validity period of each cached entry (i.e. how long a DNS response remains valid) is determined by a value called the Time To Live (TTL), set by the administrator of the DNS server handing out the response.
-  If the cache is full (8 elements) and a new IP address is resolved, an element is deleted from the cache: the one that has not been used for the longest time.
-  It is recommended to clean the cache, if command **+CCLK** has been issued while the DNS Response Caching was enabled.



AT#CACHEDNS?

Read command reports whether the DNS Response Caching is currently enabled or not, in the format:

#CACHEDNS: <mode>



AT#CACHEDNS=?

Test command returns the currently cached mapping along with the range of available values for parameter <mode>, in the format:

#CACHEDNS: [<hostn₁>,<IPAddr₁>,[...,[<hostn_n>,<IPAddr_n>]]](0,1)

Additional info:

- ▶▶ Response parameters

Name	Type	Default	Description
------	------	---------	-------------

<hostn>	string	-	host name
<IPaddr>	string	-	IP address in the format " xxx.xxx.xxx.xxx "

3.16.35. AT#DNS - Manual DNS Selection

This command manually set primary and secondary DNS servers.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#DNS=<cid>,<primary>,<secondary>

Set command allows to manually set primary and secondary DNS servers either for a PDP context defined by +CGDCONT or for a GSM context defined by #GSMCONT.

Parameters:

Name	Type	Default	Description
<cid>	integer	0	context identifier
Values:			
0	:		specifies the GSM context
1÷max	:		specifies a PDP context definition. The max value is returned by the test command
<primary>	string	-	manual primary DNS server, in the format "xxx.xxx.xxx.xxx", used for the specified cid; we are using this value instead of the primary DNS server coming from the network (default is "0.0.0.0")
<secondary>	string	-	manual secondary DNS server, in the format "xxx.xxx.xxx.xxx", used for the specified cid; we are using this value instead of the secondary DNS server coming from the network (default is "0.0.0.0")

- i** If <primary> is "0.0.0.0" and <secondary> is not "0.0.0.0", then issuing **AT#DNS=...** returns an error.
- i** If <primary> is "0.0.0.0" we are using the primary DNS server coming from the network as consequence of a context activation.
- i** If <primary> is not "0.0.0.0" and <secondary> is "0.0.0.0", then we are using only the manual primary DNS server.
- i** The context identified by <cid> must be previously defined, otherwise issuing **AT#DNS=...** returns an error.
- i** Issuing **AT#DNS=...** returns an error if the context identified by <cid> has already been activated by AT commands.



AT#DNS?

Read command returns the manual DNS servers set for every defined PDP context and for the single GSM context (only if defined), in the format:

```
[#DNS: <cid>,<primary>,<secondary>][<CR><LF>
#DNS: <cid>,<primary>,<secondary>]]
```




AT#DNS=?

Test command reports the supported range of values for the **<cid>** parameter only.

3.16.36. AT#NWDNS - DNS from Network

The command allows to get the primary and secondary DNS addresses for selected GSM or PDP context identifiers.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#NWDNS=[<cid>[,...]]

Execution command returns either the primary and secondary DNS addresses for the GSM context (if specified) and/or a list of primary and secondary DNS addresses for the specified PDP context identifiers. The maximum number of <cid> that can be specified as input are 6, even if not all different. The command returns a row of information for every specified <cid> whose context has been already defined. No row is returned for a <cid> whose context has not been defined yet. The response is in the form:

```
#NWDNS: <cid>,<PDNSaddress<sub>1</sub>>,<SDNSaddress<sub>1</sub>><CR><LF>
#NWDNS: <cid<sub>2</sub>>,<PDNSaddress<sub>2</sub>>,<SDNSaddress<sub>2</sub>><CR><LF>
...
#NWDNS: <cid<sub>n</sub>>,<PDNSaddress<sub>n</sub>>,<SDNSaddress<sub>n</sub>><CR><LF>
```

Parameter:

Name	Type	Default	Description
<cid>	integer	N/A	context identifier

Values:

- 0 : GSM context, see #GSMCONT command
- 1÷max : specifies PDP context definition. max value is returned by test command AT+CGDCONT=?

Additional info:

- ▶▶ Parameters response description

Name	Type	Default	Description
<PDNSaddress_n>	string	-	primary DNS address, the same set through #DNS or otherwise assigned during PDP (or GSM) context activation
<SDNSaddress_n>	string	-	secondary DNS address, the same set through #DNS, or otherwise assigned during PDP (or GSM) context activation

- i** Entering AT#NWDNS= (no <cid> specified), the DNS addresses for all defined contexts are returned.
- i** The command returns only one row of information for every specified <cid>, even if the same <cid> is present more than once.



AT#NWDNS=?

Test command returns a list of defined <cid_n>s.

3.16.37. AT#NTP - Calculate and Update Date and Time with NTP

The command handles the date and time update using NTP protocol.



[1] Standard RFC2030

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	10 s	2



AT#NTP=<NTPAddr>,<NTPPort>,<updModClock>,<timeout>[,<timeZone>]

Execution command permits to calculate and update date and time through NTP protocol sending a request to a NTP server, see standard [1]. The command returns an intermediate response having the following format:

#NTP: <time>

The <time> parameter is described in Additional info section.

Parameters:

Name	Type	Default	Description
<NTPAddr>	string	-	address of the NTP server. This parameter can be either: <ul style="list-style-type: none"> any valid IP address in the format: "xxx.xxx.xxx.xxx" any host name to be solved with a DNS query
<NTPPort>	integer	N/A	NTP server port to contact Value: 1÷65535 : port
<updModClock>	integer	N/A	update mode Values: 0 : no update module clock 1 : update module clock
<timeout>	integer	N/A	waiting timeout for server response in seconds Value: 1÷10 : waiting timeout for server response in seconds
<timeZone>	string	0	Time Zone: indicates the difference, expressed in quarter of an hour, between the local time and GMT. Value: -47÷48 : Time Zone

Additional info:

►► Intermediate response parameter.

Name	Type	Default	Description
<time>	string	-	current time as quoted string in the format: "yy/MM/dd,hh:mm:ss±zz"

i The Time Zone is applied directly in the Date and Time received by the NTP Server, that is, by definition, GMT+0.



AT#NTP=?

Test command returns the supported range of values of parameters: <NTPAddr>, <NTPPort>, <updModClock>, <timeout> and <timeZone>.



Execution command with NTP server.

```
AT#NTP="ntp1.inrim.it",123,1,2,4
#NTP: 12/01/27,14:42:38+04
OK
```

```
AT+CCLK?
+CCLK: "12/01/27,14:42:39+04"
OK
```

3.16.38. AT#PROTOCOLCFG - Configure Protocol Parameters

This command configures the parameters needed to specific protocols.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#PROTOCOLCFG=<protocol>,<cid>[,<unused1>[,<unused2>[,<unused3>]]]

Set command defines the parameters needed to specific protocols.

Parameters:

Name	Type	Default	Description
<protocol>	string	N/A	protocol to be configured
Values:			
"FTP"	:	FTP protocol	
"SMTP"	:	SMTP protocol	
"PING"	:	PING service (ICMP protocol)	
"SSL"	:	SSL protocol	
<cid>	integer	N/A	PDP Context Identifier to be used for the specified protocol
Value:			
1÷max	:	identifier (max is returned by the test command)	
<unused1>	mixed	-	Unused
<unused2>	mixed	-	Unused
<unused3>	mixed	-	Unused



AT#PROTOCOLCFG?

Read command returns the current settings in the format:

```
#PROTOCOLCFG:"FTP",<cid>,<unused1>,<unused2>,<unused3><CR><LF>
#PROTOCOLCFG:"SMTP",<cid>,<unused1>,<unused2>,<unused3><CR><LF>
#PROTOCOLCFG:"PING",<cid>,<unused1>,<unused2>,<unused3><CR><LF>
#PROTOCOLCFG:"SSL",<cid>,<unused1>,<unused2>,<unused3><CR><LF>
```



AT#PROTOCOLCFG=?

Test command returns values supported as a compound value.

3.16.39. AT#GDATAVOL - PS Data Volume

The command resets data counters or reports data counts of the PS and/or CS data sessions.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#GDATAVOL=[<mode>]

Execution command reports, for every defined PDP and/or GSM context, the amount of data received and transmitted in the last PS and/or CS data session, or the total amount of data received and transmitted during all past PS data and/or CS data sessions, since last reset executed by **AT#GDATAVOL=0**.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	defines the readings type of the PS and CS data counters

Values:

- 0 : reset PS and CS data counters
- 1 : report the last PS data counts and/or the last CS data count. Refer to Additional info section.
- 2 : report the total PS data counts and/or the total CS data count. Refer to Additional info section.

Additional info:

▶▶ When <mode>=1, the command returns the following last data counts:

- the last data counts of the GPRS session linked with the PDP contexts set by **+CGDCONT**.
- the last data count of the GSM session linked with the GSM context set by **#GSMCONT**.

For each <cid> the format of the returned message is:

#GDATAVOL: <cid_n>,<tot_n>,<sent_n>,<received_n>[<CR><LF>

#GDATAVOL: <cid_m>,<tot_m>,<sent_m>,<received_m>[...]]

Name	Type	Default	Description
<cid>	integer	N/A	contexts identifiers
Values:			
0	:	GSM context identifier	
1÷max	:	PDP context identifier, max is returned by the test command AT+CGDCONT=?	
<tot>	integer	-	number of bytes either received or transmitted in the last PS and/or CS data session for the <cid> context
<sent>	integer	-	number of bytes transmitted in the last PS and/or CS data session for the <cid> context.

<received>	integer	-	number of bytes received in the last PS and/or CS data session for <cid> context
-------------------------	---------	---	---

▶▶ When **<mode>=2**, the command returns the following total data counts, since last reset executed by **AT#GDATAVOL=0**



- the total data count of the GPRS session linked with the PDP contexts set by **+CGDCONT**.
- the total data count of the GSM session linked with the GSM context set by **#GSMCONT**.

For each **<cid>** the format of the returned message is:

#GDATAVOL: <cid_{nnnn}

#GDATAVOL: <cid_{mmmm}

Name	Type	Default	Description
<cid>	integer	N/A	contexts identifiers
Values:			
	0	:	GSM context identifier
	1÷max	:	PDP context identifier, max is returned by the test command AT+CGDCONT=?
<tot>	integer	-	number of bytes either received or transmitted in every PS and/or CS data session for the <cid> context, since last reset
<sent>	integer	-	number of bytes transmitted, in every PS and/or CS data session for the <cid> context, since last reset
<received>	integer	-	number of bytes received, in every PS and/or CS data session for the <cid> context, since last reset

-  The last PS and CS session counts are not saved in NVM, are lost at power off.
-  The total PS and CS session counts are saved on NVM.



AT#GDATAVOL=?

Test command returns the supported range of the **<mode>** parameter values.

3.16.40. AT#SCFGEXT3 - Socket Configuration Extended 3

This command sets the socket configuration extended parameters for features not included in #SCFGEXT command nor in #SCFGEXT2 command.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#SCFGEXT3=<connId>,<immRsp>[,<closureEnabling>[,<fastSRING>[,<unusedC>[,<unusedD>]]]]]

Parameters:

Name	Type	Default	Description
<connId>	integer	N/A	socket connection identifier
	Value:		
	1÷conMax	:	socket connection identifier. conMax value is returned by test command
<immRsp>	integer	0	enables #SD command mode immediate response
	Values:		
	0	:	#SD in command mode (see #SD) returns after the socket is connected
	1	:	#SD in command mode returns immediately; then the state of the connection can be read by the AT command #SS
<closureEnabling>	integer	0	setting this parameter, successive #SD or #SL with <closureType> parameter 255 setting takes effect in command mode.
			<closureEnabling> parameter has been introduced due to retro compatibility reason regarding <closureType> behavior in command mode.
	Values:		
	0	:	#SD or #SL <closureType> 255 in command mode has no effect
	1	:	#SD or #SL <closureType> 255 in command mode takes effect
<fastSRING>	integer	0	enables the fast SRING (active only when #SCFGEXT parameter <srmode>=2) in TCP and UDP sockets
	Values:		
	0	:	SRING unsolicited is received periodically if data are available every 200 ms
	1	:	if data are available SRING unsolicited is received asynchronous as fast as possible
<unusedC>	mixed	0	unused parameter
	Value:		
	0	:	unused parameter

<unusedD>	mixed	0	unused parameter
------------------------	-------	---	------------------

Value:

0	:	unused parameter
---	---	------------------

**AT#SCFGEXT3?**

Read command returns the current socket extended configuration parameters values for all sockets, in the format:

```
#SCFGEXT3:<connIdi>,<immRsp>, <closureEnabling>,< fastsring >,0,0<CR><LF>
```

...

```
#SCFGEXT3:<connIdconMax>,<immRsp>, <closureEnabling>, < fastsring >,0,0<CR><LF>
```

OK

**AT#SCFGEXT3=?**

Test command returns the range of supported values for all the parameters.

3.16.41. AT#IIDIPV6 - Configure Context Identifier and IID

This command permits to have a fixed IID (Interface Identifier) in IPV6 address associated to a selected context identifier <cid>.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#IIDIPV6=<cid>,<IID>

Parameters:

Name	Type	Default	Description
<cid>	integer	N/A	context identifier, see +CGDCONT command.

Value:

1÷max : specifies a PDP context identifier. max value is returned by test command

<IID>	string	-	can be any valid IP address in one of the two following formats:
-------	--------	---	--

- xxx.xxx.xxx.xxx.xxx.xxx.xxx
- yyyy:yyyy:yyyy:yyyy

If the <IID> is set to 0.0.0.0.0.0.0.0 for a selected <cid>, all the IPv6 address for that <cid> are set by the network.



AT#IIDIPV6?

Read command returns a row for each <cid> reporting the current <IID> setting in the following format:

```
...
#IIDIPV6: <cid>,<IID>
...
```



AT#IIDIPV6=?

Test command returns the supported range of parameter <cid> and the maximum length of <IID>.



Suppose to use the IID "1.2.3.4.5.6.7.8" on the cid 3
AT#IIDIPV6=3,1.2.3.4.5.6.7.8
OK

AT#IIDIPV6?
#IIDIPV6: 1,"0.0.0.0.0.0.0.0"
#IIDIPV6: 2,"0.0.0.0.0.0.0.0"
#IIDIPV6: 3,"1.2.3.4.5.6.7.8"
#IIDIPV6: 4,"0.0.0.0.0.0.0.0"
...
...
OK

Set a socket to use the cid 3
AT#SCFG=2,3
OK

AT#SGACT=3,1
#SGACT: 254.128.0.0.0.0.0.0.0.106.53.29.248.1
OK

3.17. FTPEasy

3.17.1. AT#FTPAPP - FTP Append

This command is used to append data to an already existing file via FTP during an FTP session.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#FTPAPP=<fileName>[,<connMode>]

Set command, issued during an FTP connection, opens a data connection and append data to existing <fileName> file.

If the data connection succeeds, a **CONNECT** indication is sent, afterward a **NO CARRIER** indication is sent when the socket is closed.




Parameters:

Name	Type	Default	Description
<fileName>	string	-	the file name

<connMode>	integer	0	the connection mode
------------	---------	---	---------------------

Values:

- 0 : online mode
- 1 : command mode

-  If <connMode> is set to 1, the data connection is opened, the device remains in command mode and the **OK** result code is displayed (instead of **CONNECT**).
-  Use the escape sequence **+++** to close the data connection.
-  The command causes an **ERROR** result code if no FTP connection has been opened yet.



AT#FTPAPP=?

Test command reports the maximum length of <fileName> and the supported range of values of <connMode>. The format is:

#FTPAPP: <length>, (list of supported <connMode>s)

Additional info:

- ▶▶ Parameter meaning.

Name	Type	Default	Description
<length>	integer	-	is the maximum length of <fileName>

3.17.2. AT#FTPAPPEXT - FTP Append Extended

The command sends data on a FTP data port while the module is in command mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#FTPAPPEXT=<bytesToSend>[,<eof>]

Execution command sends data on a FTP data port while the module is in command mode.

FTP data port must be previously opened by #FTPPUT (or #FTPAPP) with <connMode> parameter set to command mode connection.

After command line is terminated with <CR>, the module responds sending a four characters sequence prompt, and waits for the specified number of bytes:

<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)

When <bytesToSend> bytes have been sent, operation is automatically completed. If (all or part of the) data are successfully sent, then the response is:

#FTPAPPEXT: <sentBytes>
OK

If data sending fails for some reason, an error code is reported.

Parameters:

Name	Type	Default	Description
<bytesToSend>	integer	N/A	number of bytes to be sent
Value:			
1÷1500 : number of bytes			
<eof>	integer	0	data port closure
Values:			
0 : normal sending of data chunk			
1 : close data port after sending data chunk			

Additional info:

▶▶ Parameters:

Name	Type	Default	Description
<sentBytes>	integer	N/A	the number of sent bytes
Value:			
1÷1500 : number of bytes			

i <sentBytes> could be less than <bytesToSend>.

**AT#FTPAPPEXT=?**

Test command reports the supported values of parameters **<bytesToSend>** and **<eof>**.



```
AT#FTPOPEN="IP",username,password
OK
```

```
AT#FTPPUT=<filename>,1
OK
```

the second param (1) means that we open the connection in command mode
Here data socket will stay opened, but interface will be available (command mode)

```
AT#FTPAPPEXT=Size
>binary data
#FTPAPPEXT: <sentBytes>
OK
```

write here the binary data. As soon Size bytes are written, data are sent and **OK** is returned
Last **#FTPAPPEXT** will close the data socket, because second (optional) parameter has this meaning:

```
AT#FTPAPPEXT=Size,1
>binary data
#FTPAPPEXT: <sentBytes>
OK
```

write here the binary data. As soon Size bytes are written, data are sent and **OK** is returned
and the data socket is closed.

If the user has to reopen the data port to send another (or append to the same) file, they can restart with **#FTPPUT** (or **#FTPAPP**).

Then **#FTPAPPEXT** to send the data chunks on the reopened data port.

If, while sending the chunks, the data port is closed from remote, user will be aware of it because **#FTPAPPEXT** will indicate **ERROR** and cause (available if previously issued the command **AT+CMEE=2**) will indicate that socket has been closed.

Also in this case obviously, data port will have to be reopened with **#FTPPUT** and the related commands.

3.17.3. AT#FTPCLOSE - FTP Close Command

The command purpose is to close the previously open FTP connection.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#FTPCLOSE

Execution command closes an FTP connection.



AT#FTPCLOSE=?

Test command returns the **OK** result code.

3.17.4. AT#FTPCWD - FTP Change Working Directory

Command to change the working directory on FTP server.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2




AT#FTPCWD=[<dirname>]

Execution command, issued during an FTP connection, changes the working directory on FTP server.

Parameter:

Name	Type	Default	Description
<dirname>	string	-	Name of the new working directory.

-  The command causes an **ERROR** result code to be returned if no FTP connection has been opened yet.



AT#FTPCWD=?

Test command returns the **OK** result code.

3.17.5. AT#FTPDELE - FTP Delete

This command, issued during a FTP connection, allows to delete a file from the remote working directory.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2





AT#FTPDELE=[<filename>]

Execution command, issued during a FTP connection, deletes a file from the remote working directory.

Parameter:

Name	Type	Default	Description
<filename>	string	-	Name of the file that must be deleted

-  This command returns an **ERROR** result code if no FTP connection has been opened yet.
-  This command returns an **ERROR** result code in case of delayed server response. If this is the case, the **#FTPMSG** response is temporarily empty; a later check of the **#FTPMSG** response will show the server response.



AT#FTPDELE=?

Test command returns **OK** result code.

3.17.6. AT#FTPFSIZE - Get File Size from FTP Server

This command returns the size of a file located on a FTP server.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#FTPFSIZE=<filename>

Execution command, issued during an FTP connection, permits to get the size of a file located on a FTP server. The response format is:

#FTPFSIZE: <size>

Parameter:

Name	Type	Default	Description
<filename>	string	-	the name of the file that you want to know the size

Additional info:

▶▶ Parameter:

Name	Type	Default	Description
<size>	integer	-	dimension in bytes of the file located on the FTP server



AT#FTPTYPE=0 command must be issued before **#FTPFSIZE** command, to set file transfer type to binary mode.



AT#FTPFSIZE=?

Test command returns **OK** result code.

3.17.7. AT#FTPGET - FTP Get Command

This command executes the FTP Get function during an FTP connection.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2





AT#FTPGET=[<filename>]

Execution command opens a data connection and starts getting a file from the FTP server. If the data connection succeeds a **CONNECT** indication is sent and the file is received on the serial port.

Parameter:

Name	Type	Default	Description
<filename>	string	-	file name to get from server.

-  The command causes an **ERROR** result code to be returned in case no FTP connection has been opened yet.
-  Command closure should always be handled by application. To avoid download stall situations a timeout should be implemented by the application.



AT#FTPGET=?

Test command returns the **OK** result code.

3.17.8. AT#FTPGETPKT - FTP Get in Command Mode

FTP gets in command mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#FTPGETPKT=<fileName>[,<viewMode>]

Execution command, issued during an FTP connection, opens a data connection and starts getting a file from the FTP server while remaining in command mode.

The data port is opened, we remain in command mode and we see the result code **OK**.

Retrieval from FTP server of <fileName> is started, but data are only buffered in the module.



It is possible to read data afterwards issuing #FTPGETPKT command.

Parameters:

Name	Type	Default	Description
<fileName>	string	-	file name. Maximum length: 200 characters.
<viewMode>	integer	0	choose the view mode

Values:

- 0 : text format
- 1 : hexadecimal format

-  The command causes an **ERROR** result code to be returned in case no FTP connection has been opened yet.
-  Command closure should always be handled by application. To avoid download stall situations a timeout should be implemented by the application.



AT#FTPGETPKT?

Read command reports current download state for <fileName> with <viewMode> chosen, in the format:

#FTPGETPKT: <remotefile>,<viewMode>,<eof>

Additional info:

- ▶▶ The following parameter signals the state of the file transmission.

Name	Type	Default	Description
<eof>	integer	N/A	End of file

Values:

- 0 : file currently being transferred
- 1 : complete file has been transferred to FTP client



AT#FTPGETPKT=?

Test command returns **OK** result code.

3.17.9. AT#FTPLIST - FTP List

This command is used during a FTP connection.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2





AT#FTPLIST=[<name>]

Execution command, issued during an FTP connection, opens a data connection and starts getting from the server the list of contents of the specified directory or the properties of the specified file

Parameter:

Name	Type	Default	Description
<name>	string	-	is the name of the directory or file

-  The command causes an **ERROR** result code to be returned if no FTP connection has been opened yet.
-  Issuing **AT#FTPLIST<CR>** opens a data connection and starts getting from the server the list of contents of the working directory.



AT#FTPLIST=?

Test command returns the **OK** result code.

3.17.10. AT#FTPMSG - FTP Read Message

This command returns the last response received from the FTP server.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#FTPMSG

Execution command returns the last response received from the server during an FTP connection.



AT#FTPMSG=?

Test command returns the **OK** result code.

3.17.11. AT#FTPOPEN - FTP Connection Opening

This execution command opens an FTP connection toward the FTP server.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#FTPOPEN=[[<server:port>,<username>,<password>,<mode>],<cid>]

Parameters:

Name	Type	Default	Description
<server:port>	string	-	address and port of FTP server (factory default port 21)
<username>	string	-	authentication user identification for FTP
<password>	string	-	authentication password for FTP
<mode>	integer	0	active or passive mode
Values:			
	0	:	active mode
	1	:	passive mode
<cid>	string	-	PDP context identifier

- i** Before opening an FTP connection the PDP context (or GSM context) must have been activated by **AT#SGACT=x,1** command. The context identifier "x" is the one used by FTP, as specified in **#PROTOCOLCFG** command.



AT#FTPOPEN=?

Test command returns the **OK** result code

3.17.12. AT#FTPPUT - FTP Send File

This command sends a file to the FTP server.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2



AT#FTPPUT=[<filename>[,<connMode>]]



Execution command, issued during an FTP connection, opens a data connection and starts sending <filename> file to the FTP server.

Parameters:

Name	Type	Default	Description
<filename>	string	-	name of the file (maximum length 200 characters)
<connMode>	integer	0	<p>select online or command mode:</p> <p>If online mode is selected (default) and the data connection succeeds, a CONNECT indication is sent; afterward a NO CARRIER indication is sent when the socket is closed.</p> <p>If command mode is selected and the data connection succeeds, we remain in command mode and we see the result code OK (instead of CONNECT).</p>

Values:

- 0 : online mode
- 1 : command mode

-  Use the escape sequence **+++** to close the data connection.
-  The command causes an **ERROR** result code to be returned if no FTP connection has been opened yet.



AT#FTPPUT=?

Test command reports the maximum length of <filename> and the supported range of values of <connMode>.

Additional info:

- ▶▶ The format is:
#FTPPUT: <length>, (list of supported <connMode>s)

Name	Type	Default	Description
<length>	integer	-	maximum length of <filename>

3.17.13. AT#FTPPWD - FTP Print Working Directory


This command, issued during an FTP connection, shows the current working directory on FTP server.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#FTPPWD

Execution command, issued during an FTP connection, shows the current working directory on FTP server.

-  The command causes an **ERROR** result code to be returned if no FTP connection has been opened yet.



AT#FTPPWD=?

Test command returns the **OK** result code.

3.17.14. AT#FTPRECV - Receive Data in Command Mode

The command permits the user to read a given amount of data already transferred via FTP from a remote file.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#FTPRECV=<blockSize>

Execution command permits the user to transfer at most <blocksize> bytes of remote file, provided that retrieving from the FTP server has been started with a previous #FTPGETPKT command, onto the serial port.




This number is limited to the current number of bytes of the remote file which have been transferred from the FTP server.

Parameter:

Name	Type	Default	Description
<blockSize>	integer	N/A	maximum number of bytes to read

Value:

1÷3000 : maximum number of bytes to read

-  It is necessary to have previously opened FTP data port and started download and buffering of remote file through #FTPGETPKT command.
-  Issuing #FTPRECV when there is no FTP data port opened raises an error.
-  Data port will stay opened if socket is temporary waiting to receive data (#FTPRECV returns 0 and #FTPGETPTK gives an EOF 0 indication).



AT#FTPRECV?

Read command reports the number of bytes currently transferred from FTP server in the format:

#FTPRECV: <available>

Additional info:

▶▶ Parameter:

Name	Type	Default	Description
<available>	integer	-	number of transferred bytes and available for reading



AT#FTPRECV=?

