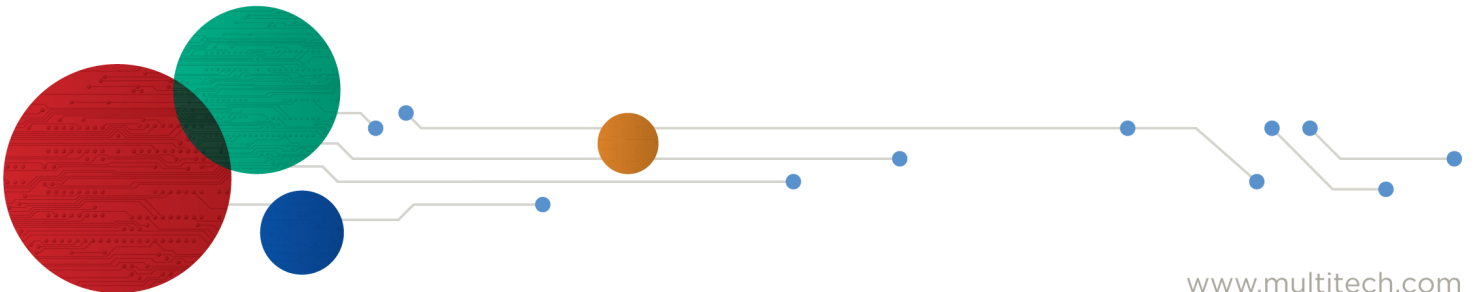




SocketModem® Cell

MTSMC-L4G1 Device Guide



SocketModem® Cell Device Guide

Models: MTSMC-L4G1, MTSMC-L4G1-U

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Chapter 1 Product Overview

Overview

SocketModem Cell models are complete, ready-to-integrate communications devices that offer standards-based LTE Cat 4 performance. These quick-to-market communications devices allow developers to add wireless communication to products with a minimum of development time and expense. SocketModem Cell models are based on industry-standard open interfaces and use MultiTech's Universal Socket design.

Build Options

Ordering Part Number	Description	Region
MTSMC-L4G1	Embedded LTE Cat 4 Serial Modem with Fallback and GNSS (50 pack)	Australia, Canada, European Union, United Kingdom, United States
MTSMC-L4G1-SP	Embedded LTE Cat 4 Serial Modem with Fallback and GNSS (single pack)	Australia, Canada, European Union, United Kingdom, United States
MTSMC-L4G1-U	Embedded LTE Cat 4 USB Modem with Fallback and GNSS (50 pack)	Australia, Canada, European Union, United Kingdom, United States
MTSMC-L4G1-U-SP	Embedded LTE Cat 4 Serial Modem with Fallback and GNSS (single pack)	Australia, Canada, European Union, United Kingdom, United States

Note:

- Devices ship without network activation. To connect devices to the cellular network, contact your service provider and request the correct SIM cards.
- The complete ordering part number may include an ".Rx" designation. For example, MTSMC-L4G1.Rx, where x is the hardware revision number.