Test command returns the supported values for parameter <blocksize>.



```
AT#FTPRECV?
#FTPRECV: 3000
OK
```

Read required part of the buffered data:

```
AT#FTPRECV=400
#FTPRECV:400
Text row number 1 * 11111111111111111111111111111111 *
Text row number 2 * 222222222222222222222222222222 *
Text row number 3 * 333333333333333333333333333333 *
Text row number 4 * 444444444444444444444444444444 *
Text row number 5 * 555555555555555555555555555555 *
Text row number 6 * 666666666666666666666666666666 *
Text row number 7 * 777777777777777777777777777777 *
Text row number 8 * 888888888888888888888888888888
OK
```

```
AT#FTPRECV=200
#FTPRECV:200
88888 *
Text row number 9 * 999999999999999999999999999999 *
Text row number 10 * AAAAAAAAAAAAAAAAAAAAAAAAAAAAAA *
Text row number 11 * BBBBBBBBBBBBBBBBBBBBBBBBBBBBBB *
Text row number 12 * CCCCCCCCCCCCCCCCCC
OK
```

To check when you have received complete file it is possible to use **#FTPGETPKT** read command:

```
AT#FTPGETPKT?
#FTPGETPKT:sample.txt,0,1
OK
```

(you will get <eof> set to 1)

3.17.15. AT#FTPREST - Set Restart Position for FTP GET

Set command sets the restart position for successive #FTPGET (or #FTPGETPKT) command. It permits to restart a previously interrupted FTP download from the selected position in byte.




SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#FTPREST=[<restartPosition>]

Parameter:

Name	Type	Default	Description
<restartPosition>	integer	-	position in byte of restarting for successive #FTPGET (or #FTPGETPKT)

-  It is necessary to issue #FTPTYPE=0 before successive #FTPGET (or #FTPGETPKT) command) to set binary file transfer type.
-  Setting <restartPosition> takes effect on successive FTP download. After successive successfully initiated #FTPGET (or #FTPGETPKT) command <restartPosition> is automatically reset.
-  Value set for <restartPosition> takes effect on next data transfer (data port opened by #FTPGET or #FTPGETPKT). Then <restartPosition> value is automatically assigned to 0 for next download.



AT#FTPREST?

Read command returns the current <restartPosition>:

#FTPREST:<restartPosition>



AT#FTPREST=?

Test command returns the OK result code.

3.17.16. AT#FTPPTO - FTP Time Out

Set the FTP time out.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#FTPPTO=[<tout>]

Set command sets the time out used when opening either the FTP control channel or the FTP traffic channel.

Parameter:

Name	Type	Default	Description
<tout>	integer	100	time out in 100 milliseconds units

Value:

100÷5000 : hundreds of milliseconds



AT#FTPPTO?

Read command returns the current FTP operations time out in the format:

#FTPPTO: <tout>



AT#FTPPTO=?

Test command returns the supported values of parameter <tout>.

3.17.17. AT#FTPTYPE - FTP Type

This command sets the FTP file transfer type.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#FTPTYPE=[<type>]

Set command, issued during a FTP connection, sets the file transfer type.

Parameter:

Name	Type	Default	Description
<type>	integer	N/A	file transfer type

Values:

0 : binary

1 : ASCII



The command causes an **ERROR** result code to be returned if no FTP connection has been opened yet.



AT#FTPTYPE?

Read command returns the current file transfer type, in the format:

#FTPTYPE: <type>



AT#FTPTYPE=?

Test command returns the range of available values for parameter <type>:

#FTPTYPE: (0,1)

3.17.18. AT#FTPCFG - FTP Configuration

This command sets the time-out used when opening either the FTP control channel or the FTP traffic channel.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#FTPCFG=<tout>,<IPPignoring>[,<FTPSEn>]

Parameters:

Name	Type	Default	Description
<tout>	integer	100	time out in 100 milliseconds units

Value:

100÷5000 : hundreds of ms

<IPPignoring>	integer	N/A	enable or disable IP private ignoring
---------------	---------	-----	---------------------------------------

Values:

- 0 : No IP Private ignoring. During a FTP passive mode connection client uses the IP address received from server, even if it is a private IPV4 address.
- 1 : IP Private ignoring enabled. During a FTP passive mode connection if the server sends a private IPV4 address the client doesn't consider this and connects with server using the IP address used in AT#FTPOPEN.

<FTPSEn>	integer	N/A	enable or disable FTPS security
----------	---------	-----	---------------------------------

Values:

- 0 : disable FTPS security: all FTP commands will perform plain FTP connections.
- 1 : enable FTPS security: from now on any FTP session opened through FTP commands will be compliant to FTPS protocol, providing authentication and encrypted communication.

i In FTPS mode, FTP commands response time is generally bigger than in normal FTP mode. This latency is mainly due to the SSL handshake that has to be done at the opening of the FTP session (**#FTPOPEN**) and whenever a data exchange is required (**#FTPPUT**, **#FTPGET** etc.).

i FTP security cannot be enabled if an SSL socket has been activated by means of **#SSLD** or **#SSLFASTD**. Moreover, trying to dial an SSL socket when **<enable>=1** raises an error.

i Any **<enable>** change is forbidden during an open FTP connection (with or without security). Furthermore, SSL configuration settings are forbidden during FTPS connections.

**AT#FTPCFG?**

Read command reports the currently selected parameters in the format:

#FTPCFG: <tout>,<IPPignoring>,<FTPSEn>

**AT#FTPCFG=?**

Test command reports the supported range of values for parameter:
<tout>, <IPPignoring> and <FTPSEn>.

3.18. SMTP

3.18.1. AT#ESMTP - E-mail SMTP Server

This command allows to set the SMTP server address for e-mail sending.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#ESMTP=<smtp>

Set command sets the SMTP server address, used for sending e-mails. SMTP server can be specified as IP address or as nick name.

Parameter:

Name	Type	Default	Description
<smtp>	string	-	SMTP server address. This parameter can be either: <ul style="list-style-type: none"> any valid IP address in the format: "xxx.xxx.xxx.xxx" any host name to be solved with a DNS query in the format: <host name> (factory default is the empty string "").



The SMTP server used shall be inside the APN space (the SMTP server provided by the network operator) or it must allow the relay, otherwise the command will refuse to send the e-mail.



AT#ESMTP?

Read Command reports the current SMTP server address, in the format:

#ESMTP: <smtp>



AT#ESMTP=?

Test command returns the max length for the parameter <smtp>.



Example of SMTP server format name:

```
AT#ESMTP="smtp.mydomain.com"
OK
```

3.18.2. AT#EMAILMSG - SMTP Read Message

The command returns the last response from SMTP server.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT#EMAILMSG

Execution command returns the last response from SMTP server.



AT#EMAILMSG=?

Test command returns the **OK** result code.

3.18.3. AT#SMTPCFG - Configure SMTP Parameters

Configure SMTP parameters

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#SMTPCFG=<ssl_enabled>[,<port>[,<mode>[,<unused1>[,<pkt_size>[,<unused2>]]]]]

Sets the parameters needed to the SMTP connection

Parameters:

Name	Type	Default	Description
<ssl_enabled>	integer	0	Numeric parameter indicating if the SSL encryption is enabled
Values:			
0	:	SSL encryption disabled	
1	:	SSL encryption enabled	
<port>	string	25	SMTP port to contact
Values:			
25÷465	:	SMTP port to contact	
587	:	SMTP port to contact	
<mode>	integer	0	SMTP start session command
Values:			
0	:	SMTP start session command HELO	
1	:	SMTP start session command EHLO	
<unused1>	integer	0	for future purpose
Value:			
0	:	use this value	
<pkt_size>	string	1024	send size for attachment sending (see #SMTPCL command)
Values:			
0	:	select automatically default value (1024)	
1÷1500	:	send size in bytes	
<unused2>	integer	0	for future purpose
Value:			
0	:	use this value	

- i** The SSL encryption can be enabled only if **<Enable>** parameter of **#SSLEN** is set to 0, **<FTPSEn>** parameter of **#FTPCFG** is set to 0 and **<ssl_enabled>** parameter of **#HTTPCFG** is set to 0

**AT#SMTPCFG?**

Returns the current settings in the format

#SMTPCFG:<ssl_enabled>,<port>,<mode>,0,<pkt_size>,0<CR><LF>

**AT#SMTPCFG=?**

Returns the supported range of parameters <ssl_enabled>, <port>, <mode> and <pkt_size> in the format:

#SMTPCFG: (list of supported <ssl_enabled>s),(list of supported <port>s),(list of supported <mode>s),(0),(list of supported <pkt_size>s) ,(0)

3.18.4. AT#ERST - E-mail Parameters Reset

This execution command resets the e-mail parameters to the "factory default" configuration.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#ERST

The e-mail parameters to reset are:

- E-mail User Name
- E-mail Password
- E-mail Sender Address
- E-mail SMTP server



AT#ERST=?

Test command returns the **OK** result code.

3.18.5. AT#ESAV - E-mail Parameters Save

This execution command stores the e-mail parameters in the NVM.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#ESAV

The e-mail parameters that are stored are:

- E-mail User Name
- E-mail Password
- E-mail Sender Address
- E-mail SMTP server



AT#ESAV=?

Test command returns the **OK** result code.



If a parameter value has not been previously specified using the e-mail parameters setting commands, like **#EADDR**, then a default value will be taken.

3.18.6. AT#EUSER - E-mail Authentication User Name

This command sets the user identification string to be used during the SMTP authentication step.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2




AT#EUSER=[<eUser>]

Parameter:

Name	Type	Default	Description
<eUser>	string	""	string containing the e-mail authentication User ID

Value:

"" : factory default

 If no authentication is required then the <eUser> parameter must be the empty string "".



AT#EUSER?

Read command returns the value of the current user identification string <e-user>, in the format:

#EUSER: <eUser>



AT#EUSER=?

Test command returns the maximum allowed length of the string parameter <eUser>



```
AT#EUSER="myE-Name"
OK
```

```
AT#EUSER?
#EUSER: "myE-Name"
OK
```

3.18.7. AT#ESMTPPORT - E-mail SMTP Port

This command sets SMTP port.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#ESMTPPORT=<Port>

Parameter:

Name	Type	Default	Description
<Port>	string	25	SMTP port to contact

Value:

25÷465, : SMTP port values
587

 SMTP protocol is used on the selected port.



AT#ESMTPPORT?

Read command reports the currently selected <Port> in the format:

#ESMTPPORT: <Port >



AT#ESMTPPORT=?

Test command reports the supported range of values for parameter < Port >.

3.18.8. AT#EPASSW - E-mail Authentication Password

This command sets the password string to be used during the authentication step of the SMTP.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#EPASSW=[<ePwd>]

Parameter:

Name	Type	Default	Description
<ePwd>	string	""	e-mail authentication password that can have any string value up to max length reported by test command

Value:

"" : factory default



If no authentication is required then the <ePwd> parameter shall be empty "".



AT#EPASSW=?

Test command returns the maximum allowed length of the string parameter <ePwd>.



```
AT#EPASSW="myPassword"
OK
```

3.18.9. AT#EMAILD - E-mail Sending

This command sends an e-mail message.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#EMAILD=[<da>,<subj>]

A PDP context shall have been activated through **AT#SGACT=x,1**. The context "x" is the one used by SMTP, as specified by **#PROTOCOLCFG** command. It is also possible to send an e-mail on the GSM context, if it has already been activated by **AT#SGACT=0,1**.

After command line is terminated with **<CR>**, the device responds sending a four character sequence prompt:




<CR><LF><greater_than><space> (see IRA character set: 13, 10, 62, 32)

To complete the operation, send **Ctrl-Z** char (**0x1A** hex). To exit without completing the operation send **ESC** char (**0x1B** hex).

If the e-mail message is successfully sent, then the response is **OK**. If message sending fails for some reason, an error code is reported.

Parameters:

Name	Type	Default	Description
<da>	string	-	destination address (maximum length 100 characters).
<subj>	string	-	subject of the message (maximum length 100 characters).

-  If the length of one of the string type parameters exceeds the maximum length, then the string is truncated.
-  Care must be taken to ensure that during the command execution, no other commands are issued: to avoid malfunctions it is suggested to wait for the **OK** or **ERROR / +CMS ERROR:<err>** response before issuing further commands.
-  Maximum length for message body is 1500: trying to send more data will cause the surplus to be discarded and lost.



AT#EMAILD=?

Test command returns **OK** result code.



```
AT#EMAILD="me@myaddress.com","subject of the mail"
>message body... . This is the text of the mail message
CTRL-Z
... wait...
OK
Message has been sent.
```

3.18.10. AT#SMTPCL - Send an e-Mail with an Attachment

This command permits to send an e-mail with different types of attachments. Before using this command, a context must be activated.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SMTPCL=<da>,<subj>,<att>[,<filename>,<encod>]

After sending message body text (as with **#EMAILD** command), the command switches to online mode if an attachment must be sent.

While in online mode, data received on the serial port are transmitted on the SMTP socket as MIME (Multipart Internet Mail Extension) attachment.



To close the SMTP connection, you must send the escape sequence.

If you are sending binary data the encoding of data received on the serial port will be performed before transmission on the SMTP socket.

Parameters:

Name	Type	Default	Description
<da>	string	-	destination address. The maximum permitted length is 100 characters.
<subj>	string	-	subject of the message. The maximum permitted length is 100 characters.
<att>	integer	0	attached file flag
Values:			
0 : no attachment.			
1 : attach a text file			
2 : attach a binary file (jpg, bin, pdf, ...)			
<filename>	string	-	attached file name. The maximum permitted length is 50 characters.
<encod>	integer	N/A	Content-Transfer-Encoding used for attachment. The parameter is used for a check on consistency of input data: there is no default value.
Values:			
0 : "7bit" means data all represented as short lines of US-ASCII data			
1 : "base64" designed to represent arbitrary sequences of octets in a form that need not be humanly readable			

- i** If no attachment (**<att>=0**) must be sent, the behavior is the same as with **#EMAILD** command.
After **CTRL-Z**, **OK** message is returned (if connection was successful) and the switch to online mode is not performed.
- i** If a text file (**<att>=1**) is attached, only **<encod>=0** ("7bit") is possible.
If a binary file (**<att>=2**) is attached, only **<encod>=1** ("base64") is possible.
- i** If **<att>=0** and **<filename>** is present and not empty, the attachment won't be considered.

-  if **<att>** is set to 1 or 2 and **<filename>** is not present, command will return an **ERROR** message.
-  Default SMTP port (25) is used

**AT#SMTPCL=?**

Test command reports the supported range of values for integer type parameters and the maximum permitted length of string type parameters, in the format:

#SMTPCL: <da>,<subj>,<att>[,<filename>,<encod>]



- Example with a text file attached to the email.
AT#SMTPCL="me@myaddress.com","test1",1,"sample.txt",0
 >message body ... this is the text of the mail message ...
 Send CTRL-Z
CONNECT
 ... data received on the serial port are sent as attachment ...

 Send escape sequence to close the SMTP connection
+++
NO CARRIER
- Example with an image file attached to the email.
AT#SMTPCL="me@myaddress.com","test2",2,"image.jpg",1
 >message body ... this is the text of the mail message ...
 Send CTRL-Z
CONNECT
 ... data received on the serial port are base64-encoded and sent as attachment ...

 Send escape sequence to close the SMTP connection
+++
NO CARRIER

3.18.11. AT#EADDR - E-mail Sender Address

This command sets the sender address string to be used for sending the e-mail.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#EADDR=[<eAddr>]

Parameter:

Name	Type	Default	Description
<eAddr>	string	""	sender address. This parameter can be set to any string with any length up to the one reported by the test command.

Value:

"" : default value



AT#EADDR?

Read command reports the current sender address, in the format:

#EADDR: <eAddr>



AT#EADDR=?

Test command returns the maximum allowed length of the string parameter <eAddr>.



The examples describe how to set and get the sender e-mail address.

- Set the sender e-mail address.
AT#EADDR="me@email.box.com"
OK
- Get sender e-mail address.
AT#EADDR?
#EADDR: "me@email.box.com"
OK

		1-65535	:	time interval in seconds to wait for receiving data from HTTP server.
<cid>	integer	N/A		PDP context identifier. Refer to additional info section for default value.
				Value:
		1-max	:	max value is returned by test command
<pkt_size>	integer	300		configure send or receive packet size:
				<ul style="list-style-type: none"> • send (#HTTPSND) • rcv (#HTTPCV)
				Values:
		0	:	select automatically default value
		1-1500	:	send or rcv size in bytes
<unused1>	integer	-		parameter for future use. Must be set to 0.
<unused2>	integer	-		parameter for future use. Must be set to 0.

Additional info:

- ▶▶ The default value of **<cid>** parameter depends on the product as shown in the following table.

Products	<cid> default value
LE910-SV V2 and LE910-SV1	3
All other	1


- i** A special form of the set command, **AT#HTTPCFG=<prof_id>**, causes the values for profile number **<prof_id>** to reset to default values.
- i** Only one profile can use the SSL encryption.
- i** The SSL encryption can be enabled only if **<Enable>** parameter of **#SSLEN** is set to 0, and **<FTPSEn>** parameter of **#FTPCFG** is set to 0.
- i** If it's needed to configure security parameters, it is possible to use **#SSLSECCFG** and **#SSLSECDATA** commands as usual for **#SSLD**.



AT#HTTPCFG?

Read command returns the current settings for each defined profile in the format:

```
#HTTPCFG:<prof_id>,<server_address>,<server_port>,<auth_type>,<username>,<password>,<ssl_enabled>,<timeout>,<cid>,<pkt_size>,0,0<CR><LF>[<CR><LF>]
#HTTPCFG:<prof_id>,<server_address>,<server_port>,<auth_type>,<username>,<password>,<ssl_enabled>,<timeout>,<cid>,<pkt_size>,0,0<CR><LF>[...]
```

 **AT#HTTPCFG=?**

Test command returns the supported range of parameters **<prof_id>**, **<server_port>**, **<auth_type>**, **<ssl_enabled>**, **<timeout>**, **<cid>** and **<pkt_size>** and the maximum length of **<server_address>**, **<username>** and **<password>** parameters in the format:

HTTPCFG: (list of supported **<prof_id>s**),**<s_length>**,(list of supported **<server_port>s**), (list of supported **<auth_type>s**),**<u_length>**,**<p_length>**,(list of supported **<ssl_enabled>s**),(list of supported **<timeout>s**),(list of supported **<cid>s**),(list of supported **<pkt_size>s**)

Additional info:

- ▶▶ Meaning of the **<..._length>** parameters:

Name	Type	Default	Description
<s_length>	integer	-	maximum length of parameter <server_address>
<u_length>	integer	-	maximum length of parameter <username> .
<p_length>	integer	-	maximum length of parameter <password>

3.19.2. AT#HTTPQRY - Send HTTP GET, HEAD or DELETE Request

This command performs a GET, HEAD or DELETE request to HTTP server.



Standard RFC 2616

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#HTTPQRY=<prof_id>,<command>,<resource>[,<extra_header_line>]

Parameters:

Name	Type	Default	Description
<prof_id>	integer	N/A	profile identifier
Value:			
0=2 : identifier values			
<command>	integer	0	identifies command requested to HTTP server
Values:			
0 : GET			
1 : HEAD			
2 : DELETE			
<resource>	string	-	is the HTTP resource (URI), object of the request
<extra_header_line>	string	-	is the optional HTTP header line

Additional info:

- ▶▶ When the HTTP server answer is received, then the following URC is put on the serial port:

#HTTPRING: <prof_id>,<http_status_code>,<content_type>,<data_size>

If there are no data from server or the server does not answer within the time interval specified in <timeout> parameter of #HTTPCFG command, then the URC #HTTPRING <http_status_code> parameter has value 0.

Name	Type	Default	Description
<http_status_code>	string	-	is the status code, as received from the server, see RFC 2616
<content_type>	string	-	reports the "Content-Type" header line, as received from the server, see RFC 2616
<data_size>	string	-	is the byte amount of data received from the server. If the server does not report the "Content-Length:" header line, the parameter value is 0.

- ▶▶ To set more than one HTTP header line in parameter **<extra_header_line>**, they have to be separated by ">>"

Example:

AT#HTTPQRY=0,0, "myURI", "Content-Type: xyz">>Authorization: something"

- i** If sending ends successfully, the response is **OK**; otherwise an error code is reported. The HTTP request header sent with **#HTTPQRY** always contains the "Connection: close" line, and it cannot be removed.



AT#HTTPQRY=?

Test command reports the supported range of values for the parameters **<prof_id>** and **<command>** and the maximum length of **<resource>** parameter in the format:

#HTTPQRY:(list of supported <prof_id>s),(list of supported <command>s),<r_length>, <m_length>

Additional info:

- ▶▶ Meaning of **<..._length>** parameters:

Name	Type	Default	Description
<r_length>	integer	-	maximum length of parameter <resource> .
<m_length>	integer	-	maximum length of parameter <extra_header_line> .

3.19.3. AT#HTTPSND - Send HTTP POST or PUT request

This command performs a POST or PUT request to HTTP server and starts sending data to the server.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#HTTPSND=<profilid>,<command>,<resource>,<dataLen>[,<postParam>[,<extraHeaderLine>]]

After entering **AT#HTTPSND=...** command, and terminated the command line with <CR>, the module returns the following three characters sequence prompt, and waits for data to send:

<greater_than><greater_than><greater_than> (see IRA character set: 62, 62, 62)

Now, data can be entered from TE, sized <dataLen> bytes. If sending ends successfully the response will be **OK**, otherwise an error code will be reported.

When the HTTP server answer is received, the URC will be available on the serial port with the following format:

#HTTPRING: <profilid>,<httpStatusCode>,<contentType>,<dataSize>

The URC parameters are described in Unsolicited Field section.

Parameters:

Name	Type	Default	Description
<profilid>	integer	N/A	profile identifier
	Value:		
	0÷2	:	profile identifier
<command>	integer	N/A	command requested to HTTP server
	Values:		
	0	:	POST command
	1	:	PUT command
<resource>	string	-	HTTP resource (uri), object of the request
<dataLen>	integer	-	data length to send in bytes
<postParam>	string	N/A	HTTP Content-type identifier, used only for POST command, optionally followed by colon character (:) and a string that extends with sub-types the identifier
	Values:		
	1[:extension]	:	"text/plain" with optional extension
	2[:extension]	:	"application/octet-stream" with optional extension
	3[:extension]	:	"multipart/form-data" with optional extension
	other	:	free string corresponding to other content type and possible sub-types
<extraHeaderLine>	string	-	optional HTTP header line

Unsolicited fields:

Name	Type	Description
<httpStatusCode>	integer	status code, as received from the server (see RFC 2616)
<contentType>	string	"Content-Type" header line, as received from the server (see RFC 2616)
<dataSize>	integer	byte amount of data received from the server (if the server doesn't report the "Content-Length:" header line, the parameter value is 0)

- i** The HTTP request header sent with **#HTTPSND** always contains the "Connection: close" line, and it cannot be removed.
- i** If there are no data from server or the server doesn't answer within the time interval specified in <timeout> parameter of **#HTTPCFG** command, then the URC **#HTTTPRING** <http_status_code> parameter will have value 0.



AT#HTTPSND=?

Test command returns the supported range of parameters <profil>, <command> and <dataLen> and the maximum length of <resource>, <postParam> and <extraHeaderLine> string parameters in the format:

HTTPSND: (list of supported <profil>s),(list of supported <command>s), <rLength>, (list of supported <dataLen>s),<pLength>,<mLength>

Additional info:

- ▶▶ <...Length> parameters meaning:

Name	Type	Default	Description
<rLength>	integer	-	maximum length of parameter <resource>
<pLength>	integer	-	maximum length of parameter <postParam>
<mLength>	integer	-	maximum length of parameter <extraHeaderLine>



POST commands examples.

- Post 100 byte without "Content-type" header
AT#HTTPSND=0,0,"/",100
>>>
- Post 100 byte with "application/x-www-form-urlencoded"
AT#HTTPSND=0,0,"/",100,0
>>>
- Post 100 byte with "multipart/form-data" and extension
AT#HTTPSND=0,0,"/",100,"3:boundary=----FormBoundary"
>>>

3.19.4. AT#HTTTPRCV - Receive HTTP Server Data

This command permits the user to read data from HTTP server in response to a previous HTTP module request.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#HTTTPRCV=<profilid>[,<maxByte>]

The module is notified of these data by the #HTTTPRING URC.



The device shall prompt a three-character sequence followed by the data:

<less_than><less_than><less_than> (see IRA character set: 60,60,60)

If reading ends successfully, the response is **OK**; otherwise an error code is reported.

Parameters:

Name	Type	Default	Description
<profilid>	integer	N/A	profile identifier
Value:			
0÷2 : profile identifier			
<maxByte>	integer	0	max number of bytes to read at a time
Value:			
0, : 0 means infinite size. 64÷1500			

-  If <maxByte> is unspecified, server data will be transferred all in once.
-  If the data are not present or the #HTTTPRING <httpStatusCode> parameter has value 0, an error code is reported.



AT#HTTTPRCV=?

Test command reports the supported range of values for <profilid> and <maxByte> parameters in the format:

HTTTPRCV: (list of supported <profilid>s,<maxByte>)

3.20. SSL

3.20.1. AT#SSLCFG - Configure General Parameters of a SSL Socket

This command configures SSL connection parameters.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#SSLCFG=<SSId>,<cid>,<pktSz>,<maxTo>,<defTo>,<txTo>[,<SSLSRingMode>[,<noCarrierMode>[,<unused1>[,<unused2>]]]]]

Set command allows configuring SSL connection parameters.

SSLSRING unsolicited result code can be disabled or enabled in one of two available formats:

decoded data format: **SSLSRING: <SSId>,<recData>**

chunk of data format: **SSLSRING: <SSId>,<dataLen>,<data>**

Parameters:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier
Value:			
1	:	Until now SSL block manages only one socket	
<cid>	integer	-	dummy parameter. The PDP context identifier used by SSL is specified in #PROTOCOLCFG command.
<pktSz>	integer	0	packet size to be used by the SSL/TCP/IP stack for data sending
Values:			
0	:	select automatically default value (300)	
1÷1500	:	number of bytes	
<maxTo>	integer	90	exchange timeout or socket inactivity timeout; in online mode, if there's no data exchange within this timeout period, the connection is closed
Values:			
0	:	no timeout	
1÷65535	:	timeout in seconds	
<defTo>	integer	100	timeout that will be used by default whenever the corresponding parameter of each command is not set
Value:			
10÷5000	:	timeout in tenth of seconds	
<txTo>	integer	50	data sending timeout; in online mode, after this period data are sent also if they're less than max packet size
Values:			
0	:	no timeout	

		1÷255	:	timeout value in hundreds of milliseconds
<SSLSRingMode>	integer	0		enables/disables SSLSRING : unsolicited mode and format
	Values:			
	0	:		disable
	1	:		enable decoded data format, see Additional info section
	2	:		enable chunk of data format, see Additional info section
<noCarrierMode>	integer	0		selects the NO CARRIER indication format when the secure socket is closed
	Values:			
	0	:		NO CARRIER without additional information
	1	:		NO CARRIER: SSL,<SSId> See Additional info section
	2	:		NO CARRIER: SSL,<SSId>,<cause> See Additional info section
<unused1>	mixed	-		unused
<unused2>	mixed	-		unused

Additional info:

- ▶▶ When **<SSLSRingMode>= 1** a new unsolicited is sent whenever the amount of data ready to be read changes, the unsolicited format is:

SSLSRING: <SSId>,<recData>

Only a record is decoded at once so, any further record is received and decoded only after the first have been read by the user by means of the **#SSLRCV** command.

<recData> is described in the Unsolicited fields section.

- ▶▶ When **<SSLSRingMode>= 2** the unsolicited format is:

SSLSRING: <SSId>,<dataLen>,<data>

<dataLen> and **<data>** are described in the Unsolicited fields section.

- ▶▶ The **NO CARRIER** indication can be followed by additional information:

NO CARRIER: SSL,<SSId>,<cause>

NO CARRIER: SSL,<SSId>,<cause>

The fixed "**SSL**" string distinguishes secure sockets from TCP sockets.

Name	Type	Default	Description
<cause>	integer	N/A	cause of the secure socket closure



Values:

- 0 : not available (secure socket has not yet been closed)
- 1 : the remote TCP connection has been closed (RST, or any fatal error in send/rcv are all included within this case)

- 2 : socket inactivity timeout
- 3 : network deactivation (PDP context deactivation from network)
- 4 : SSL "Close Notify Alert" message has been received
- 5 : the remote TCP connection has been closed(FIN) after all data have been retrieved from socket
- 6 : closure due to any other SSL alert different from the previous ones

Unsolicited fields:

Name	Type	Description
<recData>	integer	amount of data received and decoded by the SSL socket
<dataLen>	integer	length of the current chunk of data in bytes
<data>	hex	received data in ASCII format

-  The parameters cannot be changed if the secure socket is connected.
-  If secure socket is not enabled using **#SSLEN** only test requests can be made. Read command can be issued if at least a **<SSId>** is enabled.



AT#SSLCFG?

Read command reports the parameters current values in the format:

#SSLCFG:

<SSId>,<cid>,<pktSz>,<maxTo>,<defTo>,<txTo>,<ssISRingMode>,<noCarrierMode>,0,0

-  Read command can be issued if at least a **<SSId>** is enabled.



AT#SSLCFG=?

Test command reports the ranges of all parameters values.

3.20.2. AT#SSLSECCFG - Configure Security Parameters of a SSL Socket

This command allows configuring SSL connection parameters.




SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#SSLSECCFG=<SSId>,<CipherSuite>,<auth_mode>[,<cert_format>]

Parameters:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier
Value:			
1 : Until now only one SSL socket is available			
<CipherSuite>	integer	0	cipher suite
Values:			
0 : chiper suite is chosen by remote server among the following: TLS_RSA_WITH_AES_256_CBC_SHA, TLS_RSA_WITH_AES_128_CBC_SHA, TLS_RSA_WITH_RC4_128_SHA, TLS_RSA_WITH_RC4_128_MD5			
1 : TLS_RSA_WITH_RC4_128_MD5			
2 : TLS_RSA_WITH_RC4_128_SHA			
3 : TLS_RSA_WITH_AES_128_CBC_SHA			
4 : TLS_RSA_WITH_NULL_SHA			
5 : TLS_RSA_WITH_AES_256_CBC_SHA			
<auth_mode>	integer	0	authentication mode
Values:			
0 : SSL Verify None			
1 : manage server authentication			
2 : manage server and client authentication if requested by the remote server			
<cert_format>	integer	1	selects the format of the certificate to be stored via #SSLSECDATA command
Values:			
0 : DER format			
1 : PEM format			

-  Assume that the module is just powered on and the **#SSLSECCFG** command is entered without **<cert_format>** parameter, the default format is PEM. In this case the **#SSLSECCFG?** read command doesn't return the setting of the format to meet backward compatibility with other families. Now, let's assume that **#SSLSECCFG** command is entered again, but using the **<cert_format>** parameter for the first time: if the read command is entered, it reports the parameter value just used. Subsequently, if the **<cert_format>** is omitted, the **#SSLSECCFG?** read command reports the parameter value entered the last time.
-  Server CA certificate must be stored through **#SSLSECDATA**.
-  If secure socket is not enabled using **#SLEN** command, only test command can be used.

**AT#SSLSECCFG?**

Read command reports the currently selected parameters in the format:

#SSLSECCFG: <SSId>,<CipherSuite>,<auth_mode>[,<cert_format>]

Read command returns **ERROR** if secure socket has not been enabled using **#SLEN** command.

**AT#SSLSECCFG=?**

Test command returns the range of supported values for all the parameters.

3.20.3. AT#SSLEN - Enable a SSL Socket

This command activates/deactivates a socket secured by SSL.



SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#SSLEN=<SSId>,<Enable>

Parameters:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier
Value:			
1 : only one socket is available			
<Enable>	integer	0	activate/deactivate secure socket
Values:			
0 : deactivate			
1 : activate			

-  If the unique available secure socket is not activated, all the commands - belonging to the SSL set (example: #SSLSECDATA, #SSL..., etc.) and different from test commands - return an error message. #SSLS command is an exception, it can be issued also if the socket is deactivated.
-  If the unique available secure socket is connected, it cannot be deactivated issuing AT#SSLEN=1,0.



AT#SSLEN?

Read command reports the current status of secure socket in the format:

```
#SSLEN: <SSId>,<Enable>
OK
```



AT#SSLEN=?

Test command returns the range of supported values for all the parameters:

```
#SSLEN: (1),(0,1)
```

3.20.4. AT#SSLD - Open a SSL Socket to a Remote Server

This command opens a remote connection via socket secured through SSL.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Other	No	-	2



AT#SSLD=<SSId>,<rPort>,<IPAddress>,<ClosureType>[,<connMode>[,<Timeout>]]

Execution command opens a remote connection via socket secured through SSL. Both command and online modes can be used. In the first case, **OK** is printed on success, and data exchange can be performed by means of **#SSLSEND** and **#SSLRECV** commands. In online mode, **CONNECT** message is printed, and data can be sent/received directly to/by the serial port. Communication can be suspended by issuing the escape sequence (by default **+++**) and restored with **#SSLO** command.










Parameters:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier
	Value:		
	1	:	only one socket is available
<rPort>	integer	1	Remote TCP port to contact
	Value:		
	1-65535	:	TCP port number
<IPAddress>	string	-	address of the remote host, string type. This parameter can be either: - any valid IP address in the format: "xxx.xxx.xxx.xxx" - any host name to be solved with a DNS query
<ClosureType>	integer	0	Closure type
	Value:		
	0	:	only value 0 supported
<connMode>	integer	1	connection mode
	Values:		
	0	:	online mode connection
	1	:	command mode connection
<Timeout>	integer	100	Time-out in 100 ms units. It represents the maximum allowed TCP inter-packet delay. It means that, when more data is expected during the handshake, the module awaits <Timeout> * 100 msecs for the next packet. If no more data can be read, the module gives up the handshake and raises an ERROR response. Note that <u>IT IS NOT</u> the total handshake timeout or, in other words, it is not the absolute maximum time between the #SSLD issue and the CONNECT/OK/ERROR response. Though by changing this parameter you can limit the handshake duration (for example in case of congested network or busy server), there's no way to be sure to get the command response

within a certain amount of time, because it depends on the TCP connection time, the handshake time and the computation time (which depends on the authentication mode and on the size of keys and certificates).

Value:

10÷5000 : hundreds of ms

-  If secure socket has not be enabled through **#SSLEN** command, only test requests can be used.
-  if timeout is not set for SSL connection the default timeout value, set by **#SSLCFG**, is used.
-  In online mode the socket is closed after an inactivity period (configurable with **#SSLCFG**, with a default value of 90 seconds), and the **NO CARRIER** message is printed.
-  In online mode data are transmitted as soon as the data packet size is reached or as after a transmission timeout. Both these parameters are configurable by using **#SSLCFG**.
-  If there are input data arrived through a connected socket and not yet read because the module entered command mode before reading them (after an escape sequence or after **#SSLD** has been issued with **<connMode>** set to command mode connection), these data are buffered and we receive the **#SSLSRING** URC (if any of its presentation formats have been enabled by means the **#SSLCFG** command); it's possible to read these data afterwards issuing **#SSLRECV**. Under the same hypotheses it's possible to send data while in command mode issuing **#SSLSEND**.
-  Before opening a SSL connection, the GPRS context must have been activated by **#SGACT=x,1**
-  Before opening a SSL connection, make sure to have stored the needed secure data (CA certificate), using **#SSLSECDATA**.
-  In case of CA Certificate already stored, it could be possible to avoid **#SSLSECDATA** command.
-  Connection with SSL using IPV6 is not supported.



AT#SSLD=?

Test command returns the range of supported values for all the parameters:

#SSLD: (1),(1-65535),(0),(0,1),(10-5000)

3.20.5. AT#SSLO - Restore a SSL Socket after a +++

This command restores a SSL connection (online mode) suspended by an escape sequence (+++).

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SSLO=<SSId>




This command restores a SSL connection (online mode) suspended by an escape sequence (+++). After the connection restore, the **CONNECT** message is printed. Please note that this is possible even if the connection has been started in command mode (**#SSLD** with **<connMode>=1**).

Parameter:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier

Value:

1 : only one socket is available.

-  If secure socket has not be enabled through **#SLEN** command, only test command can be used.
-  Before opening a SSL connection, the PDP context must have been activated by **AT#SGACT=X,1**.
-  If an error occurs during reconnection the socket cannot be reconnected, then a new connection has to be done.



AT#SSLO=?

Test command returns the range of supported values for all the parameters:

#SSLO: (1)

3.20.6. AT#SSLH - Close a SSL Socket

This command allows closing the SSL connection.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SSLH=<SSId>[,<ClosureType>]

Parameters:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier
Value:			
1 : only one socket is available			
<ClosureType>	integer	0	type of socket closure.
Value:			
0 : only value 0 is supported			



If secure socket has not be enabled through **#SLEN** command, only test command can be used.



AT#SSLH=?

Test command returns the range of supported values for all the parameters:

#SSLH: (1),(0)

3.20.7. AT#SSLSEND - Send Data through a SSL Socket

This command allows sending data through a secure socket.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SSLSEND=<SSId>[,<Timeout>]

Parameters:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier
Value:			
1 : only one socket is available			
<Timeout>	integer	100	socket send timeout
Value:			
1÷5000 : timeout in 100 ms units			

Additional info:


- ▶▶ After command line is terminated with <CR>, the command returns the following four-character sequence prompt:


<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)

and waits for the data to be send.

- to end the data editing and start the sending, enter Ctrl-Z char (0x1A hex). The maximum number of bytes to send is 1023, trying to send more data will cause the data excess to be discarded and lost.
- to exit without sending the message, enter ESC char (0x1B hex).

If data are successfully sent, the command returns **OK**. If data sending fails, an error code is reported.

 If secure socket has not be enabled through **#SSLEN** command, only test command can be used.

 If timeout is not set for SSL connection, is used the timeout value set by **#SSLCFG**.

 Before sending data through the SSL connection, it must be established using **#SSLD**.



AT#SSLSEND=?

Test command returns the range of supported values for all the parameters.

3.20.8. AT#SSLRCV - Read Data from a SSL Socket

This command reads data from a SSL socket.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SSLRCV=<SSId>,<MaxNumByte>[,<Timeout>]

Set command allows to receive data, arrived through a connected secure socket, which has been buffered and not read yet since the module entered in command mode before reading it. The module can be notified of this data by a **SSLSRING** URC, whose enabling and presentation format depend on the last **SSLCFG** setting.

Parameters:




Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier
Value:			
1 : only one socket is available			
<MaxNumByte>	integer	N/A	maximum number of bytes to read
Value:			
1÷1000 : maximum number of bytes to read			
<Timeout>	integer	100	time-out in 100 ms units
Value:			
1÷5000 : hundreds of ms			

Additional info:

- ▶▶ If data are received, the device responds:
#SSLRCV: NumByteRead
...(Data read)...
OK

- ▶▶ If no data are received, the device responds:
#SSLRCV: 0
TIMEOUT
OK

- ▶▶ If the remote host closes the connection, the device responds:
#SSLRCV: 0
DISCONNECTED
OK

-
-  If secure socket has not be enabled through **#SLEN** command, only test command can be used.
 -  If timeout is not set for SSL connection, is used the timeout value set by **#SSLCFG**.
 -  Before receiving data from the SSL connection, it has to be established using **AT#SSLD**.
-

**AT#SSLRCV=?**

The test command returns the ranges of the parameters values in the form:

#SSLRCV: (1),(1-1000),(10-5000)

3.20.9. AT#SSLS - Report the Status of a SSL Socket

This command reports the status of secure sockets.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SSLS=<SSId>

The command reports the status of secure sockets. The response message of the command can have one of the following formats:

- If secure socket is connected, the format is:
#SSLS: <SSId>,2,<CipherSuite>
- otherwise:
#SSLS: <SSId>,<ConnectionStatus>

The response messages parameters are described in the Additional info section.

Parameter:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier.

Value:

1 : only one secure socket is available

Additional info:

- ▶▶ List of the meaning of the response message parameters.

Name	Type	Default	Description
<CipherSuite>	integer	N/A	Cipher Suite identifier

Values:

0 : unknown
 1 : TLS_RSA_WITH_RC4_128_MD5
 2 : TLS_RSA_WITH_RC4_128_SHA
 3 : TLS_RSA_WITH_AES_128_CBC_SHA
 4 : TLS_RSA_WITH_NULL_MD5
 5 : TLS_RSA_WITH_AES_256_CBC_SHA
 N : all other Cipher Suite are identified by N = RFC value + 100

<ConnectionStatus>	integer	N/A	Connection Status identifier
--------------------	---------	-----	------------------------------

Values:

0 : socket disabled
 1 : connection closed

2 : connection open

 This command can be issued even if the <SSId> is not enabled.



AT#SSLS=?

Test command returns the range of the <SSId> parameter values in format:

#SSLS: (1)

3.20.10. AT#SSLI - Secure Socket Info

This command is used to get information about secure socket data traffic.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#SSLI[=<SSId>]

Execution command is used to get information about secure socket data traffic.
The response is in the format:

#SSLI: <SSId>,<DataSent>,<DataRecv>,<PendingData>,<TCPConnWaitingAck>

Parameter:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier

Value:

1 : only one SSL socket is available

Additional info:

- ▶▶ Parameters returned by the response message and not described in the previous sections.

Name	Type	Default	Description
<DataSent>	integer	-	total amount (in bytes) of data sent to the TLS/SSL connection since the beginning of the connection itself (obviously: not yet encoded into TLS/SSL record)
<DataRecv>	integer	-	total number of bytes received from the TLS/SSL connection since the beginning of the connection itself (obviously: already decoded from TLS/SSL record)
<PendingData>	integer	-	number of bytes available to be read from the TLS/SSL record that is currently being processed (obviously: already decoded from TLS/SSL record)
<TCPConnWaitingAck>	integer	N/A	indication of the underlying TCP socket condition, if there are TCP/IP packets sent but not yet acknowledged or not

Values:

0 : no TCP/IP packets sent waiting for ack

1 : TCP/IP packets sent waiting for ack



AT#SSLI=?

Test command returns the range of supported values for all the parameters.

#SSLI: (1)

3.20.11. AT#SSLSENDEXT - Send Data through a SSL Socket in Command Mode

This command sends data through a secure socket.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SSLSENDEXT=<SSId>,<bytestosend>[,<Timeout>]

Execution command sends data through a secure socket.

After command line is terminated with <CR>, the command returns the following four-character sequence prompt:

<CR><LF><greater_than><space> (see IRA 13, 10, 62, 32)

and waits for the data to be send.

When <bytestosend> bytes have been sent, the sending is automatically completed. If data are successfully sent, the command returns **OK**. If data sending fails, an error code is reported.

Parameters:

Name	Type	Default	Description
<SSId>	integer	N/A	Secure Socket Identifier
	Value:		
	1	:	only one SSL socket is available.
<bytestosend>	string	-	number of bytes to be sent. Refer to test command for range
<Timeout>	integer	100	time-out in 100 ms units.
	Value:		
	1÷1500	:	hundreds of ms.



If secure socket has not be enabled through **#SSLEN** command, only test command can be used.



If timeout is not set for SSL connection, is used the timeout value set by **#SSLCFG**.



Before sending data through the SSL connection, it must be established using **#SSLD**.



All special characters are sent like a generic byte. For instance: 0x08 BS (Backspace) is sent through the socket, it does not delete the previous character.



AT#SSLSENDEXT=?

Test command returns the range of supported values for parameters <SSId>, <bytestosend> and <Timeout>.



Open the socket in command mode:

```
AT#SSLD=1,443,<port>,"IP address",0,1  
OK
```

Send data specifying total number of bytes:

```
AT#SSLSENDEXT=1,256,100  
>...
```

3.20.12. AT#SSLSECDATA - Manage the Security Data

This command stores, reads and deletes security data (Certificate, CA certificate, private key) in NVM. SSL certificates can be in PEM or DER format, according to the configuration set by #SSLSECCFG command.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#SSLSECDATA=<SSId>,<action>,<dataType>[,<size>]

Parameters:

Name	Type	Default	Description
<SSId>	integer	1	Secure Socket Identifier
	Value:		
	1	:	only one socket is available
<action>	integer	0	required action
	Values:		
	0	:	delete data from NVM
	1	:	store data in NVM.
	2	:	read data from NVM.
<dataType>	integer	0	security data type
	Values:		
	0	:	Certificate
	1	:	CA certificate
	2	:	RSA Private key
<size>	integer	1	size of security data to be stored. The parameter is mandatory if write action is issued, can be omitted for delete or read actions.
	Value:		
	1÷4000	:	size

Additional info:

►► Store security data in NVM

<action>=1 specifies the storing in NVM, **<size>** parameter is mandatory. After command line is terminated with <CR>, the command returns the following four-character sequence prompt:

<CR><LF><greater_than><space> (see IRA character set: 13, 10, 62, 32)

and waits for the data to be store:

security data can be in PEM or in DER format, according to the **<cert_format>** parameter of the #SSLSECCFG command. If no **<cert_format>** has been specified, PEM format is assumed.

If security data are in PEM format:

- to end the security data editing, enter Ctrl-Z char (0x1A hex)
- to exit without writing the data, enter ESC char (0x1B hex)

If security data are in DER format:

- when **<size>** bytes are entered, the certificate is automatically stored. ESC or Ctrl-Z does not take effect, because they are considered as possible octets contained in the certificate.

If data are successfully stored, the command returns **OK**, otherwise an error code is reported.

▶▶ Read security data from NVM

<action>=2 specifies the reading from NVM, the **<size>** parameter is not mandatory. The command returns the following message:

```
#SSLSECDATA: <SSId>,<dataType>
<DATA>
OK
```

If the required security data has not been stored in NVM (or it has been deleted) the response has the following format:

```
#SSLSECDATA: <SSId>,<dataType>
No data stored
OK
```

- ⚠ If secure socket has not be enabled through **#SSLEN** command, only test command can be used.
- ℹ If secure socket **<SSId>** has been already connected an error code is reported.
- ℹ If the required CA certificate belongs to the list of preinstalled root CA certificates, there is no need to store it with **#SSLSECDATA** command.
- ℹ The DCD signal shall be in ON state while data is entered.
- ℹ The echoing of given characters is controlled by echo command **E**.



AT#SSLSECDATA?

Read command reports what security data are stored. The returned message has the following format:

```
#SSLSECDATA: <SSId>,<certIsSet>,<CACertIsSet>,<privKeyIsSet>
```

Additional info:

- ▶▶ This Additional info section describes the parameters returned by the **AT#SSLSECDATA?** read command.

Name	Type	Default	Description
<certIsSet>	integer	0	identifies the certificate presence in the NVM
Values:			
0 : not present			
1 : present			
<CACertIsSet>	integer	0	identifies the CA certificate presence in the NVM
Values:			
0 : not present			
1 : present			
<privKeyIsSet>	integer	0	identifies the RSA Private key presence in the NVM
Values:			
0 : not present			
1 : present			

**AT#SSLSECDATA=?**

Test command returns the supported values for all the parameters.

3.20.13. AT#SSLSECCFG2 - Configure Additional Parameters of a SSL Socket

This command allows configuring additional SSL security parameters.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#SSLSECCFG2=<SSId>,<version>[,<unused_A>[,<unused_B>[,<unused_C>[,<unused_D>]]]]

Parameters:

Name	Type	Default	Description
<SSId>	integer	N/A	Secure Socket Identifier
	Value:		
	1	:	only one socket is available
<version>	integer	1	select SSL/TLS protocol version
	Values:		
	0	:	protocol version SSLv3
	1	:	protocol version TLSv1.0
	2	:	protocol version TLSv1.1
	3	:	protocol version TLSv1.2
<unused_A>	mixed	-	reserved for future implementations
<unused_B>	mixed	-	reserved for future implementations
<unused_C>	mixed	-	reserved for future implementations
<unused_D>	mixed	-	reserved for future implementations

i See **#SSLSECCFG** for the configuration of basic security parameters.

⚠ If secure socket has not be enabled through **#SSLEN** command, only test command can be used.



AT#SSLSECCFG2?

Read command reports the currently selected parameters in the format:

#SSLSECCFG2: <SSId>,<version>,0,0,0,0

Read command returns **ERROR** if secure socket has not been enabled through **#SSLEN** command.



AT#SSLSECCFG2=?

Test command reports the range of supported values for all the parameters.

3.20.14. AT#APPSSLCFG - Configure Application SSL Parameters

This command allows the configuration of the security parameters of the applications supported by the module. It also allows the addition, the configuration and the deletion of the same set of SSL parameters used by custom applications from AppZone. Configuration of existing applications and addition of new ones are done by specifying all the parameters. Deletion of custom entries are performed by sending only **<appName>** parameter.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2





AT#APPSSLCFG=<appName>[,<CipherSuite>,<SecLevel>,<TLSVer>]

Parameters:

Name	Type	Default	Description
<appName>	string	-	<p>name of the application which SSL parameters need to be configured.</p> <p>Configuration: if the string matches an entry already present in the applications list, and all the parameters of the command are defined, the corresponding security parameters will be changed. The string comparison is case insensitive.</p> <p>Addition: if the string is not present in the current list of applications, a new entry is created. The application name can contain only alphanumeric parameters, stored in upper case, and the maximum allowed length is 8. All the parameters are mandatory.</p> <p>Deletion: if the string matches an entry already present in the applications list and only this parameter is set, the corresponding entry is deleted.</p>
<CipherSuite>	integer	N/A	<p>cipher suite used in the secure connection. Default may be different for any native application.</p> <p>Values:</p> <ul style="list-style-type: none"> 0 : cipher suite is chosen by remote server 1 : TLS_RSA_WITH_RC4_128_MD5 2 : TLS_RSA_WITH_RC4_128_SHA 3 : TLS_RSA_WITH_AES_128_CBC_SHA 4 : TLS_RSA_WITH_NULL_SHA 5 : TLS_RSA_WITH_AES_256_CBC_SHA
<SecLevel>	integer	N/A	<p>security level. Default may be different for any native application.</p> <p>Values:</p> <ul style="list-style-type: none"> 0 : SSL Verify None 1 : Manage server authentication
<TLSVer>	integer	N/A	<p>SSL/TLS protocol version used by the current application. Default may be different for any native application.</p>

Values:

- 0 : protocol version SSLv3
- 1 : protocol version TLSv1.0
- 2 : protocol version TLSv1.1
- 3 : protocol version TLSv1.2

-  Five slots are totally available for applications parameters. Any attempt to add further entries raises an error.
-  Native applications cannot be deleted. Any attempt to delete them raises an error.



AT#APPSSLCFG?

Read command reports the currently selected parameters for each configured application in the format:

```
#APPSSLCFG: "app_1",<CipherSuite_1>,<SecLevel_1>,<TLSVer_N>
...
#APPSSLCFG: "app_N",<CipherSuite_N>,<SecLevel_N>,<TLSVer_N>
```



AT#APPSSLCFG=?

Test command returns the range of supported values for all the parameters.

Depending on the number of applications defined, the **<appName>** parameter range has two different formats: it shows either the list of all defined application names, if the memory is full, or the maximum permitted length for any new application name (8), if the memory is not full.

3.21. AT Run

3.21.1. AT#SMSATRUN - Enable SMS Run AT Service

This command enables/disables the SMS AT RUN service.



Telit Running AT Commands Remotely Application Note, 80000NT10029a

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#SMSATRUN=<mod>

Set command enables/disables the SMS AT RUN service.

Parameter:

Name	Type	Default	Description
<mod>	integer	0	enables/disables the SMS AT RUN service

Values:

- 0 : Service Disabled
- 1 : Service Enabled



When the service is active on a specific AT instance (see **#SMSATRUNCFG**), that instance cannot be used for any other scope, except for OTA service that has the highest priority.

For example, in the multiplexer request to establish the Instance, the request will be rejected.



AT#SMSATRUN?

Read command returns the current settings of <mode> and the value of <stat> in the format:

#SMSATRUN: <mod>,<stat>

Additional info:

- ▶▶ Parameters returned by the Read command and not described in the previous sections.

Name	Type	Default	Description
<stat>	string	0	service status

Values:

- 0 : not active
- 1 : active

**AT#SMSATRUN=?**

Test command returns the supported values of parameter **<mod>**



By default, the SMS ATRUN service is disabled. It can be activated either by the command **#SMSATRUN** or receiving a special SMS that can be sent from a Telit server.

3.21.2. AT#SMSATRUNCFG - Set SMS Run AT Service Parameters

This command configures the SMS AT RUN service.