Additional Documentation

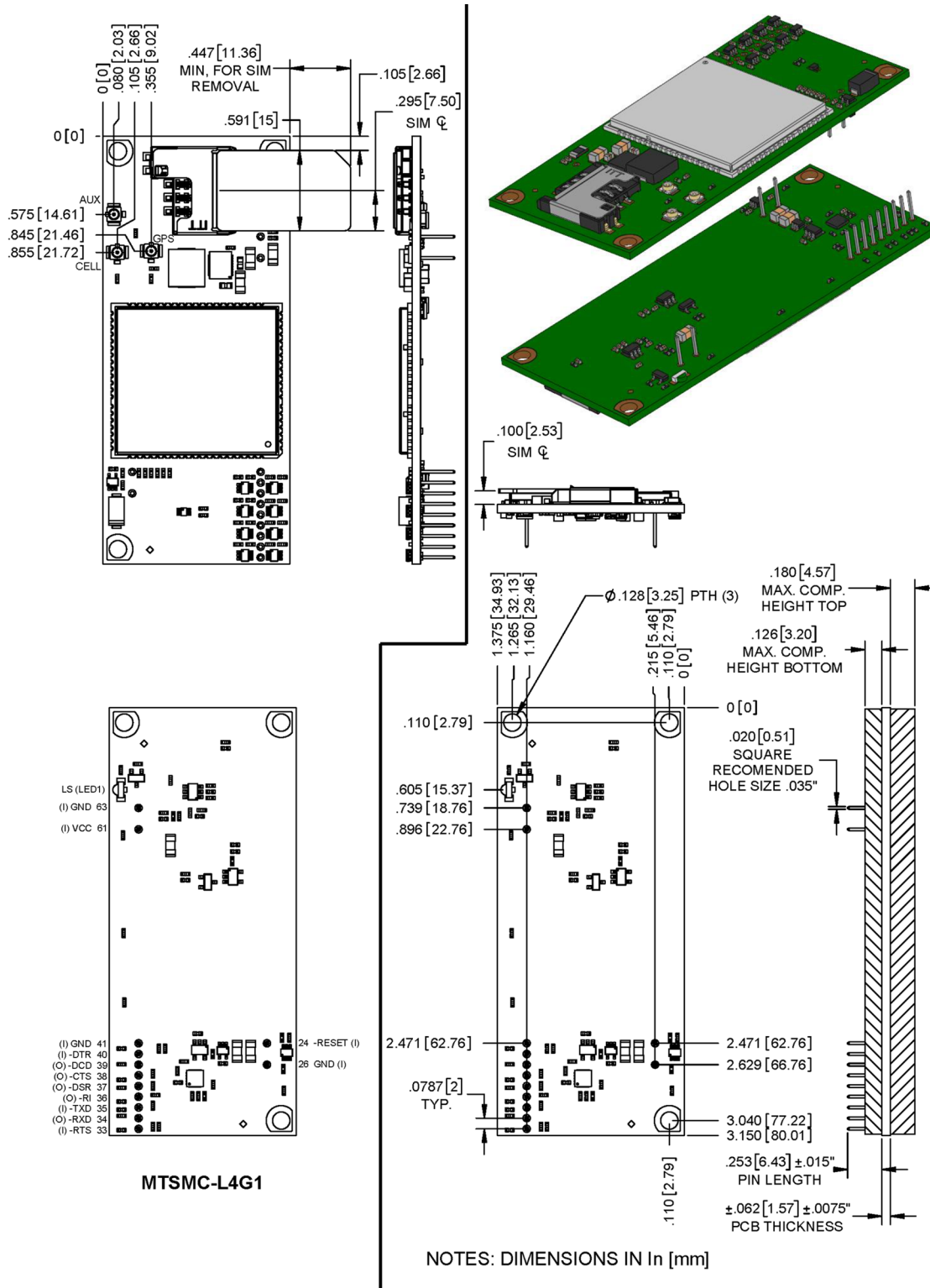
Additional documentation is available at <https://multitech.com/product/socketmodem-cell-lte-cat-4-embedded-cellular-modems-global/>. Select your model to find the documents specific for that device.

Document	Description	Part Number
Device Guide SocketModem Cell MTSMC-L4G1	This document. Provides overview, safety and regulatory information, design considerations, schematics, and device information.	S000776