Telit Running AT Commands Remotely Application Note, 80000NT10029a

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#SMSATRUNCFG=<instance>[,<urcmo>[,<timeout>]]

Parameters:

Name	Type	Default	Description
<instance>	integer	3	AT instance that will be used by the service to run the AT Command
	Value:		
	1÷5	:	AT instance
<urcmo>	integer	1	enable/disable unsolicited.
	Values:		
	0	:	disable unsolicited message
	1	:	enable an unsolicited message when an AT command is requested via SMS
<timeout>	integer	5	It defines in minutes the maximum time for a command execution. If timeout expires the module will be rebooted.
	Value:		
	1÷60	:	Range in minutes

Unsolicited field:

Name	Type	Description
<text>	string	when unsolicited is enabled, the AT Command requested via SMS is indicated to TE with unsolicited result code: #SMSATRUN: <text> e.g.: #SMSATRUN: AT+CGMR;+CGSN;+GSN;+CCLK Unsolicited is dumped on the instance that requested the service activation.



AT#SMSATRUNCFG?

Read command returns the current settings of parameters in the format:

#SMSATRUNCFG:<instance>,<urcmo>,<timeout>

**AT#SMSATRUNCFG=?**

Test command returns the supported values for the SMSATRUNCFG parameters.



The instance used for the SMS AT RUN service is the same used for the EvMoni service. Therefore, when the **#SMSATRUNCFG** sets the **<instance>** parameter, the change is reflected also in the **<instance>** parameter of the **#ENAEVMONICFG** command, and vice versa.

The set command returns **ERROR** if the command **AT#ENAEVMONI?** returns 1 as **<mod>** parameter or the command **AT#SMSATRUNCFG?** returns 1 as **<mod>** parameter

3.21.3. AT#SMSATWL - SMS AT Run White List

This command adds, deletes, prints an element of the white list.



Telit Running AT Commands Remotely Application Note, 80000NT10029a

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#SMSATWL=<action>,<index>[,<entryType>[,<string>]]

Parameters:

Name	Type	Default	Description
<action>	integer	0	identifies the action on the white list.
Values:			
0 : add an element to the white list			
1 : delete an element from the white list			
2 : print and element of the white list			
<index>	integer	N/A	index of the white list
Value:			
1-8 : index values			
<entryType>	integer	N/A	type of entry
Values:			
0 : phone number			
1 : password			
<string>	string	-	string parameter enclosed between double quotes containing the phone number or the password: <ul style="list-style-type: none"> phone number shall contain numerical characters and/or the character "+" at the beginning of the string and/or the character "*" at the end of the string. password shall be 16 characters length.

- i** When the character "*" is used, it means that all the numbers that begin with the defined digit are part of the white list, e.g.:
- "+39*" all Italian users can ask to run AT Command via SMS
 - "+39349*" all users having the Service Provider identified by 349 can ask to run AT Command via SMS



AT#SMSATWL?

Read command returns the list elements in the format:

#SMSATWL: [<entryType>,<string>]



AT#SMSATWL=?

Test command returns the supported values for parameters **<action>**, **<index>** and **<entryType>**.



The command will return **ERROR** if executed using **SMSATRUN** digest mode or **TCPATRUN** server mode.

3.21.4. AT#TCPATRUNCFG - Set TCP AT Run Service Parameters

This command configures the TCP AT RUN service Parameters.



Telit Running AT Commands Remotely Application Note, 80000NT10029a

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#TCPATRUNCFG=<connId>,<instance>,<tcpPort>,<tcpHostPort>,<tcpHost>[,<urcmod>[,<timeout>[,<authMode>[,<retryCnt>[,<retryDelay>]]]]]

Parameters:

Name	Type	Default	Description
<connId>	integer	1	socket connection identifier
Value:			
1÷6 : Socket connection identifier			
<instance>	integer	2	at instance that will be used by the service to run the AT Command.
Value:			
1÷5 : AT instance			
<tcpPort>	integer	1024	TCP Listen port for the connection to the service in server mode
Value:			
1÷65535 : Tcp Listen port			
<tcpHostPort>	integer	1024	TCP remote port of the Host to connect to, in client mode
Value:			
1÷65535 : Tcp remote port			
<tcpHost>	string	""	IP address of the Host, string type. The parameter can be either: <ul style="list-style-type: none"> any valid IP address in the format: "xxx.xxx.xxx.xxx" any host name to be solved with a DNS query
Value:			
"" : default value			
<urcmod>	integer	1	enables/disables URC messages, see Additional info section.
Values:			
0 : disable			
1 : enable			

<timeout>	string	5	this parameter defines in minutes the maximum time for a command execution and If timeout expires the module will be rebooted
Value:			
1÷5 : minutes of maximum time for a command execution			
<authMode>	integer	0	determines the authentication procedure in server mode
Values:			
0 : When connection is up, username and password (in this order and each of them followed by a Carriage Return) must be sent to the module before the first AT command			
1 : When connection is up, the user receives a request for username and, if username is correct, a request for password. Then a message of "Login successful" will close authentication phase.			
<retryCnt>	integer	0	in client mode, at boot or after a socket disconnection, this parameter represents the number of attempts that are made to re-connect to the Host.
Value:			
0÷5 : the number of attempts			
<retryDelay>	integer	2	in client mode, delay between one attempt and the other
Value:			
1÷3600 : delay in minutes			

Additional info:

►► **<urcmo>=1**, URC is enabled:

An asynchronous TCP Socket connection is indicated to TE with:

#TCPATRUN: <iphostaddress>




The TCP socket disconnection is indicated to TE with:

#TCPATRUN: <DISCONNECT>

URC is dumped on the instance that requested the service activation.

Unsolicited fields:

Name	Type	Description
<iphostaddress>	string	IP host address.
<DISCONNECT>	string	disconnect string.

-
-  To start automatically the service when the module is powered-on, the automatic PDP context activation must be set, see **#SGACTCFG** command.
 -  The set command returns **ERROR** if the command **AT#TCPATRUND?** returns 1 as **<mod>** parameter or the command **AT#TCPATRUND?** returns 1 as **<mod>** parameter.
 -  **<authMode>** : if username and/or password are not allowed (see **#TCPATRUNAUTH**) the connection will close immediately.
-

**AT#TCPATRUNCFG?**

Read command returns the current settings of parameters in the format:

#TCPATRUNCFG:<connId>,<instance>,<tcpPort>,<tcpHostPort>,<tcpHost>,<urcmod>,<timeout>,<authMode>,<retryCnt>,<retryDelay>

**AT#TCPATRUNCFG=?**

Test command returns the supported values for the **#TCPATRUNCFG** parameters

3.21.5. AT#TCPATRUNFRWL - TCP AT Run Firewall List

This command controls the internal firewall settings for the TCPATRUN connection.



Telit Running AT Commands Remotely Application Note, 80000NT10029a

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#TCPATRUNFRWL=<action>,<ipAddr>,<netMask>



Firewall general policy is **DROP**, therefore all packets that are not included into an **ACCEPT** chain rule will be silently discarded. When a packet comes from the IP address **incomingIp**, the firewall chain rules will be scanned for matching with the following criteria:

incomingIp & <netMask> = <ipAddr> & <netMask>

If criteria is matched, then the packet is accepted and the rule scan is finished; if criteria is not matched for any chain the packet is silently dropped.

Parameters:

Name	Type	Default	Description
<action>	integer	N/A	command action
Values:			
0	:	remove selected chain	
1	:	add an ACCEPT chain	
2	:	remove all chains (DROP everything); <ipAddr> and <netMask> has no meaning in this case.	
<ipAddr>	string	-	remote address to be added into the ACCEPT chain; string type, it can be any valid IP address in the format: xxx.xxx.xxx.xxx
<netMask>	string	-	mask to be applied on the <ipAddr>; string type, it can be any valid IP address mask in the format: xxx.xxx.xxx.xxx

-  A maximum of 5 firewall can be present at same time in the list.
-  The command returns **ERROR** if executed using **SMSATRUN** digest mode or **TCPATRUN** server mode.



AT#TCPATRUNFRWL?

Read command reports the list of all **ACCEPT** chain rules registered in the Firewall settings in the format:

#TCPATRUNFRWL: <ipAddr>,<netMask>

#TCPATRUNFRWL: <ipAddr>,<netMask>

...
OK



AT#TCPATRUNFRWL=?

Test command returns the allowed values for parameter **<action>**.

3.21.6. AT#TCPATRUNAATH - TCP AT Run Authentication Parameters List

This command manages the authentication parameters for the TCPATRUN connection.



Telit Running AT Commands Remotely Application Note, 80000NT10029a

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#TCPATRUNAATH=<action>,<userid>,<passw>

Parameters:

Name	Type	Default	Description
<action>	integer	N/A	command action
Values:			
0	:		remove selected chain
1	:		add an ACCEPT chain
2	:		remove all chains (DROP everything); <userid> and <passw> has no meaning in this case.
<userid>	string	-	username to be added into the ACCEPT chain. The maximum parameter permitted length is 50 characters.
<passw>	string	-	password of the user on the <userid>. The maximum parameter permitted length is 50 characters.



A maximum of 3 entries (password and userid) can be present at same time in the list.



AT#TCPATRUNAATH?

Read command reports the list of all **ACCEPT** chain rules, registered in the Authentication Parameters settings, in the format:

```
#TCPATRUNAATH: <userid>,<passw>
#TCPATRUNAATH: <userid>,<passw>
...
OK
```



AT#TCPATRUNAATH=?

Test command returns the allowed values for parameter <action>.

3.21.7. AT#TCPATRUND - TCP AT Run in Dial (Client) Mode

The command enables/disables the TCPATRUND service in client mode.



Telit Running AT Commands Remotely Application Note, 80000NT10029a

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#TCPATRUND=<mode>





Set command enables/disables the TCPATRUND service in client mode. When this service is enabled, the module tries to open a connection to the Host (the Host is specified in #TCPATRUNCFG).

Parameter:

Name	Type	Default	Description
<mode>	integer	N/A	TCPATRUND service mode.

Values:

- 0 : Service disabled
- 1 : Service enabled

-  If SMSATRUND is active on the same instance (see #TCPATRUNCFG) the command will return **ERROR**.
-  When enabled, the service is active on a specific AT instance (see #TCPATRUNCFG) which cannot be used for any other scope. For example, any request to establish that instance (e.g. from multiplexer), will be rejected.
-  In order to automatically start the service at power-on, the automatic PDP context activation has to be set (see #SGACTCFG).
-  At boot or if the connection closes, when both TCPATRUND service and context are active, the module will try to reconnect for the number of attempts and delay between them as specified by #TCPATRUNCFG.



AT#TCPATRUND?

Read command returns the current settings of <mode> and the value of <stat> in the format:

#TCPATRUND: <mode>,<stat>

Additional info:

- ▶▶ <stat> parameter description

Name	Type	Default	Description
<stat>	integer	N/A	Connection status.

Values:

- 0 : not connected
 - 1 : connected or connecting at socket level
 - 2 : not connected but still trying to connect, attempting every delay time specified in AT#TCPATRUNCFG
-



AT#TCPATRUND=?

Test command returns the supported values of the parameter **<mode>**.

The supported values depend on AT instance: on the same instance where TCPATRUN is active (see AT#TCPATRUNCFG) test command will return (0).

3.21.8. AT#TCPATRUNCLOSE - Closes TCP Run AT Socket

Execution command that closes TCPATRUN connection



Telit Running AT Commands Remotely Application Note, 80000NT10029a

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#TCPATRUNCLOSE

Closes the socket used by TCPATRUN connection.



TCPATRUN status is still enabled after this command, so the service re-starts automatically.



AT#TCPATRUNCLOSE=?

Test command returns **OK**

3.21.9. AT#TCPATCMDSEQ - TCP AT Run Command Sequence

This command enables/disables, for TCP Run AT service, a feature that allows giving more than one AT command without waiting for responses.



Telit Running AT Commands Remotely Application Note, 80000NT10029a

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#TCPATCMDSEQ=<mod>

Parameter:

Name	Type	Default	Description
<mod>	integer	0	current mode for TCP Run AT feature for multiple commands

Values:

- 0 : service disabled
- 1 : service enabled



It does not work with commands that use the prompt '>' to receive the message body text (e.g. +CMGS).



AT#TCPATCMDSEQ?

Read command returns the current settings of parameters in the format:

#TCPATCMDSEQ: <mod>



AT#TCPATCMDSEQ=?

Test command returns the supported values of parameter <mod>.

3.21.10. AT#TCPATCONSER - TCP AT Run Service on Serial Port

Set command sets the TCP AT Run Service in TRANSPARENT mode to access directly the specified hardware port. Data is exchanged between the TCP AT Run Service and the specified hardware port without being elaborated. To have info on the service refer to #TCPATRUNDL, #TCPATRUND, and #TCPATRUNCFCG commands.



Telit Running AT Commands Remotely Application Note, 80000NT10029a

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2







AT#TCPATCONSER=<port>,<rate>

Parameters:

Name	Type	Default	Description
<port>	integer	0	identifies the serial port
Values:			
0	:	USIF0	
1	:	USIF1	
2	:	USB0	
3	:	USB1	
4	:	USB2	
5	:	USB3	
6	:	USB4	
<rate>	integer	300	defines the data transfer speed
Values:			
300	:	bit/sec	
1200	:	bit/sec	
2400	:	bit/sec	
4800	:	bit/sec	
9600	:	bit/sec	
19200	:	bit/sec	
38400	:	bit/sec	
57600	:	bit/sec	
115200	:	bit/sec	

i The ports availability depends on the current ports configuration set through the #PORTCFG command. Use the #PORTCFG=? test command to know the current ports configuration.

i Use TCP AT Run Instance to enter #TCPATCONSER command, refer to #TCPATRUNCFCG command.

-
-  After **#TCPATCONSER** command has been issued, and if no error has occurred, a **CONNECT** message is returned by the module to advise that the **TCP AT Run** Instance is in **ONLINE** mode and connected to the specified port.
 -  To exit from **ONLINE** mode and close the connection, enter the escape sequence **(+++)** on the **TCP AT Run** Instance.
 -  For **USB** ports the **<rate>** parameter is dummy.
 -  If the **CMUX** protocol is running the command returns **ERROR** message.
-

**AT#TCPATCONSER=?**

Test command returns the ranges of the **#TCPATCONSER** parameters. The returned range of the **<port>** parameter depends on the current **#PORTCFG** configuration.

3.21.11. AT#ATRUNDELAY - Set the Delay on Run AT Command Execution

This command allows the configuration of a delay before the execution of AT command received by Run AT service (TCP and SMS). It affects just AT commands given through Run AT service.

The use of the delay is recommended to execute some AT commands that require network interaction or switch between GSM and GPRS services.



Telit Running AT Commands Remotely Application Note, 80000NT10029a

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#ATRUNDELAY=<srv>,<delay>

Set command enables and configures the delay before the execution of AT command received by Run AT service. A different delay can be configured for each service (TCP and SMS).

Parameters:

Name	Type	Default	Description
<srv>	integer	0	service affected by the configuration
Values:			
0	:	TCP Run AT service	
1	:	SMS Run AT service	
<delay>	integer	0	delay after which the remote AT command will be executed
Value:			
0÷30	:	values of the delay, in seconds.	



The delay is valid till a new #ATRUNDELAY is set.



AT#ATRUNDELAY?

Read command returns the current settings of parameters in the format:

```
#ATRUNDELAY: 0, <delayTCP>
#ATRUNDELAY: 1, <delaySMS>
OK
```



AT#ATRUNDELAY=?

Test command returns the supported values for all parameters.

3.21.12. AT#TCPATRNL - Enables TCP AT Run Service in Listen (Server) Mode

This command enables/disables the TCP AT RUN service in server mode. When this service is enabled, the module tries to put itself in TCP listen state.



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SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2






AT#TCPATRNL=<mod>

Parameter:

Name	Type	Default	Description
<mod>	integer	0	enable/disable TCP AT RUN service in server mode.

Values:

- 0 : service disabled
- 1 : service enabled

-  If TCPATRNL is active on the same instance (see #TCPATRNLCFG) the command will return **ERROR**.
-  When the service is active it is on a specific AT instance (see #TCPATRNLCFG), that instance cannot be used for any other scope. For example, if the multiplexer requests to establish the Instance, the request will be rejected.
-  To start automatically the service when the module is powered-on, the automatic PDP context activation has to be set (see #SGACTCFG command).



AT#TCPATRNL?

Read command returns the current settings of <mod> and the value of <stat> in the format:

#TCPATRNL: <mod>,<stat>

Additional info:

- ▶▶ Parameters returned by the read command and not described in the previous section.

Name	Type	Default	Description
<stat>	integer	0	connection status

Values:

- 0 : not in listen
- 1 : in listen or active

**AT#TCPATRNL=?**

Test command returns the supported values for all parameters.

The supported values depend on AT instance: on the same instance where TCPATRNL is active (see AT#TCPATRNLCFG) test command will return (0).

<overflowHandling>	integer	0	Setting to handle data management overflow.
	Values:		
	0 : FIFO		
	1 : LIFO		
<atrunInstanceld>	integer	4	AT instance used by the service to run the AT Command.
	Value:		
	0÷4 : AT instance that will be used by the service to run the AT Command.		
<serviceTimeout>	integer	5	Maximum time interval for a service request to the server in seconds.
	Value:		
	1÷120 : time interval in seconds		
<contextID>	integer	-	PDP context identifier. Refer to additional info section for range and default value.
<unused_1>	integer	-	parameter for future use. Must be set to 0
<unused_2>	integer	-	parameter for future use. Must be set to 0

Additional info:

- ▶▶ The **<contextID>** range and the default value depends on the product as shown in the following table.

Products	<contextID> range	<contextID> default value
LE910-SV_V2 and LE910-SV1	3...5	3
All other	1...5	1

- i** **<deviceIDSelector>** is 0 basically if no SIM card or CDMA ID installed
- i** If SSL TLS secure connection is required, some initial settings have to be done as follows.
For further details, refer to document [1].

In case server authentication is needed, **#SSLSECCFG** must be set as follows:

```
AT#SSLSECCFG=1,0,1,0
OK
```

Then, CA Certificate (DER format) has to be stored as follows:

```
AT#SSLSECDATA=1,1,1,<size>
>
.....// store CA Certificate
OK
```

Only the configuration SSL commands listed above are admitted. DW connection in secure mode cannot be used contemporarily to any command starting an SSL connection (including SSL sockets, FTPS, secure SMTP and HTTPS).

**AT#DWCFG?**

Read command returns the current settings in the format:

```
#DWCFG:<serverUrl>,<deviceIdSelector>,<appToken>,<security>,<heartBeat>,<autoReconnect>,<overflowHandling>,<atruncInstanceld> ,<serviceTimeout>,<contextID>,0,0
```

**AT#DWCFG=?**

Test command returns the supported range of parameters **<deviceIdSelector>**, **<security>**, **<heartBeat>**, **<AutoReconnect>**, **<overflowHandling>**, **<atruncInstanceld>** , **<serviceTimeout>** and **<contextID>**, and the maximum length of **<serverUrl>** and **<appToken>** parameters.

3.22.2. AT#DWEN - Enable Agent Features

This command permits to enable/disable up to 8 different deviceWISE features.



SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#DWEN=<feat>,<en>[,<option1>[,<option2>[,<option3>[,<option4>[,<option5>]]]]]

Parameters:

Name	Type	Default	Description
<feat>	integer	0	deviceWISE feature to be enabled or disabled
Values:			
0	:	remote at commands	
1÷7	:	reserved for future use	
<en>	integer	0	enable or disable this deviceWISE feature
Values:			
0	:	disable the feature	
1	:	enable the feature	
<option1>	string	-	optional string parameter depending on the feature
<option2>	string	-	optional string parameter depending on the feature
<option3>	string	-	optional string parameter depending on the feature
<option4>	string	-	optional string parameter depending on the feature
<option5>	string	-	optional string parameter depending on the feature

-  Feature 0 (Remote AT commands) has no option.
-  The <en> value is considered only at the very first connection to IoT Portal (#DWCONN=1) after a device power on or reboot



AT#DWEN?

Read command returns the current settings for each feature in the format:

#DWEN:<feat>,<en>,<option1>,<option2>,<option3>,<option4>,<option5>



AT#DWEN=?

Test command reports the supported range of values for parameters <feat> and <en> and the maximum length of <optionX> (where X=1,...,5) parameters

3.22.3. AT#DWCONN - Connect to IoT Portal

This command connects/disconnects to the IoT Portal.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#DWCONN=<connect>

Parameter:

Name	Type	Default	Description
<connect>	integer	0	connect/disconnect to the IoT Portal

Values:

- 0 : disconnect
- 1 : connect

- i** **AT#DWCONN=1** performs the socket connection and the MQTT connection. **AT#DWCONN=0** performs the socket disconnection.
- i** The PDP Context used for the network connection is the first (<cid>=1 has to be previously defined with **+CGDCONT** command and activated with **#SGACT** command).
- i** If the secure mode connection has been enabled, it cannot be used contemporarily to any command starting an SSL connection (including SSL sockets, FTPS, secure SMTP and HTTPS).



AT#DWCONN?

Read command returns the current settings for all parameters in the format:

#DWCONN: <connect>,<status>

Additional info:

- ▶▶ Read command response format:

Name	Type	Default	Description
<connect>	integer	-	see Set section
<status>	integer	N/A	the real connection status

Values:

- 0 : disconnected
- 1 : trying to connect
- 2 : connected
- 3 : waiting to connect



AT#DWCONN=?

Test command reports the supported range of values for all parameters.

3.22.4. AT#DWSTATUS - Query Connection Status

The command purpose is to query the IoT Portal to receive the status of the connection, including some runtime statistics.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2




AT#DWSTATUS

Execution command returns the status of the connection, including some runtime statistics.

Additional info:

- ▶▶ The IoT Portal will return a generic structure:
#DWSTATUS:<connected>, <lastErrorCode>, <latency>, <pktsIn>, <pktsOut>, <bytesIn>, <bytesOut>

Name	Type	Default	Description
<connected>	integer	N/A	Connection status value.
Values:			
	3	:	waiting to connect
	2	:	connected
	1	:	trying to connect
	0	:	disconnected
<lastErrorCode>	integer	-	last error code encountered by the client.
<latency>	integer	-	time interval in milliseconds measured between last request and reply.
<pktsIn>	integer	-	number of packets received, tracked by the server.
<pktsOut>	integer	-	number of packets sent.
<bytesIn>	integer	-	number of bytes received, contained in the TCP/IP payload.
<bytesOut>	integer	-	number of bytes sent.

-  All statistics should be stored in RAM, not NVM.



AT#DWSTATUS=?

Test command reports **OK** result code.

3.22.5. AT#DWSEND - Send Data to IoT Portal

The command is related to sending data to the IoT Portal

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#DWSEND=<type>,<param_1>,<param_2>[,...,<param_N>]]]

Execution command permits to send formatted data to the IoT Portal.

Parameters:

Name	Type	Default	Description
<type>	integer	0	code for the type of message to send.
Values:			
	0	:	normal request
	1	:	method request
	2	:	method update
	3	:	method ack
<param_1>	string	-	the meaning of the <param_1> parameter depends on the values of <type>. Refer to Additional info section.
<param_2>...<param_N>	string	-	the meaning of the <param_2> ... <param_N> parameters depends on the values of <type>. Refer to Additional info section.

Additional info:

- ▶▶ <type>=0, identifies an "API execution request" message format.

Name	Type	Default	Description
<param_1>	string	-	Contains the API command to execute.
<param_2+>	string	-	String parameter required by the method, in the format <key_i>,<value_i>. They are key-value pairs indicating the i-th parameter, with i=0,...,12. If the current API does not require input variables, these parameters can be omitted.

- ▶▶ <type>=1, identifies a "Remote method execution request" message format.

Name	Type	Default	Description
<param_1>	string	-	"thingKey", is the key of a thing to execute
<param_2>	string	-	timeout, time to wait before returning an error for the request.
<param_3>	string	-	method, the method key of a thing to execute
<param_4>	integer	N/A	is singleton

Values:

- 0 : more than one of these instances can exist
- 1 : no more than one of these instances can exist

<param_5+>	string	-	string parameters required by the method, in the format <key_i>,<value_i>. They are key-value pairs indicating the i-th parameter, with i=0,...,10. If the current method does not require input variables, these parameters can be omitted.
-------------------------	--------	---	--

▶▶ **<type>=2**, identifies a "Method update" message format.

Name	Type	Default	Description
<param_1>	string	-	id, the identification of the method instance
<param_2>	string	-	message, a message represents the current status of the method

▶▶ **<type>=3**, identifies a "Method acknowledgement" message format.

Name	Type	Default	Description
<param_1>	string	-	id, the identification of the method instance
<param_2>	string	-	status, the integer result status for the execution. 0 is reserved for OK
<param_3>	string	-	when status is set to non zero value: error message associated with the status
<param_3+>	string	-	when status is set to zero value: return parameters of the method. Key-value pairs should be used. <param_i> should be the name of the element and <param_i+1> should be the value of the element. If the current method does not require output variables, these parameters can be omitted.

- i** It's possible to use **#DWSEND** only if the connection has been opened with **#DWCONN**.
- i** If data are successfully sent, then the response is **OK**. If data sending fails for some reason, an error code is reported.
- i** The response to the **#DWSEND** command reports the **<msgId>** value that identifies the sending.
- i** There is no limit on the length of the single **<param_i>**, but there is a limit in the total length of the AT command string, that cannot exceed 400 characters. If this threshold is exceeded, then an **ERROR** will be raised.
There is also a limit of 20 messages on the receive queue. If the queue is full, the consequent send will still succeed but the response for that particular request will be dropped until an item is removed from this queue (See commands **#DWRCV** and **#DWRCVR**).



AT#DSEND=?

Test command reports the maximum length of **<type>** parameter.

3.22.6. AT#DSENDNR - Send Raw Data to IoT Portal

The command is related to sending data to the IoT Portal

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#DSENDNR=<dataLen>

Execution command permits to send raw data to the IoT Portal.

After command line is terminated with <CR>, the device responds sending a four characters sequence prompt:

<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)

and waits for raw data, formatted as valid JSON.






The operation is automatically completed when all data specified by the parameter have been entered.

Parameter:

Name	Type	Default	Description
<dataLen>	integer	N/A	number of bytes to be sent

Value:

1÷1500 : range of the number of bytes to be sent

-  It's possible to use **#DSENDNR** only if the connection has been opened with **#DWCONN**.
-  There is a limit of 20 messages on the receive queue. If the queue is full, the consequent send will still succeed but the response for that particular request will be dropped until an item is removed from this queue (see command **#DWRCV** and **#DWRCVR**).
-  The response to the sending operation is notified by URC **#DWRING**. Data can be read using **#DWRCVR** command.
-  The DCD signal shall be in **ON** state while input JSON data are entered. The echoing of input JSON data is controlled by echo command **E**.
-  If data sending fails for some reason, then an error code is reported.



AT#DSENDNR=?

Test command reports the supported values of parameter <dataLen>.

3.22.7. AT#DWRCV - Receive Data from IoT Portal

The command is related to receiving data from the IoT Portal

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#DWRCV=<msgld>

Execution command permits the user to read formatted data arriving from IoT Portal. The incoming data have been previously notified by the following URC:

#DWRING: <type>,<msgld>,<len>

If the incoming data are accepted with **#DWRCV=<msgld>**, then the formatted data are received and showed by the following URC:

#DWDATA: <msgld>,<error>,<len>,<param_1>[,<param_2>[,...[,<param_n>]]]

Parameter:

Name	Type	Default	Description
<msgld>	integer	N/A	index of the data message to receive, as indicated in the URC #DWRING

Value:

1-65536 : index of the data message to receive

Unsolicited fields:

Name	Type	Description
<type>	integer	code for the type of message to receive
<msgld>	integer	index of the data message to receive
<len>	integer	length of data message to receive
<error>	integer	error code of the message to receive, 0 if there is no error
<param_i>	string	the i-th parameter associated to the type specified

- i** It is possible to use **#DWRCV** only if the connection has been opened with **#DWCONN**, else the ME is raising an error.
- i** If the data received are the consequence of a previous data sending issued by **#DSEND**, then they can be read only using **#DWRCV** command and not **#DWRCVR** command (i.e.: **#DWRCV** and **#DWRCVR** are not interchangeable).
- i** If the received data are the consequence of a previous data sending issued by **#DSEND**, then the <msgld> value is the same of the <msgld> value reported in the answer of **#DSEND**.



AT#DWRCV=?

Test command reports the supported values for parameter <msgld>.

3.22.8. AT#DWRCVR - Receive Raw Data from M2M Service

This command permits the user to read raw data arriving from M2M Service.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#DWRCVR=<msgId>

Execution command permits the user to read raw data arriving from M2M Service; the module is notified of these data by the URC **#DWRING**.

Parameter:

Name	Type	Default	Description
<msgId>	integer	N/A	index of the data message to receive, as indicated in the URC #DWRING .

Value:

1-65536 : index values

Additional info:

- ▶▶ If the received data are the consequence of a previous data sending (issued by **#DWSEND**), then the <msgId> value is the same of the <msgId> value reported in the answer of **#DWSEND**.

The incoming data Server are notified by the URC **#DWRING** with the following format:

#DWRING: <type>,<msgId>,<len>

If the incoming data are accepted with **#DWRCVR**, then the data are received and showed with the following URC:

#DWRDATA: <msgId>,<error>,<len>,<data>

Unsolicited fields:

Name	Type	Description
<type>	integer	type of the data message to receive.
<msgId>	integer	index of the data message to receive.
<len>	integer	length of data message to receive
<error>	integer	error code of the message to receive, 0 if there is no error.
<data>	string	M2M Service data.

- i** It is possible to use **#DWRCVR** only if the connection has been opened with **#DWCONN**, else the ME is raising an error.
- i** If the received data are the consequence of a previous data sending issued by **#DWSEND**, then they can be read only using **#DWRCVR** command and not **#DWRCV** command (i.e.: **#DWRCV** and **#DWRCVR** are not interchangeable).



AT#DWRCVR=?

Test command reports the supported range of values for all parameters.

3.22.9. AT#DWLRCV - List Information on Messages Pending from IoT Portal

This command allows the users to get the list of the incoming messages from IoT Portal.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#DWLRCV

Execution command reports the list of the pending messages from IoT Portal in the following format:

#DWLRCV:<msg_number>[,<msgld_1>,<msg_1_len>[, ...<msgld_N>,<msg_N_len>]]

Additional info:

▶▶ Parameters meanings.

Name	Type	Default	Description
<msg_number>	integer	-	number of messages pending from IoT Portal (at least 0)
<msg_id>	integer	-	index of the i-th data message to receive
<msg_i_len>	integer	-	length of the i-th data message to receive



It is possible to use **#DWLRCV** only if the connection has been opened with **#DWCONN**, else the ME is raising an error.



AT#DWLRCV=?

Test command reports **OK** result code

3.23. FOTA & OMA

3.23.1. SWM FUMO

3.23.1.1. AT#SWMENA - SWM Client Enable / Disable

This execution command enables/disables the SWM Client feature. It is only intended for client initiated SWM sessions management, SWM NIA sessions could be executed independently.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#SWMENA=<mode>

Parameter:

Name	Type	Default	Description
<mode>	integer	0	enable/disable the SWM Client feature

Values:

0 : disable

1 : enable



AT#SWMENA?

Read command reports the current setting of SWM Client <mode> and <status> in the format:

#SWMENA: <mode>,<status>

Additional info:

- ▶▶ Here are the parameters returned by the read command and not described in the previous sections.


Name	Type	Default	Description
<status>	string	0	service status

Values:

0 : not connected

1 : connected

- i** Issuing **#SWMENA=0** resets any pending update process by resetting the SWM OMADM client to its default values and by deleting all the files needed by the SMW OMADM client currently present in the "/swm" folder in the file system.
- i** SWM Client could also be enabled by an incoming SWM NIA SMS message, even in case it is not enabled already. The SMS reception should activate the client if any other OMADM campaign is not concurrently ongoing, and at the end of it, the SWM client is automatically disabled to restore the starting condition.

-  If SWM client was not user activated and a NIA SMS has been correctly received, the PDN connection is activated to manage the SWM campaign, and at the end of it the PDN connection is deactivated to restore the previous condition; if the SWM client was already user-activated, the NIA campaign should maintain the PDN connection active status.

**AT#SWMENA=?**

Test command reports the supported range of values for the **<mode>** parameter.



```
AT#SWMENA=?
#SWMENA: (0,1)
OK
```

```
Starting condition
AT#SWMENA?
#SWMENA: 0,0
OK
```

```
After SWM NIA SMS reception and during SWM campaign management
AT#SWMENA?
AT#SWMENA: 0,1
OK
```

...

```
After SWM NIA SMS end-of-management
AT#SWMENA?
AT#SWMENA: 0,0
OK
```

...

```
SWM client user activation
AT#SWMENA=1
OK
```

```
AT#SWMENA?
AT#SWMENA: 1,1
OK
```

3.23.1.2. AT#SWMCFG - Configure SWM Client Parameters

This set command configures the parameters related to SWM Client

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2






AT#SWMCFG=[<maxAvailSizeExtStorage>[,<pdpld>[,<enableInRoaming>[,<enableReleaseNoteURL>[,<pollingIntervalInHours>[,<bootupPollingInterval>[,<recoveryPollingInterval>[,<secureConnection>]]]]]]]]]

Parameters:

Name	Type	Default	Description
<maxAvailSizeExtStorage>	integer	0	maximum available size in bytes of the external storage for external application updates
Value:			
0 : default value			
<pdpld>	integer	1	PDP context identifier the SWM client should use on the module
Value:			
1÷5 : PDP context identifier			
<enableInRoaming>	integer	0	flag indicating if DM sessions are allowed in cellular roaming conditions
Values:			
0 : DM sessions not allowed in roaming			
1 : DM sessions allowed in roaming			
<enableReleaseNoteURL>	integer	0	flag indicating if unsolicited ring notifications for #SWMCHKUPD and #SWMRING will contain the release note strings even if they are present in the DM session
Values:			
0 : release note not present in URC			
1 : release note presents in URC			
<pollingIntervalInHours>	integer	168	the span of time in hours between automatic DM session initiations by the SWM client. A value of 0 means no polling. Valid value is equal or greater than 0.
Value:			
168 : default is stored as part of the DM tree: 168			
<bootupPollingInterval>	integer	60	the span of time in minutes between device boot and a one time DM session initiation by the SWM client. A value of 0 means that the SWM Client

			launches a DM session immediately. Valid value is equal or greater than 0.
	Value:		
	60	:	default is stored as part of the DM tree: 60
<recoveryPollingInterval>	integer	2	indicates the next polling clock time when the device initiated (polling) session has failed. The value should be smaller than <pollingIntervallnHours> . A value of 0 means no polling. Valid value is equal or greater than 0. default is stored as part of the DM tree: 2.
	Value:		
	2	:	default is stored as part of the DM tree: 2
<secureConnection>	integer	0	flag indicating if the SSL encryption is enabled; not implemented yet
	Values:		
	0	:	SSL encryption disabled
	1	:	SSL encryption enabled (not implemented yet)

-  If SSL encryption is enabled, another secure socket will not be available for the application
-  If the parameter **<maxAvailSizeExtStorage>** has value 0, then the external application handling is not supported/required
-  The configuration has to be done before enabling SWM. Issuing the **#SWMCFG** set command after **AT#SWMENA=1** will raise an error

**AT#SWMCFG?**

Read command reports the current values of parameters in the format:

```
#SWMCFG:<maxAvailSizeExtStorage>,<pdpld>,<enableInRoaming>,<enableReleaseNoteURL>,<pollingIntervallnHours>,<bootupPollingInterval>,<recoveryPollingInterval>,<secureConnection>
```

**AT#SWMCFG=?**

Test command reports the supported range of values for all the parameters

3.23.1.3. AT#SWMBOOTSTRAP - Configure Bootstrap

The set command configures the DM parameters like server URL and access credentials required for the DM sessions.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2




AT#SWMBOOTSTRAP=<serverId>,<name>,<serverURL>,<serverAuthType>,<serverAuthName>,<serverAuthSecret>,<serverAuthData>,<clientAuthType>,<clientAuthName>,<clientAuthSecret>,<clientAuthData>

Parameters:

Name	Type	Default	Description
<serverId>	string	-	server identifier
<name>	string	-	name of the bootstrap parameters set.
<serverURL>	string	-	URL of the SWM server in the form: address:port The address substring shall start with "http://" or "https://" otherwise an error is raised.
<serverAuthType>	integer	N/A	authentication type at the server side. Values: 0 : BASIC 1 : DIGEST 2 : HMAC
<serverAuthName>	string	-	username in the server authentication.
<serverAuthSecret>	string	-	password in the server authentication.
<serverAuthData>	string	-	nonce in the server authentication.
<clientAuthType>	string	N/A	authentication type at client side. Values: 0 : BASIC 1 : DIGEST 2 : HMAC
<clientAuthName>	string	-	username in the client authentication.
<clientAuthSecret>	string	-	password in the client authentication.
<clientAuthData>	string	-	nonce in the client authentication.

- i** The command is allowed only if SWM Client is enabled (i.e. **AT#SWMENA?** answers 1 for **<mode>** parameter).
- i** If the user wants to omit **<serverAuthName>**, **<serverAuthSecret>**, **<serverAuthData>**, **<clientAuthName>**, **<clientAuthSecret>** or **<clientAuthData>** parameters, a void string such as "" should be inserted for each of them.

-
-  The client supports only 15 possible Bootstrap account changes. Every successive attempt to change it will result in an **ERROR**. To reset this condition, SWM client should be switched off (**#SWMENA=0**).
-

**AT#SWMBOOTSTRAP?**

Read command reports the current values of parameters in the format:

```
#SWMBOOTSTRAP: <serverId>,<name>,<serverURL>,<serverAuthType>,  
<serverAuthName>,<serverAuthSecret>,<serverAuthData>,<clientAuthType>,  
<clientAuthName>,<clientAuthSecret>,<clientAuthData>
```

**AT#SWMBOOTSTRAP=?**

Test command reports the supported range of values for all the parameters.

3.23.1.4. AT#SWMREG - Enable/Disable Self Registration

This command enables/disables the SWM Client self-registration on an SWM Center service domain.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2

AT#SWMREG=<mode>[,<domainName>[,<PIN>]]

Set command enables/disables the SWM Client the self-registration. In case self-registration is enabled, the SWM client will use the <domainName> and <PIN> combination to register upon first OMA-DM session to the correct customer domain (account) in the SWM Center server. After a successful self-registration, any later attempt is accepted but will not have any effect.

When the self-registration is ended, the following URC is received:

On success:

.....

On failure:

#SWMRING: <notificationId>,<errorId>

Where <notificationId>=1 or 11

Refer to **#SWMCHKUPD** command for the complete list of <notificationId> and <errorId>.

In the Unsolicited fields section are reported the URC parameters no previously described.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	self-registration mode.
Values:			
	0	:	disable
	1	:	enable
<domainName>	string	-	indicates the SWM Center domain name to register to. If absent, then a predefined default one is used from the DM tree configuration.
<PIN>	string	-	indicates the PIN code for registration into the domain. If absent, then a predefined default one is used from the DM tree configuration.

- The self-registration is possible only if SWM has previously been enabled by issuing **AT#SWMENA=1** command.
- The self-registration <mode>, <domainName> and <PIN> parameters are not reset after the SWM Client disabling, as they refer to parameters that affect the server behavior.

AT#SWMREG?

Read command reports the current setting of <mode> parameter in the format:

#SWMREG: <mode>

The registration credentials are not reported for security reasons.



AT#SWMREG=?

Test command reports the supported range of values for the <mode> parameter and the maximum length of <domainName> and <PIN> parameters in the following format:

#SWMREG: (list of supported <mode>s),<domainLength>,<pinLength>

Additional info:

- ▶▶ Here are the parameters returned by the test command and not described in the previous sections.

Name	Type	Default	Description
<domainLength>	integer	-	maximum length of the <domainName> string
<pinLength>	integer	-	maximum length of the <PIN> string

3.23.1.5. AT#SWMCHKUPD - Check Updates

This command triggers a DM Session to query the OMA-DM server for a pending update

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SWMCHKUPD

Execution command triggers a DM Session to check for a pending update on the OMA-DM server. If the command has been executed successfully, it returns **OK**.


When the update check is ended, the following URC is received.

```
#SWMCHKUPD:<isUpdateAvailable>[,<totalPackageSizeInBytes>,<description>
[,<releaseNoteURL>]]
```

In the Unsolicited fields section are reported the URC parameters.

Unsolicited fields:

Name	Type	Description
<isUpdateAvailable>	integer	update availability Values: 0 : no update is available 1 : update is available
<totalPackageSizeInBytes>	integer	size of update package in bytes. The <totalPackageSizeInBytes> parameter is optional and will be present in the response in case an update package is pending on the OMA-DM server side.
<description>	string	description of the release package
<releaseNoteURL>	string	OMA-DM Server URL where the package release note is located. The <releaseNoteURL> parameter is optionally, is available if there is a descriptive release note string associated with the update package and if <enableReleaseNoteURL>=1 in #SWMCFG .

 **#SWMCHKUPD** command returns an error if issued before **AT#SWMENA=1**.



AT#SWMCHKUPD=?

Test command returns the **OK** result code.



- Check if the update is available
AT#SWMCHKUPD
OK

#SWMCHKUPD: 1,4096, Minor Bug Fixes and Added Functionality

The update is available.

- Check if the update is available
AT#SWMCHKUPD
OK

#SWMCHKUPD: 0

No Update is available

3.23.1.6. AT#SWMGETDP - Download Update Package from OMA-DM Software Management Server

The command accepts/rejects the update package downloading from OMA-DM server after #SWMCHKUPD: URC has been received.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SWMGETDP=<cmd>

After receiving the following URC (triggered by #SWMCHKUPD command):

#SWMCHKUPD: 1,<totalPackageSizeInBytes>[,<description> [,<releaseNoteURL>]]

enter #SWMGETDP execution command to accepts or rejects the update package download. To have information on the URC parameters refer to #SWMCHKUPD command.

Parameter:

Name	Type	Default	Description
<cmd>	integer	0	accepts or rejects the download

Values:

0 : reject
1 : accept

Additional info:

- ▶▶ If #SWMGETDP has been successfully executed, it returns the result code **OK**. After a while, the following URC is received:

#SWMDLPRGRSS:<accumulativeReceivedBytes>,<totalDPSizeInBytes>



When the download is successfully ended, the following URC is received:

#SWMRING: 2[,<description>[,<releaseNoteURL>]]

In the Unsolicited fields section are reported the URC parameters.

Unsolicited fields:

Name	Type	Description
<accumulativeReceivedBytes>	string	current size of the downloaded portion of the package expressed in bytes.
<totalDPSizeInBytes>	integer	total size of the package expressed in bytes
<description>	string	general description of the update package.
<releaseNoteURL>	string	release note relative to URL

-  The command raises an error if issued before **AT#SWMENA=1**.
-  If **#SWMGETDP** issued when the delta package has already been downloaded, the command returns **OK** and no action is performed.

**AT#SWMGETDP=?**

Test command reports the supported range of values of the **<cmd>** parameter.



Example of the sequence generally required to get an update package from OMA-DM software management server.

Trigger a DM Session for querying the OMA-DM server for a pending update.

```
AT#SWMCHKUPD  
OK
```

URC shows that the update is available

```
#SWMCHKUPD: 1,1024,"Description of update package", "Release Note URL "
```

Accept the download

```
AT#SWMGETDP=1  
OK
```

URCs showing current size of the downloading portion of the package and total size of the package expressed in bytes

```
#SWMDLPRGRSS: 0,1024
```

```
#SWMDLPRGRSS: 1024,1024
```

URC shows that the download is done successfully

```
#SWMRING: 2,"Description of update package", "Release Note URL "
```

3.23.1.7. AT#SWMDEPLOYDP - Install Software Update Package

This command confirms SWM client to install update package after #SWMRING: URC has been received.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT#SWMDEPLOYDP=<cmd>

After receiving the following URC (triggered by #SWMGETDP command):

#SWMRING: 2[,<description>[,<releaseNoteURL>]]

enter #SWMDEPLOYDP execution command to accepts or rejects the update package installation. To have information on the URC parameters refer to #SWMGETDP command.

Parameter:

Name	Type	Default	Description
<cmd>	integer	0	confirm or not the update package installation.

Values:

- 0 : reject
- 1 : accept

Additional info:

- ▶▶ If #SWMDEPLOYDP has been successfully executed, it returns the result code **OK**. When the FUMO update is done, the following URC is received:

#SWMRING:<notificationId>[,<description>[,<releaseNoteURL>]]




On success <notificationId>=4

On failure <notificationId>=5

In the Unsolicited fields section are reported the URC parameters.

Unsolicited fields:

Name	Type	Description
<description>	string	general description of the update package.
<releaseNoteURL>	string	release note relative to URL

-  If the update requires a device reboot, the device will be rebooted silently.
-  The command raises an error if issued before **AT#SWMENA=1**.
-  If #SWMDEPLOYDP is issued before the delta package is downloaded with #SWMGETDP, the command returns **OK** and no action is performed.

**AT#SWMDEPLOYDP=?**

Test command reports the supported range of values for the <cmd> parameter.



Execution command accepts the update package installation

AT# SWMDEPLOYDP =1

OK

The module reboot automatically

If firmware update has been successfully deployed, the following URC is displayed

#SWMRING: 4,"description of update package","Release Note URL"

3.23.2. OMA-DM

3.23.2.1. AT#OMACFG - OMA-DM Configuration Parameters Management

The command configures the parameters related to AT&T OMA-DM Client.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#OMACFG=<pdpld>[,<unused1>[,<unused2>[,<unused3>]]]

The set command is intended to allow the end-user to handle the OMADM AT&T parameters configuration.

Parameters:

Name	Type	Default	Description
<pdpld>	integer	1	PDP context identifies the AT&T OMA-DM client should use on the module
Value:			
1÷5	:	PDP context identifier	
<unused1>	integer	0	reserved for future use
Value:			
0	:	default value	
<unused2>	integer	0	reserved for future use
Value:			
0	:	default value	
<unused3>	integer	0	reserved for future use
Value:			
0	:	default value	



AT#OMACFG?

Read command returns the parameters current value.



AT#OMACFG=?

Test command returns the supported range for #OMACFG command parameters



Get the current values

```
AT#OMACFG?  
#OMACFG: 1,0,0,0  
OK
```

Set a new PDP context identifier value

```
AT#OMACFG=3  
OK
```

Read the currently set value

```
AT#OMACFG?  
#OMACFG: 3,0,0,0  
OK
```

Test command

```
AT#OMACFG=?  
#OMACFG: (1-5),(0), (0), (0)  
OK
```

3.23.2.2. AT#ENAOMADM - Enable OMA-DM AT&T Client

This command allows the user to control some features about Open Mobile Alliance (OMA) standards-based Device Management (DM) functionality. OMA DM is used to remotely provision new subscribers, configure applications and network settings, manage software, and retrieve device information over the air.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#ENAOMADM=<enable>[,<unsolicited>[,<accountType>]]

Parameters:

Name	Type	Default	Description
<enable>	integer	-	is no more used to disable/enable OMA DM functionality. <enable> parameter is managed and saved in NVM to maintain the former AT&T client's behavior.
<unsolicited>	integer	1	type of notification. The ME could inform (or not) about reception of DM events related to ongoing session through an unsolicited code with the following format: #OMADM: <event> For <event> parameter meaning see Unsolicited Code values section.
<accountType>	integer	0	is used to change the server to connect to (if necessary). Only for AT&T products.

Values:

0 : disable URC
1 : enable URC

Values:

0 : AT&T production server
1-5 : reserved

Unsolicited field:

Name	Type	Description
<event>	string	it could be one of the following strings: <ul style="list-style-type: none"> "UIE_SESSION_DM_NI_STARTED" A NIA session has started "UIE_BOOTSTRAP_GET_PIN" Request PIN code "UIE_BOOTSTRAP_GET_NSS" Request NSS data

- "UIE_UI_ALERT_INFO"
Shows the end-user a UI Alert information message
- "UIE_UI_ALERT_CONFIRM"
Shows the end-user an UI Alert confirmation message
- "UIE_UI_ALERT_INPUT"
Shows the end-user an UI Alert input message
- "UIE_UI_ALERT_CHOICE"
Shows the end-user an UI Alert choice list
- "UIE_FUMO_CONFIRM_UPDATE"
Prompts the end-user to confirm update installation

Only for Verizon products

- "UIE_SESSION_STATE_NOTIFY_UI", <message> could be associated with the following <message>:

 "Started", when a NIA message is taken in charge by the OMADM client

 "Complete", when the OMADM session has completed its scope

 "Aborted", when the session started but the connection management resulted in a fatal error and the OMADM session fails. It is issued along with an internal code
- "UIE_SESSION_NOTIFY_NIA_DROP", <code> alerts the user that a NIA message was received but discarded because of <code> reasons:

 1: reports that the device is in roaming

 2: reports that the device has no network coverage

 3: reports a generic error

i Valid only for AT&T

The command only works for **#ENS=1** (see **#ENS** command). It is consequent that, once the OMADM client is active, **#ENS** could not be disabled.

- i The values **<enable>** and **<account type>** set by command are directly stored in NVM and do not depend on the specific CMUX instance; the value **<unsolicited>** is stored in the profile extended section, and it depends on the specific AT instance.
- i It is in charge of the user to verify if a IP context must be defined before the enable command is issued; the context, if not already activated, is activated by the command.
- i OMA DM Client is enabled by an incoming AT&T NIA SMS message. The SMS reception should activate the client if any other OMADM campaign is not concurrently ongoing (i.e.: SWM client could be active but it is not managing any delta downloading/deploying), and at the end of it, the OMA DM client is automatically disabled to restore the starting condition. There is no real correlation between the OMA DM client status and the **<enable>** parameter.

**AT#ENAOMADM?**

Read command reports the currently selected parameters and DM engine status in the format:

#ENAOMADM: <enable>,<unsolicited>,<accountType>,<engineStatus>

Additional info:

- ▶▶ Parameters returned by the read command and not described in the previous sections.

Name	Type	Default	Description
<engineStatus>	integer	0	engine status

Values:

- 0 : DM engine stopped
- 1 : DM engine running

- i** In Verizon products, **<account type>** parameter is shown even if it is meaningless.
- i** **<enable>** parameter is shown even if uncorrelated to the effective client's status

**AT#ENAOMADM=?**

Test command reports the supported range of values for parameters **<enable>**, **<unsolicited>** and **<account type>**.



Starting condition
AT#ENAOMADM?
#ENAOMADM: 0,1,0,0
OK

AT#SGACT?
#SGACT: 1,0
OK

After AT&T NIA SMS, and during AT&T campaign management
AT#ENAOMADM?
#ENAOMADM: 0,1,0,1
OK

AT#SGACT?
#SGACT: 1,1
OK

3.23.2.3. AT#HOSTODIS - Host ODIS Parameters Management

The set command allows the end-user to handle the Host ODIS parameters for AT&T OMADM client.



[1] <CDR-DVM-4532> of AT&T, revision 16.3


SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#HOSTODIS=<Param>,<Action>[,<Value>[,<Instance>]]

Parameters:

Name	Type	Default	Description
<Param>	integer	N/A	selects the specific item on which work.
Values:			
0	:	Host Manufacturer name	
1	:	Host model Name	
2	:	Host Software application version	
3	:	Host Device Unique ID	
<Action>	integer	N/A	selects the action to be performed on the item selected by <Param>
Values:			
0	:	"SET" action	
1	:	"GET" action	
2	:	"RESET" action	
<Value>	string	-	contains a string, between double quotes, with data to be set. Maximum string length is 64 characters. It is valid only if <Action> = 0 ("SET" action)
<Instance>	integer	1	instance number
Value:			
1	:	is the only allowed value	

 Host Manufacturer, Host Model and Host Software application version do not change after an OTA firmware upgrade

 "GET" action is not allowed on Host Device Unique ID.



AT#HOSTODIS=?

Test command returns the supported values ranges of the parameters.



Get the currently set values (i.e.: Host Model)

```
AT#HOSTODIS=1,1  
#HOSTODIS:"HMOD1"  
OK
```

Set a new Host Model value

```
AT#HOSTODIS=1,0,"Model #4 - 2nd version"  
OK
```

Get the currently set value

```
AT#HOSTODIS=1,1  
#HOSTODIS: 0,"Model #4 - 2nd version"  
OK
```

Reset the Model value

```
AT#HOSTODIS=1,2  
OK
```

Get again the currently set value

```
AT#HOSTODIS=1,1  
#HOSTODIS:"HMOD1"  
OK
```

3.23.2.4. AT#OMASENDPIN - OMA DM Send PIN or NSS

This command sends a response to an `UIE_BOOTSTRAP_GET_PIN` or `UIE_BOOTSTRAP_GET_NSS` event, see `#ENAOMADM` command.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#OMASENDPIN=<data>

Parameter:

Name	Type	Default	Description
<data>	string	-	string corresponding to the requested PIN or NSS data



AT#OMASENDPIN=?