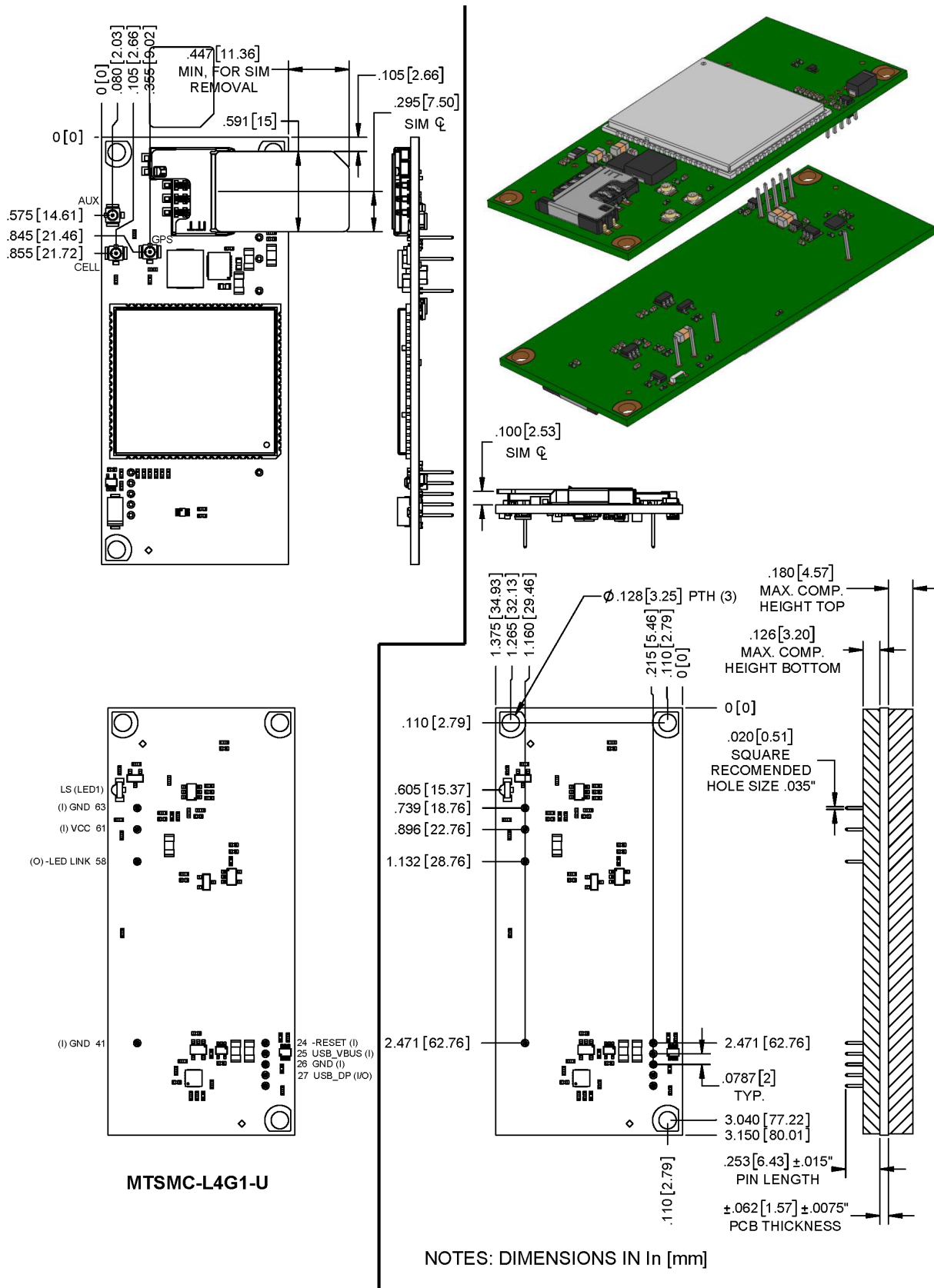
Document	Description	Part Number
Developer Guide Universal Developer Kit MTUDK2-ST-CELL.R1	Information for developing with the MTUDK2-ST-CELL.R1 Developer Kit. Includes an overview, design considerations, schematics, and installation and operation information.	S000799
AT Command Guide and other documents Quectel_EG95-EG25	Multiple documents listing AT Commands, USB Driver Installation Guides (both Windows and Linux), and other protocols used to communicate with your MTSMC-L4G1 device. Provided in a zip file.	N/A

Chapter 2 Mechanical Drawings

MTSMC-L4G1



MTSMC-L4G1-U



Chapter 3 Specifications

MTSMC-L4G1 and MTSMC-L4G1-U Specifications

Category	Description
General	
Standards	4G LTE FDD/TDD
	UMTS/HSPA+
	GSM/GPRS/EDGE
	GNSS: GPS/GLONASS/BeiDou/Galileo/QZSS
TCP/IP Functions	FTP, SMTP, SSL, TCP, UDP
Frequency Bands	LTE FDD: B1/B2/B3/B4/B5/B7/B8/B12/B13/B18/B19/B20/B25/B26/B28
	LTE TDD: B38/B39/B40/B41
	WCDMA: B1/B2/B4/B5/B6/B8/B19
	GSM: B2/B3/B5/B8
Speed	
Data Speed	LTE FDD: Max 150Mbps (DL)/Max 50Mbps (UL)
	LTE TDD: Max 130Mbps (DL)/Max 35Mbps (UL)
	DC-HSDPA: Max 42Mbps (DL)
	HSUPA: Max 5.76 Mbps (UL)
	WCDMA: Max 384Kbps (DL)/Max 384Kbps (UL)
	EDGE: Max 296Kbps (DL)/Max 236.8Kbps (UL)
	GPRS: Max 107Kbps (DL)/Max 85.6Kbps (UL)
Interface	
USB Interface	USB 2.0 High Speed
Serial Modem Interface	Up to 921.6 Kbps
Physical Description	
Weight	0.64 oz. (18 g)
Dimensions	Refer to Mechanical Drawing for Dimensions.
Connectors	
Antenna Connector	3 surface mount U.FL connectors for cellular, RX diversity/MIMO, and GPS/GNSS
SIM	1.8V/ 3V SIM holder for mini-SIM card (2FF)
Environment	