Test command tests for command existence

3.23.2.5. AT#UNIQUEDEVID - Device ID Parameter Handling

This set command is used to save the Device ID parameter (ODIS AT&T requirement).


SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#UNIQUEDEVID=<deviceID>

Parameter:

Name	Type	Default	Description
<deviceID>	string	-	16 alphanumeric digits ID assigned to the device

 Device ID can be written only once



AT#UNIQUEDEVID =abc1234567890123
OK

Read command not supported
AT#UNIQUEDEVID?
ERROR

3.24. Consume Commands

3.24.1. AT#CONSUMECFG - Configure Consume Parameters

This command sets the parameters related to the consume functionality.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2









AT#CONSUMECFG=<rule_id>[,<service_type>,<rule_enable>,<period>,<limit_amount>[,<action_id>]]]]]

The set command configures the parameters related to the consume functionality.

Parameters:

Name	Type	Default	Description
<rule_id>	integer	N/A	index of the rule to apply to a defined <service_type>
	Value:		
	0÷10	:	Index of the rule to apply to a defined <service_type>
<service_type>	integer	0	type of service to count
	Values:		
	0	:	No service
	1	:	SMS Sent
	2	:	SMS Received
	3	:	Total SMS
	4	:	CS MO Calls
	5	:	CS MT Calls
	6	:	Total CS Calls
	7	:	IP All Data Sent
	8	:	IP All Data Received
	9	:	IP All Data
	10	:	IP All Data Sent (with Header)
	11	:	IP All Data Received (with Header)
	12	:	IP All Data (with Header)
<rule_enable>	integer	0	enable the counter on the rule
	Values:		
	0	:	rule disabled
	1	:	rule enabled
<period>	integer	0	period over which the service type data are counted
	Values:		
	0	:	life (entire module life)
	1÷8760	:	Hours

<limit_amount>	integer	0	limit amount of data to count
Values:			
0÷4294967295	:		KBytes for <service_type>=7, 8, 9, 10, 11, 12
0÷65535	:		number of SMS, for <service_type>=1, 2, 3
0÷65535	:		minutes, for <service_type>=4, 5, 6
<action_id>	integer	0	identifier of the action to trigger when the threshold limit has been reached. It corresponds to the AT command associated to the event CONSUMEX (refer to #EVMONI command)
Value:			
0÷5	:		0 means no action associated: in this case only the counter is active

-  The set command **#CONSUMECFG=0** has a special behavior: for all the enabled rules, the data and time of related counters are reset (if they are not-life counters).
-  The values set by command are directly stored in NVM and don't depend on the specific AT instance.
-  The life counters are disabled if **<enable>** parameter of **#ENACONSUME** is equal to 0.
-  A rule can be changed only setting **<rule_enable>=0**. The data and time of related counter are also reset (if it's not a life counter).
-  When the period expires, the counted data are reset, so the counting in the next period starts from 0.
-  If a service is blocked, then the related (life or not) counter is stopped also in terms of time (as well as in terms of data obviously).

**AT#CONSUMECFG?**

Read command returns the current settings for each rule in the format:

#CONSUMECFG:<rule_id>,<service_type>,<rule_enable>,<period>,<limit_amount>,<action_id>

**AT#CONSUMECFG=?**

Test command reports the supported range of values for all parameters.

3.24.2. AT#IPCONSUMECFG - #SGACT/#SENDLINE Configuration

This command sets PDP context authentication and TCP/UDP connection configuration parameters.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	Auto	No	-	2



AT#IPCONSUMECFG=[<connId>[,<txProt>[,<remoteHost>[,<remotePort>[,<authIMEI/ICCIDena>[,<unused_A>[,<unused_B>[,<unused_C>]]]]]]]]]

Parameters:

Name	Type	Default	Description
<connId>	integer	1	connection identifier
	Value:	1÷6	: connection ID.
<txProt>	integer	0	transmission protocol
	Values:	0	: TCP
		1	: UDP
<remoteHost>	string	""	This parameter can be either: <ul style="list-style-type: none"> any valid IP address in the format: "xxx.xxx.xxx.xxx" any host name to be solved with a DNS query
	Value:	""	: address of the remote host.
<remotePort>	string	1024	remote host port to contact
	Value:	1÷65535	: host port
<authIMEI/ICCIDena>	string	0	enables PDP context activation (#SGACT) authentication(user/pwd) with ICCID/IMEI.
	Values:	0	: disable #SGACT authentication with IMEI/ICCID as user/pwd.
		1	: enable #SGACT authentication with IMEI/ICCID as user/pwd.
<unused_A>	string	""	unused parameter
	Value:	""	: unused parameter.
<unused_B>	string	""	unused parameter





Value:

"" : Unused parameter.

<unused_C>	string	""	unused parameter
-------------------------	--------	----	------------------

Value:

"" : unused parameter.

-  **<connId>**, **<txProt>**, **<remoteHost>** and **<remotePort>** take effect on successive **#SENDLINE** command.
-  Before entering successive **#SENDLINE** verify that **<connId>** is not already in use by other commands (e.g.: **#SD**, **#SL**).
-  **<authIMEI/ICCIDena>** takes effect on successive **#SGACT** command.
-  **<authIMEI/ICCIDena>** setting takes effect when successive **#SGACT** not indicating **<userId>** and **<pwd>** will be used.



AT#IPCONSUMECFG?

Read command reports the currently configuration parameters in the format:

#IPCONSUMECFG:<connId>,<txProt>,<remoteHost>,<remotePort>,<authIMEI/ICCIDena>,<0>,<0>,<0>



AT#IPCONSUMECFG=?

Test command reports the supported range of values for all the parameters.

3.24.3. AT#SENDLINE - Open a Connection, Send data, Close connection

This command permits to open a TCP/UDP connection, send specified data and close the TCP/UDP connection. The remote host/port of the connection must be previously specified with #IPCONSUMECFG command.


SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#SENDLINE=<data>

Parameter:

Name	Type	Default	Description
<data>	string	-	text to send, shall be enclosed between double quotes

-  Maximum allowed amount of data is 380 octets.
-  In case of UDP obviously only local opening/closure is done, datagram is sent with <data> contained in the payload.



AT#SENDLINE=?

Test command reports the maximum length of <data> parameter



```
AT+CGDCONT=1,"IP","APN"
OK
```

```
AT#IPCONSUMECFG=1,0,"remoteHost",remotePort
OK
```

Socket with <connId> 1 will be used by #SENDLINE, TCP will be the transmission protocol; Connection will be opened with remoteHost/remotePort

```
AT#SGACT=1,1
#SGACT: xxx.xxx.xxx.xxx
OK
```

```
AT#SENDLINE="test sample"
OK
```

TCP connection with "remoteHost"/remotePort is opened, data between double quotes are sent, then TCP connection is closed.

3.24.4. AT#BLOCKCONSUME - Block/Unblock a Type of Service

This command blocks/unblocks a type of service.



SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#BLOCKCONSUME=<service_type>,<block>

Parameters:

Name	Type	Default	Description
<service_type>	integer	1	indicates the value for the type of service.
Values:			
1	:	SMS Sending	
2	:	SMS Receiving	
3	:	SMS Sending/ Receiving	
4	:	CS MO Calls	
5	:	CS MT Calls	
6	:	MO/MT CS Calls	
7	:	IP Data	
<block>	integer	0	block / unblock the service specified in <service_type>
Values:			
0	:	unblock the service specified in <service_type>	
1	:	block the service specified in <service_type>	

-  Even if the service "SMS Received" has been blocked, an SMS ATRUN digest SMS can be received and managed.
-  The type of service 7 "IP Data" comprises all the IP services (i.e. IP, with or without header, sent, receive and sent/receive data).



AT#BLOCKCONSUME?

Read command reports the status blocked/unblocked of every type of service in the following format:

#BLOCKCONSUME: <service_type>,<block>



AT#BLOCKCONSUME=?

Test command reports the supported range of values for **<service_type>** and **<block>** parameters.

3.24.5. AT#STATSCONSUME - Report Consume Statistics

This command reports the values of the life counters for every type of service or the values of period counters for every rule.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#STATSCONSUME=<counterType>

Parameter:

Name	Type	Default	Description
<counterType>	integer	0	type of counter

Values:

- 0 : period counter
- 1 : life counter

Additional info:

- ▶▶ **<counterType>**=0, the command returns the values of period counters for every rule defined with **#CONSUMECFG** command in the format:

#STATSCONSUME: <rule1>,<serviceType>,<countedData>,<threshold>,<currentTimeInPeriod>,<period><CR><LF>

#STATSCONSUME: <rule2>,<serviceType>,<countedData>,<threshold>,<currentTimeInPeriod>,<period><CR><LF>

...

#STATSCONSUME: <rule10>,<serviceType>,<countedData>,<threshold>,<currentTimeInPeriod>,<period>

Name	Type	Default	Description
<rule1>	integer	0	Index of the rule defined with #CONSUMECFG

Value:

- 0÷10 : see **#CONSUMECFG**

<serviceType>	Type	Default	Description
<serviceType>	integer	N/A	type of service

Values:

- 1 : SMS Sent
- 2 : SMS Received
- 3 : Total SMS
- 4 : CS MO Calls
- 5 : CS MT Calls
- 6 : Total CS Calls
- 7 : IP All Data Sent

- 8 : IP All Data Received
- 9 : IP All Data
- 10 : IP All Data Sent (with Header)
- 11 : IP All Data Received (with Header)
- 12 : IP All Data (with Header)

<countedData>	integer	-	number of data counted during <currentTime>
<threshold>	integer	-	limit amount of data to count (set in parameter <limitAmount> with #CONSUMECFG ; see #CONSUMECFG)
<currTimeInPeriod>	integer	-	number of passed hours in the current <period>
<period>	integer	0	number of total hours in the period where the data are counted (corresponds to the value set in <period> with #CONSUMECFG)


Values:

- 0 : entire module life
- 1÷8760 : number of hours

- **<counterType>**=1, the command returns the values of life counters for every service type in the format:

```
#STATSCONSUME: <service1>,<lifeData>,<currentTime><CR><LF>
#STATSCONSUME: <service2>,<lifeData>,<currentTime><CR><LF>
...
#STATSCONSUME: <service12>,<lifeData>,<currentTime>
```

Name	Type	Default	Description
<service1>	integer	-	same as <serviceType> above
<lifeData>	integer	-	number of data counted during entire life time period
<currentTime>	integer	-	number of passed hours during entire life time period

-  Issuing **AT#STATSCONSUME** without parameters has the same effect as **AT#STATSCONSUME=0**



AT#STATSCONSUME=?

Test command returns **OK** result code

3.24.6. AT#ENACONSUME - Enable Consume Functionality

This command enables consume functionality.




SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#ENACONSUME=<enable>[,<storingMode>[,<storingPeriod>]]

Parameters:

Name	Type	Default	Description
<enable>	integer	0	enable/disable consume functionality
Values:			
0 : disable			
1 : disable except life counters			
2 : enable			
<storingMode>	integer	0	modality of NVM saving
Values:			
0 : the counters are saved in NVM at every shutdown			
1 : the counters are saved in NVM at every shutdown and periodically at regular intervals specified by <storingPeriod> parameter			
<storingPeriod>	integer	0	number of hours after that the counters are saved, numeric value in hours
Value:			
0,8÷24 : 0 means no set period (as <storingMode>=0)			

-  When the functionality is disabled with **<enable>=0**, the data counters are stopped but not reset: to reset them (except life counters) set **<ruleEnable>=0** with **#CONSUMECFG** command
-  When the functionality is disabled with **<enable>=1**, the data counters are stopped except life counters
-  The life counters are never reset, neither in terms of counted data nor in terms of time



AT#ENACONSUME?

Read command returns the current settings for all parameters in the format:

#ENACONSUME:<enable>,<storingMode>,<storingPeriod>



AT#ENACONSUME=?

Test command reports the supported values for parameters.

3.25. GNSS

3.25.1. GNSS Receiver

3.25.1.1. AT\$GPSD - GNSS Device Type Set

This set command defines which GNSS receiver is connected to the module. It reserves the serial port #1 of the module (TRACE) to receive the data stream coming from the attached GNSS module.



[1] Hardware User's Guide of the used module

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT\$GPSD=<deviceType>[,<subDeviceType>]

Parameters:

Name	Type	Default	Description
<deviceType>	integer	N/A	selects a GNSS devices family that have a GNSS device that can be connected to serial port #1.

Values:

- 0 : no GNSS device family is selected
- 1 : used for backward compatibility
- 2 : SiRF StarIV-based GNSS modules. Supported: JF2-FLASH, JF2-ROM and JF2-ROM+EEPROM
- 3 : SiRF StarIV-based GNSS modules. Supported: JN3-FLASH, JN3-ROM and JN3-ROM+EEPROM
- 4 : ST Teseo II-based GPS modules. Supported: SL869
- 5 : SiRF StarV-based GNSS modules. Supported: SE868-V2
- 6 : MediaTek MT3333-based GNSS modules. Supported: SL871

<subDeviceType>	integer	0	select the sub device type. The <subDeviceType> can be used with SiRF Star-based GNSS modules: JF2, JN3, SE868-V2, when <deviceType>= 2,3, or 5.
-----------------	---------	---	--

Values:

- 0 : Flash device: Flash based module
- 1 : ROM device: ROM based module
- 2 : ROM + EEPROM (or SPI Flash) device: EEPROM (or SPI Flash) based module



AT\$GPSD?

Read command reports the current value of <deviceType> and <subDeviceType> parameters, in the format:

\$GPSD: <deviceType>,<subDeviceType>



AT\$GPSD=?

Test command reports the range of supported values for parameter <deviceType>,<subDeviceType>.



The current setting is stored through **\$GPSSAV** command.



AT\$GPSD=0
OK

AT\$GPSD=2,1
OK

AT\$GPSD=4,2
ERROR

3.25.1.2. AT\$GPSGPIO - GPIO Configuration for GNSS Control

This execution command sets the GPIO pins to be used to drive the following GNSS modules: JF2 (SE868), JN3 (SL868), SL869, SE868-V2 and SL871.



[1] Hardware User's Guide of the used module




SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2




AT\$GPSGPIO=<onOff>,<systemOn>,<boot>,<reset>

Parameters:

Name	Type	Default	Description
<onOff>	integer	1	GPIO pin number to be used to drive the JF2/JN3/SL869/SE868-V2's ON-OFF signal.
	Value:	1 : default	
<systemOn>	integer	2	GPIO pin number to be used to drive the JF2/SE868-V2's SYSTEM-ON signal.
	Value:	2 : default	
<boot>	integer	3	GPIO pin number to be used to drive the JF2-Flash/JN3-Flash/SL869's BOOT signal.
	Value:	3 : default	
<reset>	integer	4	GPIO pin number to be used to drive the JF2-Flash/JN3-Flash's RESET signal.
	Value:	4 : default	

-  The GPIO configuration specified through this command must be coherent with the specific GNSS module that has to be used, i.e. the configuration specified through the **\$GPSD** command.
Therefore, the GPIOs corresponding to unnecessary signals (e.g. **<systemOn>**, **<boot>** and **<reset>** for a JN3-ROM) should be set to zero: this allows to reserve and use the minimum number of GPIOs.
-  See the Hardware User Guide to check the number of available GPIO pins.
-  The GPIO configuration correctness and functionality (i.e. possible conflicts with the GPIO configuration applied through **#GPIO** command) are under the customer's sole responsibility.

-  If any of the V24 signals has been previously configured as GPIO through **#V24CFG** command, it can be set by the extended GPIO range (GPIO # from 128 to 133) to drive the external GNSS receiver.

Extended GPIOs and V24 signals correspondence is shown below:

GPIO #128 => DCD

GPIO #129 => CTS

GPIO #130 => RING

GPIO #131 => DSR

GPIO #132 => DTR

GPIO #133 => RTS

See the Example section for an example on how to set such GPIOs.

An **ERROR** is returned whenever trying to set a GPIO, from the extended GPIO range, its corresponding V24 signal has not been previously configured as GPIO through **#V24CFG** command.



AT\$GPSGPIO?

Read command reports the currently selected configuration in the format:

\$GPSGPIO: <onOff>,<systemOn>,<boot>,<reset>





AT\$GPSGPIO=?

Test command reports supported range of values for parameters **<onOff>**, **<systemOn>**, **<boot>** and **<reset>**.

-  The extended GPIO range is reported along with the available customer GPIO range.



-  The **\$GPSGPIO** command is available in "Controlled Mode" only.
-  The current GPIO configuration can be stored through **\$GPSSAV** command.



For a JF2-Flash (AT\$GPSD=2,0):

```
AT$GPSGPIO=4,5,6,7  
OK
```

```
AT$GPSGPIO?  
$GPSGPIO: 4,5,6,7  
OK
```

For a JF2-ROM (AT\$GPSD=2,1):

```
AT$GPSGPIO=4,5,0,0  
OK
```

or

```
AT$GPSGPIO=4,5,6,7  
OK
```

```
AT$GPSGPIO?  
$GPSGPIO: 4,5,0,0  
OK
```

For a JF3-ROM (AT\$GPSD=3,1):

```
AT$GPSGPIO=4,0,0,0  
OK
```

or

```
AT$GPSGPIO=4,5,6,7  
OK
```

```
AT$GPSGPIO?  
$GPSGPIO: 4,0,0,0  
OK
```

Set Command to configure GPIOs from extended GPIO range:

```
AT$GPSGPIO=131,132,130,128  
OK
```

Test Command showing extended GPIO range:

```
AT$GPSGPIO=?  
$GPSGPIO: (1-8,128-131),(1-8,132-133),(1-8,128-131),(1-8,128-131)  
OK
```

3.25.1.3. AT\$GPSSERSPEED - Set the GNSS serial port speed

This execution command sets the GNSS serial port communication speed.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT\$GPSSERSPEED=<speed>

Parameter:

Name	Type	Default	Description
<speed>	integer	4800	serial speed

Values:

4800 : bps

9600 : bps

- i** This command can be used with SIRF-based GNSS modules only, such as JF2, JN3 and SE868-V2 (**AT\$GPRSD=2**, **AT\$GPRSD=2,1**, **AT\$GPRSD=2,2**, **AT\$GPRSD=3**, **AT\$GPRSD=3,1**, **AT\$GPRSD=3,2** or **AT\$GPRSD=5,2**), and MT3333-based GNSS modules such as SL871 (**AT\$GPRSD=6**).

- i** The module must be restarted to use the new configuration.



AT\$GPSSERSPEED?

Read command returns the selected serial speed in the format

\$GPSSERSPEED: <speed>



AT\$GPSSERSPEED=?

Test command returns the available range for <speed>.



The current setting is stored through **\$GPSSAV** command.



```
AT$GPSSERSPEED = 4800
OK
```

3.25.1.4. AT\$GPSAT - GNSS Antenna LNA Control

This command selects the GNSS antenna used.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT\$GPSAT=<type>

Set command selects the GNSS antenna used.

Parameter:

Name	Type	Default	Description
<type>	integer	0	Antenna type

Values:

- 0 : Disable External GNSS Antenna LNA: GNSS chip Internal LNA Gain Mode is High and GPS_EXT_LNA_EN signal is Low
- 1 : Enable External GNSS Antenna LNA: GNSS chip Internal LNA Gain Mode is Low and GPS_EXT_LNA_EN signal is High



The current setting is stored through **AT\$GPSSAV**.



AT\$GPSAT?

Read command returns the current value of <type> in the format:







\$GPSAT: <type>



AT\$GPSAT=?

Test command reports the range of supported values for parameter <type>.



-  The command is available in "Controlled Mode" only.
-  This command is currently available for SirfIV-based GNSS modules (JF2 and JN3) only, i.e. whenever is **AT\$GPSD=2** or **AT\$GPSD=3**.
-  This command must be issued only when the GNSS receiver is operating in Full Power Mode (see **\$GPSPS**), otherwise it might have no effect.
-  Since the **\$GPSAT** command performs a hardware reconfiguration of the GNSS receiver, the issuing of two consecutive **AT\$GPSAT** commands should be avoided, otherwise the reconfiguration might fail: an **ERROR** is returned in the latter case.
-  If the **<type>** parameter has been set to 1, the External GNSS Antenna LNA is directly driven by the GNSS receiver according to its current power mode (i.e. the External GNSS Antenna LNA is turned off whenever the GNSS receiver is in power saving mode).
-  Please refer to the HW User Guide for the compatible GNSS antennas and their usage.



```
AT$GPSAT=1
OK
```

3.25.1.5. AT\$GPSSAV - Save GPS Parameters Configuration

This command stores the current GNSS parameters in the NVM of the cellular module

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$GPSSAV

Execution command stores the current GNSS parameters in the NVM of the cellular module



AT\$GPSSAV=?

Test command returns the **OK** result code



The module must be restarted to use the new configuration

3.25.1.6. AT\$GPSRST - Restore Default GPS Parameters

This command resets the GNSS parameters to "Factory Default" configuration

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT\$GPSRST

Set command resets the GNSS parameters to "Factory Default" configuration and stores them in the NVM of the cellular modules



AT\$GPSRST=?

Test command returns the **OK** result code



The module must be restarted to use the new configuration

3.25.1.7. AT\$GPSSTCPUCLK - Set CPU Clock for ST TESEOII

This command allows changing the CPU clock frequency for GNSS modules.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$GPSSTCPUCLK=<cpuClock>



Set command allows changing the CPU clock frequency for ST TESEOII-based GNSS modules (e.g. SL869).

Parameter:

Name	Type	Default	Description
<cpuClock>	integer	N/A	CPU clock

Values:

- 0 : 52 MHz
- 1 : 104 MHz
- 2 : 156 MHz
- 3 : 208 MHz

-  This command can be used with ST TESEOII-based GNSS modules only (**AT\$GPSD=4**).
-  The <cpuClock> setting is saved into TESEOII NVM and retained until a NVM erase or a next firmware upgrade of the GNSS receiver is performed.




AT\$GPSSTCPUCLK?

Read command reports the current setting for the CPU clock frequency in the format:

\$GPSSTCPUCLK: <cpuClock>

An **ERROR** is returned if the CPU Clock Frequency has never been changed.

-  Please refer to the Software Application Note of the GNSS receiver used for further information on the CPU clock frequency used by default.



AT\$GPSSTCPUCLK=?

Test command reports the supported range of values for the parameter <cpuClock>.

3.25.1.8. AT\$GNSS5HZ - GNSS 5Hz Navigation Mode

This command allows enabling the 5Hz Navigation Mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$GNSS5HZ=<mode>

Set command allows enabling the 5Hz Navigation Mode on a SiRFStar V Flash-based GNSS receiver (e.g. SE868-V3).

Parameter:

Name	Type	Default	Description
<mode>	integer	0	Mode

Values:

- 0 : Disable
- 1 : Enable



AT\$GNSS5HZ?

Read command reports the current value of the <mode> parameter, in the format:

\$GNSS5HZ: <mode>



AT\$GNSS5HZ=?

Test command reports the range of supported values for parameter <mode>.



The command is available in "Controlled Mode" only.

3.25.1.9. AT\$GNSSEPE - GNSS Estimated Position Errors

This command reports the Estimated Horizontal and Vertical Position Errors.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$GNSSEPE?

Read command reports the Estimated Horizontal and Vertical Position Errors for the last GNSS position fix, for SiRF StarIV and SiRF StarV based GNSS receivers, in the format:

\$GNSSEPE: <ehpe>,<evpe>

Additional info:

- ▶ Parameters returned by the read command.

Name	Type	Default	Description
<ehpe>	integer	-	Estimated Horizontal Position Error in meters.
<evpe>	integer	-	Estimated Vertical Position Error in meters.



If a GNSS position fix has not been got yet, the answer will be as follows:

```
AT$GNSSEPE?
$GNSSEPE: 0.00,0.00
OK
```



AT\$GNSSEPE=?

Test command returns the **OK** result code.



The command is available in "Controlled Mode" only.

3.25.1.10. AT\$GPSP - GNSS Controller Power Management

This command powers on/off GNSS controller .

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT\$GPSP=<status>



The set command manages the power-up/power-down of the GNSS controller.

Parameter:

Name	Type	Default	Description
<status>	string	0	indicates the power status that has to be set.

Values:

- 0 : GNSS controller is powered down
- 1 : GNSS controller is powered up

-  The command is available in "Controlled Mode" only, see **\$GPSD** command.
-  The current setting is stored through **\$GPSSAV** command. The **<status>**, once stored through the **\$GPSSAV** command, specifies the GNSS receiver power status at the next start-up.



AT\$GPSP?

The read command reports the current value of the **<status>** parameter, in the format:

\$GPSP: <status>

The **<status>** value returned by the read command does not report the GNSS receiver power status but only the value set through the set command **\$GPSP**.



AT\$GPSP=?

The test command reports the supported values range for parameter **<status>**.



GNSS controller is powered down

```
AT$GPSP=0
OK
```

3.25.2. GNSS Power Saving Modes

3.25.2.1. AT\$GPSPS - Set the GNSS Module in Power Saving Mode

This command allows setting the GNSS module in Power saving mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$GPSPS=<mode>[,<PTF_Period>]

Set command allows setting the GNSS module in power saving mode. This command is currently available for Sirf-based GNSS modules: JF2, JN3, SE868-V2 and SE868-V3 only. See **AT\$GPSD=2**, **AT\$GPSD=3**, or **AT\$GPSD=5**; it means that the **\$GPSPS** command is available in "Controlled Mode" only.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	selects the power mode. For details, see Additional info sections.
Values:			
0	:	Full Power	
1	:	TricklePower	
2	:	Push-To-Fix	
3	:	Micro Power	
4	:	SmartGNSS I	
5	:	SmartGNSS II	
<PTF_Period>	integer	-	Push-To-Fix update period, in seconds; when mode is Push-To-Fix, the receiver turns on periodically according to this parameter. This parameter does have meaning only when <mode>=2. Default = 1800 sec

Additional info:

▶▶ <mode>=0 - Full Power Mode

Power saving is disabled (default). Full-power mode is also known as Continuous Navigation mode. This is the most accurate navigation mode and supports the most dynamic motion scenarios.

▶▶ <mode>=1 - TricklePower Mode

TricklePower mode is a duty cycled mode in which the system selects a minimum rate of navigation solution updates and minimizes average current.

▶▶ <mode>=2 - Push-To-Fix Mode

Push-to-Fix mode (PTF) is designed for applications that require infrequent position reporting. The SiRF Star receiver generally stays in the Hibernate system power state but

wakes up periodically to refresh position, time, ephemeris data and RTC calibration. A pulse on the external ON_OFF line to the receiver acts as a position update request.

▶▶ **<mode>=3 - Micro Power Mode**




Micro Power mode (MPM) is a very low power maintenance mode that delivers continuous availability of the navigation solution. It is intended for low dynamics applications. It continuously maintains ephemeris data as well as a low level of uncertainty in the estimates of position, time, and receiver clock error. It achieves this by keeping the SiRFStar receiver in the Hibernate power state and leaving Hibernate only as needed to maintain these conditions.

▶▶ **<mode>=4 - SmartGNSS I Mode**

SmartGNSS I autonomously manages GNSS system usage based on signal conditions to save power. The adaptive mechanism uses fewer system resources during strong signal conditions and uses more resources during weak signal conditions in order to maintain navigation performance.

▶▶ **<mode>=5 - SmartGNSS II Mode**

SmartGNSS II includes the benefits of SmartGNSS I and achieves further power reduction by minimizing the usage of the secondary GNSS constellation.

-  Push-To-Fix and Micro Power modes support is not available for JN3 because it does not have an ON_OFF input. Therefore, when **AT\$GPSPD=3**, only Full Power and TricklePower modes are supported. In addition, in this case, the **<PTF_Period>** parameter is accepted but not used.
-  Micro Power Mode support is not currently available for SE868-V2.
-  SmartGNSS I and SmartGNSS II mode are available on SiRF Star V Flash-based GNSS receivers only (e.g. SE868-V3).



AT\$GPSPS?

Read command returns the current power saving mode and push-to-fix period, in the format:

\$GPSPS: <mode>,<PTF_Period>



AT\$GPSPS=?

Test command returns the available range for **<mode>** and **<PTF_Period>**.

3.25.2.2. AT\$GPSWK - Wake Up GNSS from Power Saving Mode

This command wakes up GNSS receiver from Power Saving Mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$GPSWK

Execution command wakes up the GNSS module when a power saving mode has been enabled. This command is currently available for SiRF-based and MediaTek MT3333-based GNSS modules (e.g. JF2, JN3, SE868-V2 and SL871), i.e. whenever is **AT\$GPSD=2**, **AT\$GPSD=3**, **AT\$GPSD=5** or **AT\$GPSD=6**. **\$GPSWK** command works in "Controlled Mode" only.

- i Notes for SiRF-based GNSS modules only. If the GNSS module has been configured to work in:
 - TricklePower Mode, it will start up, get a fix and then continue to work in power saving mode.
 - Push-To-Fix Mode, issuing **AT\$GPSWK** allows to wake it up before the Push-To-Fix update period; once a new fix will be got, the GNSS module will return to Push-To-Fix mode.
 - Micro Power Mode, it will be set to Full Power Mode (same as issuing **AT\$GPSPS=0** command).
- i Notes for MediaTek MT3333-based GNSS modules only:
 If the GNSS module has been configured to work in any of the supported Standby modes, the current Standby mode will be disabled.



AT\$GPSWK=?

Test command returns the **OK** result code.

3.25.2.3. AT\$GPSMTKSTDBY - Set Standby Mode for MTK

This command sets the MediaTek MT3333-based GNSS modules in standby mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$GPSMTKSTDBY=<mode>



Set command allows setting the MediaTek MT3333-based GNSS modules in standby mode.

Parameter:

Name	Type	Default	Description
<mode>	integer	0	Standby modes.

Values:

- 0 : Standby Mode disabled. This value cannot be set and may be only reported by the read command.
- 1 : Stop Mode.
- 2 : Sleep Mode.

-  Stop or Sleep Standby modes can be set only when the GNSS module is powered ON and operating in full power mode.
-  The GNSS module can be forced to exit from the standby modes through the **\$GPSWK** command.



AT\$GPSMTKSTDBY?

Read command returns the current Standby mode in the format:

\$GPSMTKSTDBY: <mode>



AT\$GPSMTKSTDBY=?

Test command returns the available range for <mode>.



This command is available in "Controlled Mode" only, for MediaTek MT3333-based GNSS modules (e.g. SL871), i.e. whenever is **AT\$GPSD=6**.

3.25.2.4. AT\$GPSMTKPPS - Set the Periodic Power Saving Mode for MTK

This command allows setting the GNSS module's Periodic Power Saving Mode settings.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2







AT\$GPSMTKPPS=<mode>[,<runTime>,<sleepTime>,<secondRunTime>,<secondSleepTime>]

Set command allows setting the MediaTek MT3333-based GNSS module's Periodic Power Saving Mode settings.

Parameters:

Name	Type	Default	Description
<mode>	integer	0	Periodic Power Saving mode
Values:			
0	:		Normal mode (Periodic Power Saving mode disabled)
1	:		Periodic Backup mode
2	:		Periodic Standby mode
8	:		AlwaysLocate™ standby mode
9	:		AlwaysLocate™ backup mode
<runTime>	integer	0	Full Power (or Normal) Period in milliseconds
Value:			
1000-518400000	:		Period in ms
<sleepTime>	integer	0	Low Power Period (backup/standby) in milliseconds
Value:			
1000-518400000	:		Period in ms
<secondRunTime>	integer	0	Full Power (or Normal) Period in milliseconds for extended acquisition if GNSS acquisition fails during <runTime>
Values:			
0	:		Disable
1000-518400000	:		Enable (should be larger than the set <runTime> value)
<secondSleepTime>	integer	0	Low Power Period (backup/standby) in milliseconds for extended sleep if GNSS acquisition fails during <runTime>
Values:			
0	:		Disable
1000-518400000	:		Available range

-  The `<runTime>`, `<sleepTime>`, `<secondRunTime>`, `<secondSleepTime>` parameters must be set if `<mode>` is 1 or 2 otherwise **ERROR** is returned.
-  The `<runTime>`, `<sleepTime>`, `<secondRunTime>`, `<secondSleepTime>` parameters must be omitted if `<mode>` is 0, 8 or 9 otherwise **ERROR** is returned.
-  `<mode>` values different from 0 can be set only when the GNSS module is powered ON and operating in Full (or Normal) Power mode.
-  The `<mode>` value 0 can be set only when the GNSS module is operating in any of the Periodic Power Saving modes. Issuing **AT\$GPSMTKPPS=0** the GNSS module switches back to Full (or Normal) Power mode as soon as it wakes up according to the `<sleepTime>` and `<secondSleepTime>` values set.

**AT\$GPSMTKPPS?**

Read command returns the current Periodic Power Saving mode in the format:

\$GPSMTKPPS: <mode>[,<runTime>,<sleepTime>,<secondRunTime>,<secondSleepTime>]

**AT\$GPSMTKPPS=?**

Test command reports the supported range of values for parameters `<mode>`, `<runTime>`, `<sleepTime>`, `<secondRunTime>`, `<secondSleepTime>`.



Available in "Controlled Mode" only, see **AT\$GSPD** command.

This command is currently available for MediaTek MT3333-based GNSS modules (e.g. SL871) only, i.e. whenever is **AT\$GSPD=6**.

3.25.3. GNSS General Management

3.25.3.1. AT\$GPSSW - GNSS Software Version

The command provides the GNSS module software version



SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$GPSSW

Execution command provides the GNSS module software version in the format:

\$GPSSW: <sw version>

-  The command is available in "controlled mode" only, see **\$GPSD** command.
-  GNSS module software version is available in few seconds at first GNSS module startup



AT\$GPSSW?

Read command has the same meaning as the Execution command.



AT\$GPSSW=?

Test command returns the **OK** result code



Examples of software version obtained from different external GNSS modules.

- For modules with SE/SL868:
AT\$GPSSW
\$GPSSW: GSD4e_4.0.2-P1 05/26/2010 146
OK
- For modules with SL869:
AT\$GPSSW
\$GPSSW: SL869 v3.0.0.1 -STD -N96
OK
- For modules with SE868-V2:
AT\$GPSSW
\$GPSSW: 5xp__5.5.2-R32+5xpt_5.5.2-R32
OK

3.25.3.2. AT\$GPSCON - Direct Access to GNSS Module





This command allows setting the cellular module in transparent mode.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$GPSCON

Execution command allows setting the cellular module in transparent mode in order to have a direct access to the serial port of the GNSS module. The cellular module will directly transfer the received data to the GNSS module (and vice-versa), without checking or elaborating it.

-  The command can be used in "controlled mode" only.
-  In case of an incoming call from cellular module, this will be visible on the **RING** pin of serial port.
-  The escape sequence is "+++".
-  Suggested Serial Port Speed for SirfIV-based modules (e.g. JF2 and JN3) is 57600.
Suggested Serial Port Speed for SirfV-based modules (e.g. SE868-V2) is 115200.



AT\$GPSCON=?

Test command returns the **OK** result code.

3.25.3.3. AT\$GPSR - Reset the GPS Controller

This command resets the GNSS controller.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT\$GPSR=<resetType>




Execution command allows to reset the GNSS controller.

Parameter:

Name	Type	Default	Description
<resetType>	integer	N/A	set the type of GNSS controller reset.

Values:

- 0 : Factory Reset: this option clears all the GNSS memory including Clock Drift, Extended Ephemeris files stored into flash memory and applied software patch in case a ROM-based receiver is being used.
- 1 : Coldstart (No Almanac, No Ephemeris): this option clears all data that is currently stored in the internal memory of the GNSS receiver including Last Position, Almanac, Ephemeris and Time. However, the stored Clock Drift and Extended Ephemeris are retained.
- 2 : Warmstart (No ephemeris): this option clears Ephemeris and Last Position only. Almanac and Extended Ephemeris are retained.
- 3 : Hotstart (with stored Almanac and Ephemeris): the GNSS receiver restarts by using all data that is currently stored in the internal memory of the GNSS receiver: valid Almanac, Ephemeris and Extended Ephemeris are therefore retained and used.

-  The command is available in "Controlled Mode" only, see **#GPSD** command.
-  The command must be issued only when the GNSS receiver is operating in Full Power Mode (see **\$GPSPS**), otherwise it might have no effect.
-  Since the Factory Reset (<reset_type>=0) performs a hardware reconfiguration of the GNSS receiver, issuing two consecutive **AT\$GPSR** commands should be avoided, otherwise the reconfiguration might fail: an **ERROR** is returned in the latter case.



AT\$GPSR=?

Test command reports the range of supported values for parameter <resetType>.



```
Factory reset
AT$GPSR=0
OK
```

3.25.4. GNSS Positioning Information

3.25.4.1. AT\$GPSNMUN - Unsolicited NMEA Data Configuration

Unsolicited NMEA Data Configuration



[1] NMEA 0183 Standard

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Specific profile	No	-	2



AT\$GPSNMUN=<enable>[,<GGA>,<GLL>,<GSA>,<GSV>,<RMC>,<VTG>]

Set command allows to activate an unsolicited GNSS data stream built with NMEA sentences on the standard serial port and defines which NMEA sentences will be available.

Refer to document [1] to have information on the NMEA sentences contents and formats.

Parameters:

Name	Type	Default	Description
<enable>	integer	0	Enables unsolicited GNSS data stream and selects one of the available GNSS data stream format display. <enable> parameter is also used to disable the GNSS data stream. Here is the list of the <enable> values. See Additional info section to have information on GNSS data stream formats.
Values:			
0	:	disable GNSS data stream	
1	:	enable the first GNSS data stream format	
2	:	enable the second GNSS data stream format	
3	:	enable the first GNSS data stream format, and reserve the AT interface port only for the GNSS data stream	
<GGA>	integer	0	enables/disables the presence of the Global Positioning System Fix Data NMEA sentence (GGA) in the GNSS data stream.
Values:			
0	:	disable	
1	:	enable	
<GLL>	integer	0	enable/disable the presence of the Geographic Position - Latitude/Longitude NMEA sentence (GLL) in the GNSS data stream.
Values:			
0	:	disable	
1	:	enable	
<GSA>	integer	0	enable/disable the presence of the GNSS DOP and Active Satellites NMEA sentence (GSA) in the GNSS data stream.
Values:			

	0	:	disable
	1	:	enable
<GSV>	integer	0	enable/disable the presence of the Satellites in View NMEA sentence (GSV) in the GNSS data stream.
	Values:		
	0	:	disable
	1	:	enable
<RMC>	integer	0	enable/disable the presence of the Recommended Minimum Specific GNSS Data NMEA sentence (RMC) in the GNSS data stream.
	Values:		
	0	:	disable
	1	:	enable
<VTG>	integer	0	enable/disable the presence of the GNSS Course Over Ground and Ground Speed NMEA sentence (VTG) in the GNSS data stream.
	Values:		
	0	:	disable
	1	:	enable

Additional info:

- ▶▶ **<enable>=1**, GNSS data stream format:
\$GPRMUN: <NMEA SENTENCE 1><CR><LF>
 ...
\$GPRMUN: <NMEA SENTENCE N><CR><LF>
 ...
- ▶▶ **<enable>=2**, GNSS data stream format:
<NMEA SENTENCE 1><CR><LF>
 ...
<NMEA SENTENCE N><CR><LF>
 ...
- ▶▶ **<enable>=3**, in this case, the AT interface port is dedicated to NMEA sentences, it is not possible to send AT commands. Use the escape sequence "+++" to return in command mode. GNSS data stream format:
\$GPRMUN: <NMEA SENTENCE 1><CR><LF>
 ...
\$GPRMUN: <NMEA SENTENCE N><CR><LF>
 ...
 The NMEA data stream format is the same as the one selected by **<enable>=1**.

**AT\$GPSNMUN?**

Read command returns whether the unsolicited GNSS data stream is currently enabled or not, along with the current NMEA mask configuration, in the format:

\$GPSNMUN:<enable>,<GGA>,<GLL>,<GSA>,<GSV>,<RMC>,<VTG >

**AT\$GPSNMUN=?**

Test command returns the supported range of values for parameters:

<enable>,<GGA>,<GLL>,<GSA>,<GSV>,<RMC>,<VTG>.



Set the GSA as available sentence in the unsolicited message

**AT\$GPSNMUN=1,0,0,1,0,0,0
OK**

Turn-off the unsolicited mode

**AT\$GPSNMUN=0
OK**

Read the current NMEA mask configuration:

**AT\$GPSNMUN?
\$GPSNMUN: 1,0,0,1,0,0,0
OK**

The unsolicited message will be:

**\$GPSNMUN:
\$GPGSA,A,3,23,20,24,07,13,04,02,,,,,2.4,1.6,1.8*3C**

3.25.4.2. AT\$GPSACP - Get Acquired Position

This command returns information about the last GPS position.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$GPSACP

Execution command returns information about the last GPS position in the format:

\$GPSACP: <UTC>,<latitude>,<longitude>,<hdop>,<altitude>,<fix>,<cog>,<spkm>,<spkn>,<date>,<nsat>

Additional info:

- ▶▶ Meanings of the parameters returned by the command.

Name	Type	Default	Description
<UTC>	string	-	UTC time (hhmmss.sss) referred to GGA sentence
<latitude>	string	-	latitude in the format ddmm.mmmm N/S (referred to GGA sentence) where: dd: 00..90, degrees mm.mmmm: 00.0000..59.9999, minutes N/S: North/South
<longitude>	string	-	longitude in the format dddmm.mmmm E/W (referred to GGA sentence) where: ddd: 000..180, degrees mm.mmmm: 00.0000..59.9999, minutes E/W: East/West
<hdop>	string	-	Horizontal Dilution of Precision (referred to GGA sentence)
<altitude>	string	-	altitude - mean-sea-level (geoid) in meters (referred to GGA sentence)
<fix>	integer	N/A	fix type Values: 0 : invalid fix 1 : invalid fix 2 : 2D fix 3 : 3D fix
<cog>	string	-	Course over Ground (degrees, True) (referred to VTG sentence) in the format ddd.mm where: ddd: 000..360, degrees mm: 00..59, minutes

<spkm>	string	-	speed over ground (Km/hr) (referred to VTG sentence)
<spkn>	string	-	speed over ground (knots) (referred to VTG sentence)
<date>	string	-	date of fix (referred to RMC sentence) in the format ddmmyy where: dd: 01..31, day mm: 01..12, month yy: 00..99, year 2000 to 2099
<nsat>	integer	N/A	total number of satellites in use (referred to GGA sentence)

Value:

0÷12 : total number of satellites in use

**AT\$GPSACP?**

Read command has the same behavior as the Execution command.

**AT\$GPSACP=?**

Test command returns the **OK** result code.



For products **without** built-in GNSS receiver:

- If the GNSS receiver is turned off or its serial line is not physically connected to the cellular module, the answer might be empty as shown below.

```
AT$GPSACP
$GPSACP:
OK
```

**AT\$GPSACP**

```
$GPSACP: 122330.000,4542.8106N,01344.2720E,2.25,338.0,3,0.0,0.02,0.01,240613,04
OK
```

3.25.5. GNSS SiRFInstantFix™

3.25.5.1. AT\$GPSIFIX - GPS SiRFInstantFix™

This command enables/disables SiRFInstantFix™.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2




AT\$GPSIFIX=<enable>[,<cgee>,<sgee>[,<update>]]

Set command enables/disables SiRFInstantFix™ feature available on SiRF StarIV based modules.

Parameters:

Name	Type	Default	Description
<enable>	integer	0	SiRFInstantFix usage.
Values:			
0 : Disable			
1 : Enable			
<cgee>	integer	1	Client Generated Extended Ephemeris (CGEE).
Values:			
0 : Disable			
1 : Enable			
<sgee>	integer	0	Server Generated Extended Ephemeris (SGEE).
Values:			
0 : Disable			
1 : Enable			
<update>	integer	0	SGEE File Update Mode.
Values:			
0 : Upon Aiding Data Requests coming from GPS chip			
1÷168 : Update rate in hours (168 is the max update rate in case of 7-days SGEE files usage)			

- i** If **<enable>**=0, the rest of parameters must be omitted otherwise **ERROR** is returned.
- i** If **<enable>**=1 and the rest of parameters is omitted, the default configuration, or a previous stored one, is used.
- i** If **<sgee>**=1, the **<update>** parameter must be set otherwise **ERROR** is returned.
- i** if **<sgee>**=1 the following URC is used to warn, according to the **<update>** value, that the SGEE file has to be updated:
\$SIFIXEV: SGEE File Update Requested
- i** If **<sgee>**=0, the **<update>** parameter must be omitted otherwise **ERROR** is returned.

-
-  SiRFInstantFix default configuration may be restored by issuing the **AT\$GPSRST** command.
-

**AT\$GPSIFIX?**

Read command reports the currently selected SiRFInstantFix configuration in the format:

\$GPSIFIX: <enable>[,<cgee>,<sgee>[,<update>]]

**AT\$GPSIFIX=?**

Test command reports the supported range of values for parameters **<enable>**, **<cgee>**, **<sgee>**, **<update>**.



The Command is available in "Controlled Mode" only.



```
AT$GPSIFIX=0
```

```
OK
```

```
AT$GPSIFIX=1,1,0
```

```
OK
```

3.25.5.2. AT\$FTPGETIFIX - Get SGEE File for SiRFInstantFix™

This command gets SGEE File for SiRFInstantFix™

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT\$FTPGETIFIX=<filename>,<filesize>[,<navsystem>]

Execution command, issued during an FTP connection, opens a data connection, downloads a SGEE file from the FTP server and injects it into SiRF StarV or StarV GNSS receiver.

Whenever an error happens during the SGEE file injection stage, an **ERROR** result code is returned. The possible <err> values reported by **+CME ERROR** (numeric format followed by verbose format) are described in the Unsolicited code values section.

Parameters:

Name	Type	Default	Description
<filename>	string	-	File name.
<filesize>	integer	-	SGEE file size in bytes.
<navsystem>	integer	0	Constellation for which the SGEE file has to be downloaded and injected.

Values:

- 0 : GPS
- 1 : GLONASS

Unsolicited field:

Name	Type	Description
<err>	integer	Error description.

Values:

- 920 : SGEE update initialization stage failed
- 921 : SGEE file is not newer than the last stored one
- 922 : SGEE update generic error
- 923 : SGEE file open error

- i** Whenever an FTP connection has not been opened yet, an **ERROR** result code is returned.
- i** The command closure should always be handled by the customer application. In order to avoid download stall situations a timeout should be implemented by the application.
- i** The <navsystem> parameter has a meaning for SiRF StarV-based receivers (e.g. SE868-V2) only; if omitted, the default value will be used (GPS). Therefore, when a SiRF StarV-based receiver is used, the <navsystem> parameter is accepted but it does not have any effect.

**AT\$FTPGETIFIX=?**

Test command returns the **OK** result code.



The command is available in "Controlled Mode" only.



```
AT$FTPGETIFIX="packedDifference.f2p3enc.ee",30970
OK
```

```
AT$FTPGETIFIX="packedDifference.f2p1enc.ee",10742
+CME ERROR: SGEE file is not newer than the last stored one
```

3.25.5.3. AT\$GNSSIFIX - GNSS SiRFInstantFix™

This command enables/disables SiRFInstantFix™

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2




AT\$GNSSIFIX=<navSystem>,<cgee>,<sgee>

Set command enables/disables the SiRFInstantFix™ feature available on SiRF StarV-based GNSS modules.

Parameters:

Name	Type	Default	Description
<navSystem>	integer	N/A	Constellation for which the SiRFInstantFix™ feature has to be enabled.
Values:			
0	:	GPS	
1	:	GLONASS	
<cgee>	integer	1	Client Generated Extended Ephemeris (CGEE).
Values:			
0	:	Disable	
1	:	Enable	
<sgee>	integer	1	Server Generated Extended Ephemeris (SGEE).
Values:			
0	:	Disable	
1	:	Enable	


-  If <sgee>=1 the following URC is used to warn, according to the <navSystem> value, that the SGEE file has to be updated:

For GPS:

\$SIFIXEV: GPS SGEE File Update Requested

For GLONASS:

\$SIFIXEV: GLONASS SGEE File Update Requested

-  SE868-V2 firmware comes with CGEE and SGEE enabled by default for both GPS and GLONASS constellations.



AT\$GNSSIFIX?

Read command reports the current SiRFInstantFix™ configuration, for both GPS and GLONASS, in the format:

\$GNSSIFIX: 0,<cgee>,<sgee>

\$GNSSIFIX: 1,<cgee>,<sgee>



AT\$GNSSIFIX=?

Test command reports the supported range of values for parameters **<navSystem>**, **<cgee>**, **<sgee>**.



The command is available in "Controlled Mode" only.



```
AT$GNSSIFIX=0,1,0
```

```
OK
```

```
AT$GNSSIFIX=1,1,1
```

```
OK
```

3.25.5.4. AT\$HTTPGETIFIX - Get SGEE File for SiRFInstantFix™

This command gets SGEE File for SiRFInstantFix™

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT\$HTTPGETIFIX=<profilId>,<fileSize>[,<navSystem>]

Execution command, issued during an HTTP connection, downloads a SGEE file from the HTTP server and injects it into the SiRF StarIV or StarV GNSS receiver, after a HTTP query using a specific Profile Id, GET option, SGEE file name has been sent.



Whenever an error happens during the SGEE file injection stage, an **ERROR** result code is returned. The possible <err> values reported by **+CME ERROR** (numeric format followed by verbose format) are described in the Unsolicited code values section.

Parameters:

Name	Type	Default	Description
<profilId>	integer	N/A	Numeric parameter indicating the profile identifier.
Value:			
0÷2 : range of available values			
<fileSize>	integer	-	SGEE file size in bytes.
<navSystem>	integer	0	Constellation for which the SGEE file has to be downloaded and injected.
Values:			
0 : GPS			
1 : GLONASS			

Unsolicited field:

Name	Type	Description
<err>	integer	Error description
Values:		
920 : SGEE update initialization stage failed		
921 : SGEE file is not newer than the last stored one		
922 : SGEE update generic error		
923 : SGEE file open error		

-  Whenever an HTTP configuration has not been done yet, an **ERROR** result code is returned.
-  The <navSystem> parameter has a meaning for SiRF StarV-based receivers (e.g. SE868-V2) only; if omitted, the default value will be used (GPS). Therefore, when a SiRF StarIV-based receiver is used, the <navSystem> parameter is accepted but it does not have any effect.

**AT\$HTTPGETIFIX=?**

Test command returns the **OK** result code.



This command is available in "Controlled Mode" only.



AT\$HTTPGETIFIX=0,30970
OK

AT\$HTTPGETIFIX=0,10742
+CME ERROR: SGEE file is not newer than the last stored one

3.25.6. GNSS Patch Management

3.25.6.1. AT\$WPATCH - Write Patch on Cellular Flash Memory

This command writes patch on cellular flash memory.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$WPATCH=<patchFileName>,<size>

Execution command stores a SiRF software patch on the cellular flash memory.

Parameters:

Name	Type	Default	Description
<patchFileName>	string	-	file name, max 16 chars (case sensitive).
<size>	integer	-	file size in bytes.

Additional info:

- ▶▶ The file should be sent using RAW ASCII file transfer. It is important to set properly the port settings. In particular:
 - Flow control: hardware
 - Baud rate: 115200 bps

The device shall prompt a three-character sequence:

<greater_than><greater_than><greater_than> (IRA 62, 62, 62)

then the command line is terminated with a **<CR>**; after that a file can be sent from TE, sized **<size>** bytes.

The operations complete when all the bytes are received. If writing ends successfully, the response is **OK**; otherwise an error code is reported.

- i** This command can be used with SIRF ROM-based GNSS modules only (**AT\$GPSD=2,1**, **AT\$GPSD=2,2**, **AT\$GPSD=3,1**, **AT\$GPSD=3,2**, or **AT\$GPSD=5,2**).
- i** The patch file must have a ".pd2" or ".pd3" (**AT\$GPSD=5,2**) extension.



AT\$WPATCH=?

Test command returns the **OK** result code.



AT\$WPATCH = "GSD4E_4.1.2.pd2",5472

>>> here receive the prompt. Depending on your editor settings, it's possible that the prompt overrides the above line; then type or send the patch, sized 5472 bytes.

OK

3.25.6.2. AT\$EPATCH - Enable Patch

This command enables GNSS patch.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Other	No	-	2



AT\$EPATCH=[<patchFileName>]

Execution command moves the SiRF software patch, saved on the cellular flash memory, to the GNSS device. The command returns **OK** but, the patching procedure is confirmed by the <result> message described in Additional info section.

This command can be used with SiRF ROM-based GNSS modules only (**AT\$GSPD=2,1**, **AT\$GSPD=2,2**, **AT\$GSPD=3,1**, **AT\$GSPD=3,2** or **AT\$GSPD=5,2**).

The patch file must have a ".pd2" or ".pd3" (**AT\$GSPD=5,2**) extension.

Parameter:

Name	Type	Default	Description
<patchFileName>	string	-	file name, max 16 chars (case sensitive).

Additional info:

▶▶ <result> message description.

<result>
Patch Manager: Patched
Patch Manager: Error opening Patch File
Patch Manager: Error processing Patch File
Patch Manager: Error on Start Request
Patch Manager: Error on Load Request
Patch Manager: Error on Exit Request

- i** A previously applied patch can be removed from the GNSS module Patch RAM by issuing a Factory Reset or by powering the GNSS module down and removing the VBatt. However, if automatic patch application hasn't been disabled, the patch will be automatically reapplied.
- i** If the <patchFileName> is omitted, the automatic patch application, at the next startup of the cellular module, is disabled. However, the current patch remains applied until it will be not removed as explained above.
- i** **AT\$EPATCH** command returns **ERROR**.



AT\$EPATCH?

Read command display the patch in use in the format:

\$EPATCH: <patch_file_name>



AT\$EPATCH=?

Test command returns the **OK** result code.



The configuration specified through **\$EPATCH** can be saved by means of the **\$GPSSAV** command.



```
AT$EPATCH = "GSD4E_4.1.2.pd2"  
OK
```

Patch Manager: Patched

3.25.6.3. AT\$DPATCH - Delete Patch from Cellular Flash Memory

This command deletes the GNSS patch from cellular flash memory.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$DPATCH=<patchFileName>

Execution command deletes a SiRF software patch stored on the cellular flash memory. The execution command returns **OK**.

This command can be used with SiRF ROM-based GNSS modules only (**AT\$GSPD=2,1**, **AT\$GSPD=2,2**, **AT\$GSPD=3,1**, **AT\$GSPD=3,2** or **AT\$GSPD=5,2**).

Parameter:

Name	Type	Default	Description
<patchFileName>	string	-	file name, max 16 chars (case sensitive).



AT\$DPATCH=?

Test command returns the **OK** result code.



```
AT$DPATCH = "GSD4E_4.1.2.pd2"
OK
```

3.25.6.4. AT\$LPATCH - List Available Patch on Cellular Flash Memory

This command lists available GNSS patch on cellular flash memory.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$LPATCH

Execution command displays the available SiRF software patch saved on the cellular flash memory.

This command can be used with SiRF ROM-based GNSS modules only (**AT\$GPSD=2,1**, **AT\$GPSD=2,2**, **AT\$GPSD=3,1**, **AT\$GPSD=3,2** or **AT\$GPSD=5,2**).

The patch file must have a ".pd2" or ".pd3" (**AT\$GPSD=5,2**) extension.



AT\$LPATCH=?

Test command returns the **OK** result code.



AT\$LPATCH

```
$LPATCH: "GSD4E_4.1.2.pd2",5472
```

```
OK
```

3.25.7. GNSS ST-AGPS™

3.25.7.1. AT\$GPSSTAGPS - Enable STAGPS™ Usage

This command enables/disables the STAGPS™.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$GPSSTAGPS=<enable>

Set command enables/disables the STAGPS™ feature available on ST TESEOII-based GNSS modules.

- This command can be used with ST TESEOII-based GNSS modules only (**AT\$GPSD=4**).

Parameter:

Name	Type	Default	Description
<enable>	integer	0	Enable/disable

Values:

- 0 : Disable
- 1 : Enable



Since the current STAGPS™ configuration is not saved in NVM this command has to be issued at every power-cycle of both the GNSS receiver and the cellular module.



AT\$GPSSTAGPS?

Read command reports the currently selected STAGPS™ configuration in the format:

\$GPSSTAGPS: <enable>



AT\$GPSSTAGPS=?

Test command reports the supported range of values for parameter <enable>.

3.25.7.2. AT\$HTTPGETSTSEED - Get ST-AGPS seed file for ST-AGPSTM

This command gets ST-AGPS seed file for ST-AGPS™

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT\$HTTPGETSTSEED=<profilid>,<fileSize>

Execution command, issued during a HTTP connection, downloads a ST-AGPS seed file from the HTTP server and creates a decoded version of the file itself.

The decoded seed file, is stored onto the module's NVM and can be injected later on by means of the **\$INJECTSTSEED** command.

The ST-AGPS seed file size must be retrieved, before issuing the **\$HTTPGETSTSEED** command, by sending a HTTP query using a specific Profile Id, GET option and the ST-AGPS seed file name.

Parameters:

Name	Type	Default	Description
<profilid>	integer	N/A	Numeric parameter indicating the profile identifier.
Value:			
	0÷2	:	range of available values
<fileSize>	integer	-	ST-AGPS seed file size in bytes.



Whenever an HTTP configuration has not been done yet, an **ERROR** result code is returned.



AT\$HTTPGETSTSEED=?

Test command returns the **OK** result code.



```
AT$HTTPGETSTSEED=0,2199
OK
```


3.25.7.3. AT\$INJECTSTSEED - Inject Decoded ST-AGPS Seed File

This command injects decoded ST-AGPS seed file.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2




AT\$INJECTSTSEED

Execution command injects a decoded ST-AGPS seed, previously downloaded and stored onto the module's NVM, into TESEOII-based GNSS receivers.

Whenever an error happens during the decoded ST-AGPS seed file injection stage, an **ERROR** result code is returned. The possible **<err>** values reported by **+CME ERROR** (numeric format followed by verbose format) are described in the Unsolicited code values section.

Unsolicited field:

Name	Type	Description
<err>	integer	Error description.
Values:		
970	:	STAGPS Seed file open error
971	:	STAGPS Seed file exceeds the maximum allowed one
972	:	STAGPS pre-configuration error
973	:	STAGPS seed injection error
974	:	STAGPS re-configuration error

-  A decoded ST-AGPS seed can be injected only if the GNSS receiver has a valid UTC time from a previous fix, i.e. it is in a warm start condition.



AT\$INJECTSTSEED=?

Test command returns the **OK** result code.



The command is available in "Controlled Mode" only, see **\$GPSD** command.

3.25.8. GNSS MTK EPO

3.25.8.1. AT\$HTTPGETEPO - Get EPO file for MT EPO Aiding

This command gets EPO file for MT EPO Aiding.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Required	No	No	-	2



AT\$HTTPGETEPO=<profilId>,<fileSize>

Execution command, issued during a HTTP connection, downloads an EPO file from the HTTP server and stores it on the cellular module's NVM for future use. The EPO file can be injected later by means of the **\$INJECTEPO** command.

The EPO file size must be retrieved, before issuing the **AT\$HTTPGETEPO** command, by sending a HTTP query using a specific Profile Id, GET option and the EPO file name.

Parameters:

Name	Type	Default	Description
<profilId>	integer	N/A	Numeric parameter indicating the profile identifier.
Value:			
0÷2 : range of available values.			
<fileSize>	integer	-	EPO file size in bytes.



Whenever a HTTP configuration has not been done yet, an **ERROR** result code is returned.



AT\$HTTPGETEPO=?

Test command returns the **OK** result code.



This command is available in "Controlled Mode" only, for MediaTek MT3333-based GNSS modules (e.g. SL871), i.e. whenever is **AT\$GPSD=6**.



```
AT$HTTPGETEPO=0,129024
OK
```

3.25.8.2. AT\$INJECTEPO - Inject EPO Aiding File

This command injects the EPO aiding file.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2




AT\$INJECTEPO

Execution command injects an EPO file, previously downloaded and stored onto the cellular module's NVM, into MT3333-based GNSS receivers (e.g. SL871).

Whenever an error happens during the EPO file injection stage, an **ERROR** result code is returned. The possible **<err>** values reported by **+CME ERROR** (numeric format followed by verbose format) are described in the Unsolicited code values section.

Unsolicited field:

Name	Type	Description
<err>	integer	Error description
Values:		
980	:	GNSS file open error
985	:	Invalid EPO file
986	:	EPO MTK binary configuration error
987	:	EPO injection error
988	:	EPO NMEA configuration error

-  Only EPO files up to 14-days validity are currently supported. Therefore, if a 30-days EPO file is used, only data for the first 14 days will be injected.



AT\$INJECTEPO=?

Test command returns the **OK** result code.



This command is available in "Controlled Mode" only, for MediaTek MT3333-based GNSS modules (e.g. SL871), i.e. whenever is **AT\$GSPD=6**.

3.25.8.3. AT\$QUERYEPO - Query EPO Data Status

This command queries EPO Data Status.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$QUERYEPO

Execution command queries the EPO data status, in MT3333-based GNSS receivers (e.g. SL871), whose answer will be in the form:

\$QUERYEPO: <SET>,<FWN>,<FTOW>,<LWN>,<LTOW>,<FCWN>,<FCTOW>,<LCWN>,<LCTOW>

Additional info:

- ▶▶ Meaning of the parameters returned by the command.

Name	Type	Default	Description
<SET>	integer	-	Total number of EPO data set stored into the GNSS receiver. The EPO prediction for one day is made up of 4 EPO data sets.
<FWN>	integer	-	GPS week number of the first set of EPO data stored into the GNSS receiver.
<FTOW>	integer	-	GPS TOW of the first set of EPO data stored into the GNSS receiver.
<LWN>	integer	-	GPS week number of the last set of EPO data stored into the GNSS receiver.
<LTOW>	integer	-	GPS TOW of the last set of EPO data stored into the GNSS receiver.
<FCWN>	integer	-	GPS week number of the first set of EPO data currently used.
<FCTOW>	integer	-	GPS TOW of the first set of EPO data currently used.
<LCWN>	integer	-	GPS week number of the last set of EPO data currently used.
<LCTOW>	integer	-	GPS TOW of the last set of EPO data currently used.



AT\$QUERYEPO=?

Test command returns the **OK** result code.



This command is available in "controlled mode" only, for MediaTek MT3333-based GNSS modules (e.g. SL871), i.e. whenever is **AT\$GSPD=6**.



```
AT$QUERYEPO
$QUERYEPO: 56,1832,259200,1834,237600,1832,367200,1832,367200
OK
```

3.25.8.4. AT\$CLEAREPO - Delete EPO Data

This command deletes the EPO data.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$CLEAREPO

Execution command deletes all the EPO data from MT3333-based GNSS receivers (e.g. SL871).



AT\$CLEAREPO=?

Test command returns the **OK** result code.



This command is available in “Controlled Mode” only, for MediaTek MT3333-based GNSS modules (e.g. SL871), i.e. whenever is **AT\$GSPD=6**.

3.25.8.5. AT\$EASY - Enable EASY

This command enables/disables the EASY feature.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT\$EASY=<enable>

Set command enables or disables the EASY feature on MT3333-based GNSS receivers (e.g. SL871).

Parameter:

Name	Type	Default	Description
<enable>	integer	N/A	Enable/disable the EASY feature.

Values:

- 0 : Disable
- 1 : Enable



AT\$EASY?

Read command reports the current EASY status in the following format:

\$EASY: <enable>,<extension_day>

Additional info:

- ▶▶ Parameters returned by the Read command and not described in the previous sections.




Name	Type	Default	Description
<enable>	integer	N/A	EASY enabled and prediction finished/not finished.
Values:			
0	:		EASY enabled and prediction not finished yet or not available
1÷3	:		EASY enabled and prediction finished for 1, 2 and 3 days respectively
<extension_day>	integer	-	Number of days for which the prediction has been already done.



AT\$EASY=?

Test command reports the range of supported values for parameter <enable>.



-  This command is available in "Controlled Mode" only, for MediaTek MT3333-based GNSS modules (e.g. SL871), i.e. whenever is **AT\$GPSD=6**.
-  The EASY feature is supported starting from SL871 firmware version AXN_3.60_3333_14080800,C012,MT33-1.,1.106.
-  The default EASY configuration depends on the specific SL871 firmware version used.

3.26. File System

3.26.1. AT#CHDRIVE - File System Change Current Drive

This command sets the current drive in the file system.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#CHDRIVE=<drive>

Parameter:

Name	Type	Default	Description
<drive>	integer	-	drive identifier. 0 is the only available drive value. If the current drive value is not 0, then AT commands related to SCRIPT and MMS families that make use of the file system return ERROR.



AT#CHDRIVE?

Read command reports the current drive in the file system in the format:

#CHDRIVE: <drive>



AT#CHDRIVE=?

Test command returns the allowed values for parameter <drive>.



```
AT#CHDRIVE?
#CHDRIVE: 0
OK
```

3.26.2. AT#WSCRIPT - Write File

The command stores a file in the NVM file system.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2



AT#WSCRIPT=[<scriptName>,<size>[,<hidden>]]

Execution command starts the device to store a file in the NVM file system, giving it a specified name <fileName>. After execution command line is terminated with <CR>, the device shall prompt a five-character sequence:

<CR><LF><greater_than><greater_than><greater_than> (IRA 13, 10, 62, 62, 62)

and after the binary content of the file can be sent to the device with consistent size in bytes <size>.

The operations complete when all the bytes are received. If writing ends successfully, the response is **OK**; otherwise an error code is reported.

Parameters:

Name	Type	Default	Description
<scriptName>	string	-	file name in NVM file system; quoted string type (max 16 chars, case sensitive)
<size>	integer	-	file size in bytes
<hidden>	integer	0	file hidden attribute

Values:

- 0 : file content is readable with #RSCRIPT
- 1 : file content is readable with #RSCRIPT (no effect)

- i** File can be text or binary.
File name must be included between quotes, it is case sensitive, and can have or not extension (.xxx). File name extension is important at application level: for example, Python scripts must have .py extension, and pre-compiled executable Python scripts file must have .pyc extension.
- i** The file should be sent to the device using RAW ASCII file transfer. The file should be sent to the device using RAW ASCII file transfer. Sending the file, be sure that the line terminator is <CR><LF>, and that your terminal program does not change it while sending data to the device.
It is important to set properly the port settings when file is transferred through USIF (RS232). In particular:
 - Flow control: hardware
 - Baud rate: 115200 bps



AT#WSCRIPT=?

Test command returns **OK** result code



Store as First.py a 54 bytes size file.

AT#WSCRIPT="First.py ",54,0

>>> here receive the prompt; then type or send the 54 bytes of the file

OK

Textual script has been stored.

3.26.3. AT#RSCRIPT - Read File

The command reads a file from the NVM file system.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#RSCRIPT=[<fileName>]

Execution command starts the device to show the content of the file <fileName> stored in the file system. After execution command line is terminated with <CR>, the device shall prompt a five-character sequence:

<CR><LF><less_than><less_than><less_than> (IRA 13, 10, 60, 60, 60)

followed by the binary content of the file.

The operations complete when all the bytes are sent. If reading ends successfully, the response is **OK**; otherwise an error code is reported.

Parameter:

Name	Type	Default	Description
<fileName>	string	-	file name in NVM file system; quoted string type (max 16 chars, case sensitive)

- i** If the file name is not in the list of files stored in NVM file system, the execution command exits with an error message.



AT#RSCRIPT=?

Test command returns **OK** result code.



Read First.py file stored in NVM file system.

AT#RSCRIPT="First.py"

<<< here receive the prompt; then receive the contents of the file

OK

3.26.4. AT#LSCRIPT - List File Names

The command lists the files stored in NVM file system and the available free NVM file system memory.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#LSCRIPT

Execution command reports either the list of file names for the files currently stored in the NVM file system and the available free NVM file system memory in the format:

```
[#LSCRIPT: <fileName1>,<size1>...
[<CR><LF>#LSCRIPT: <fileNamen>,<sizeN>]]
<CR><LF>#LSCRIPT: free bytes: <freeBytes>
```

Additional info:

- ▶▶ Intermediate response parameters.

Name	Type	Default	Description
<fileNamen>	string	-	file name, quoted string type (max 16 chars, case sensitive)
<sizeN>	integer	-	file size in bytes
<freeBytes>	integer	-	size of available free NVM file system memory in bytes



AT#LSCRIPT=?

Test command returns **OK** result code.



```
AT#LSCRIPT
#LSCRIPT: "First.py",51
#LSCRIPT: "Second.py",178
#LSCRIPT: "Third.py",95
#LSCRIPT: free bytes: 20000
```

OK

3.26.5. AT#LCSCRIPT - List File Names CRC

The command lists the files stored in NVM file system, adding CRC16 information, and the available free NVM file system memory.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#LCSCRIPT[=<fileName>]

If no file name is specified as parameter, execution command reports either the list of names of the files currently stored in the Easy Script® related NVM, adding CRC16 information and the available free NVM memory in the format:

```
[#LCSCRIPT: <fileName1>,<size1>[,<crc1>]...
[<CR><LF>#LCSCRIPT: <fileNamen>,<sizeN>[,<crcn>]]]
<CR><LF>#LCSCRIPT: free bytes: <freeBytes>
```

If a file name is specified as parameter, the command reports the file stored in NVM file system, adding CRC16 information, in the format:

```
[#LCSCRIPT: <fileName1>,<size1>[,<crc1>]]
```

Parameter:

Name	Type	Default	Description
<fileName>	string	-	file name to calculate CRC16, quoted string type (max 16 chars, case sensitive)

Additional info:

- ▶▶ Intermediate response parameters.

Name	Type	Default	Description
<fileNamen>	string	-	file name quoted string type (max 16 chars, case sensitive)
<sizeN>	integer	-	file size in bytes
<crcn>	hex	-	file CRC16 poly ($x^{16}+x^{12}+x^5+1$) in hex format
<freeBytes>	integer	-	size of available free NVM file system memory in bytes

- i** CRC16 is calculated using the standard reversed CRC16-CCITT $x^{16}+x^{12}+x^5+1$ polynomial (0x1021 representation, reversed) with initial value FFFF. CRC calculation time depends on file size.
CRC16 cannot be calculated for a stored file which is in use (opened). In this case the execution command does not report the <crcn> value for that file. This happens, for example, when the #LCSCRIPT command is executed by a Python script: CRC16 cannot be calculated and then the <crcn> value is not reported for the file pointed by #ESCRIP.
- i** If a file name is specified as parameter but it is not in the list of files stored in NVM file system then execution command exits with an error message.

**AT#LCSCRIPT=?**

Test command returns **OK** result code.



- **AT#LCSCRIPT**
#LCSCRIPT: "First.py",51,8FD6
#LCSCRIPT: "Second.py",178,A034
#LCSCRIPT: "Third.py",120,7C48
#LCSCRIPT: free bytes: 20000

OK
- If only one file is selected:
AT#LCSCRIPT="Second.py"
#LCSCRIPT: "Second.py",178,A034

OK
- If file Third.py is in use:
AT#LCSCRIPT
#LCSCRIPT: "First.py",51,8FD6
#LCSCRIPT: "Second.py",178,A034
#LCSCRIPT: "Third.py",120
#LCSCRIPT: free bytes: 20000

OK

3.26.6. AT#FILEPWD - Change and Insert File System Password

This command changes and inserts file system password.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	Auto	No	-	2









AT#FILEPWD=<mode>,<pwd>[,<newPwd>]

File system password is always enabled (see notes for factory default empty string ""). If the current password is different from the empty string "" and password is not inserted, then AT commands that make use of the file system will not work (see notes for insertion and AT response).

Parameters:

Name	Type	Default	Description
<mode>	integer	1	insert/Change password mode
Values:			
1	:	insert file system password	
2	:	change file system password	
<pwd>	string	-	current password when inserting password, old password when changing password, string type (factory default is the empty string "")
<newPwd>	string	-	new password when changing password, string type (only allowed if <mode> parameter is 2)

-  For maximum password length, please refer to test command
-  Password value does not depend on the specific **+CMUX** instance
-  If current password is different from the empty string "", password will be always not inserted at power on.
-  If current password is different from the empty string "", after successful password insertion (<mode> 1) password will remain inserted until power off
-  After successful password change (<mode> 2) password will be not inserted
-  If current password is different from the empty string "" and password is not inserted then AT commands that make use of the file system (SCRIPT, M2M, MMS) will have:

ERROR

or

+CME ERROR: 16

or

+CME ERROR: incorrect password
response depending on **+CMEE** setting



AT#FILEPWD=?

Test command reports the supported range of values for parameters.



- Change default password
AT#FILEPWD=2,"","mynewpwd"
OK
Insert password
AT#FILEPWD=1,"mynewpwd"
OK
At next power on: insert password
AT#FILEPWD=1,"mynewpwd"
OK

3.26.7. AT#DSCRIPT - Delete File

This command deletes a file from Easy Script® related NVM memory.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#DSCRIPT=[<fileName>]

Parameter:

Name	Type	Default	Description
<fileName>	string	-	name of the file to delete, quoted string type (max 16 chars, case sensitive)

- i** If the file name is not in the list of files stored in NVM file system then execution command exits with an error message.



AT#DSCRIPT=?

Test command returns **OK** result code.



AT#DSCRIPT="Third.py"
OK

3.26.8. AT#DASCRIP - Delete All Files

The command deletes all files.

SIM Presence	Setting saved	Can be aborted	MAX timeout	SELINT
Not required	No	No	-	2



AT#DASCRIP

Execution command deletes all files from NVM file system.



If product supports directories then execution command deletes all files from the NVM file system current working directory, it does not delete directories.



AT#DASCRIP=?

Test command returns **OK** result code.

4. LIST OF ACRONYMS

Acronym	Meaning
ARFCN	Absolute Radio Frequency Channel Number
AT	Attention command
BA	BCCH Allocation
BCCH	Broadcast Control Channel
CA	Cell Allocation
CBM	Cell Broadcast Message
CBS	Cell Broadcast Service
CCM	Current Call Meter
CLIR	Calling Line Identification Restriction
CTS	Clear To Send
CUG	Closed User Group
DCD	Data Carrier Detect
DCE	Data Communication Equipment
DCS	Digital Cellular System
DGPS	Differential GPS, the use of GPS measurements, which are differentially corrected
DNS	Domain Name System
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
DTR	Data Terminal Ready
GGA	GPS Fix data
GLL	Geographic Position – Latitude/Longitude
GLONASS	Global positioning system maintained by the Russian Space Forces
GMT	Greenwich Mean Time
GNSS	Any single or combined satellite navigation system (GPS, GLONASS and combined GPS/GLONASS)
GPRS	Global Packet Radio Service
GPS	Global Positioning System
GSA	GPS DOP and Active satellites
GSM	Global System Mobile
GSV	GPS satellites in view
HDLC	High Level Data Link Control
HDOP	Horizontal Dilution of Precision
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IRA	International Reference Alphabet
IWF	Interworking Function
ME	Mobile Equipment
MO	Mobile Originated
MT	<i>either</i> Mobile Terminated <i>or</i> Mobile Terminal
NMEA	National Marine Electronics Association
NVM	Non-Volatile Memory
PCS	Personal Communication Service
PDP	Packet Data Protocol
PDU	Packet Data Unit
PIN	Personal Identification Number
PPP	Point to Point Protocol
PUK	Pin Unblocking Code
RLP	Radio Link Protocol
RMC	Recommended minimum Specific data
RTS	Request To Send
SAP	SIM Access Profile
SCA	Service Center Address
SMS	Short Message Service
SMSC	Short Message Service Center
SMTP	Simple Mail Transport Protocol
TA	Terminal Adapter
TCP	Transmission Control Protocol
TE	Terminal Equipment
UDP	User Datagram Protocol
USSD	Unstructured Supplementary Service Data
UTC	Coordinated Universal Time
VDOP	Vertical dilution of precision
VTG	Course over ground and ground speed
WAAS	Wide Area Augmentation System

5. DOCUMENT HISTORY

Revision	Date	Changes
0	2015-11-03	Preliminary Version
1	2016-05-10	Document template and AT commands update Alignment to first mass production release 20.00.xx2 (AT\$ commands to be added in rev.2)
2	2016-05-30	Adding GNSS AT commands, modified description of +CEMODE, #SWMBOOTSTRAP, #CODEC, #UNIQUEDEVID Applicability table update. Added LE910-JN1. Updated Storage Table.
3	2017-12-01	AT#FILEPWD typo correction, +CGCONTRD title syntax, #CESTHLCK description correction, +CFUN update Added +CGSMS, #APPSSLCFG, AT#FWSWITCH, #I2CCF, #CMAR, #TXCAL4G, +CMAR, +CMGL, +CMGR, +CMGW, #IIDIPV6, #MTUSIZE, #SEKEY, +CCHO, +CCHC, +CGLA Typo corrections.
4	2018-05-30	Applicability table update: AT#PDPAUTH on AT&T Removed AT#RXDIV command not supported Removed 3G support for AT#RXTOGGLE
5	2018-10-11	New document template #FTPAPP, #TXCALEEDGE, #ISMSCFG removal Par. 3.2.2 update
6	2018-12-14	Corrected AT#RFSTS bad text formatting Added AT#SHSANA, AT#SHSDLY, AT#OOBTSET commands AT#DTMF=2 enabled
7	2019-05-07	Updated #OOBTSET, removed LE91B1-EU
8	2019-09-17	Changed chapters structure Updated Applicability and Availability Tables Updated commands: AT#CCLK, AT#CODEC, AT#E2ESC, AT#ECHO CFG, AT#HTTPQRY, AT#MBIMCFG, AT#MTUSIZE, AT#NCM, AT#PADCMD, AT#SIMINCFG, AT#STACFG, AT#STTA, AT#TCPATRUND, AT#TCPATRUND, AT+CFUN, AT+CTZR, AT#QDNS, AT#TXCAL4G, AT#RFSTS Added commands: AT#TSVOL, AT#LSCRIPT
9	2020-04-16	Updated Applicability Table Updated commands: AT#USBCFG, AT#RFSTS, AT+CESQ, AT#JDR4GCFG, AT#AUTOATT, AT#QSS, AT#TESTMODE, AT#SGACTCFG, AT#SGACTCFGEXT, AT#SSLD



SUPPORT INQUIRIES

Link to www.telit.com and contact our technical support team for any questions related to technical issues.

www.telit.com



Telit Communications S.p.A.
Via Stazione di Prosecco, 5/B
I-34010 Sgonico (Trieste), Italy

Telit Wireless Solutions Inc.
3131 RDU Center Drive, Suite 135
Morrisville, NC 27560, USA

Telit Wireless Solutions Ltd.
10 Habarzel St.
Tel Aviv 69710, Israel

Telit IoT Platforms LLC
5300 Broken Sound Blvd, Suite 150
Boca Raton, FL 33487, USA

Telit Wireless Solutions Co., Ltd.
8th Fl., Shinyoung Securities Bld.
6, Gukjegeumyung-ro8-gil, Yeongdeungpo-gu
Seoul, 150-884, Korea

Telit Wireless Solutions
Tecnologia e Servicos Ltda
Avenida Paulista, 1776, Room 10.C
01310-921 São Paulo, Brazil