Category	Description
Operating Temperature ¹	-40° C to +85° C
Storage Temperature	-40° C to +85° C
Humidity	20%-90% RH, non-condensing
Power Requirements	
Input Voltage (USB Models)	5.0 VDC
Input Voltage (Serial Models)	3.3 VDC or 5.0 VDC
SMS	
SMS	Point-to-Point messaging
	Mobile-Terminated SMS
	Mobile-Originated SMS
	SMS over IMS
Certifications and Compliance	
EMC and Radio Compliance	FCC Part 15 Class B
	FCC Part 22H, 24E, 27, 90
EMC and Radio Compliance	CE Mark, RED (EU)
Safety Compliance	UL 62368-1
	cUL 62368-1
Safety Compliance	IEC 62368-1
Network Compliance	PTCRB
Carrier	AT&T/Verizon

¹ The Link Status LED is only rated to -30°C operating temperature.

LED Interface

LED — Link Status— All Builds

The LED signal indicates the SocketModem working status. Refer to the mechanical drawing for LED location.

LED Signal	Link Status LED
Off	No power to the device.

LED Signal	Link Status LED	
On	Continuously lit	Powered and connected, but not transmitting or receiving.
	Slow blink (0.2Hz)	Powered and searching for a connection.
	Faster blink (3Hz)	Transmitting or receiving.

UART DC Electrical Characteristics

Symbol	Applicable Signals	VCC (V)	Minimum	Maximum	Unit
V _{IH} High-level input voltage	#RESET, #RTS, #TXD, #DTR	3.0 to 3.6	2	-	V
		4.5 to 5.3	VCC × 0.7	-	V
	USB_VBUS	3.0 to 5.3	VCC × 0.7	-	V
V _{IL} Low-level input voltage	#RESET, #RTS, #TXD, #DTR	3.0 to 3.6	-	0.8	V
		4.5 to 5.3	-	VCC × 0.3	V
	USB_VBUS	3.0 to 5.3	-	VCC × 0.3	V
I _{OH} High-level output current	#RXD, #RI, #DSR, #CTS, #DCD	3.0 to 3.6	-	-24	mA
		4.5 to 5.3	-	-32	mA
I _{OL} Low-level output current	#RXD, #RI, #DSR, #CTS, #DCD	3.0 to 3.6	-	24	mA
		4.5 to 5.3	-	32	mA

Absolute Maximum Rating

Parameter	Minimum	Maximum
VCC Voltage	-0.3V	5.3V
J65 Pin 1 Voltage		
#RESET, #RTS, #RXD, #TXD, #RI, #DSR, #CTS, #DCD, #DTR Voltage	GND - 0.3V	5.3V
#LED_LINK sink current	--	50mA
USB_VBUS Voltage	GND - 0.3V	5.3V
J70 Pin 1 Voltage		
USB_DP, USB_DN Voltage	GND - 0.3V	3.3V
J65 Pins 2 & 3, J70 Pins 2 & 3	GND - 0.3V	2.3V

Recommended Operating Conditions

Symbol	Applicable Signals	VCC (V)	Minimum	Maximum
VCC	Positive DC Supply Voltage		3.3V	5.0

Symbol	Applicable Signals	VCC (V)	Minimum	Maximum
t_r, t_f Input transition rise or fall rate	#RESET, #RTS, #TXD, #DTR, USB_VBUS	3.0 to 3.6	--	10V
		4.5 to 5.5	--	5V

Electrical Characteristics Other Pins

Pin	Signal Name	VIL Min	VIL Max	VIH Min	VIH Max	VOL Min	VOL Max	VOH Min	VOH Max
J24	-RESET	--	0.8	2.0	--	--	--	--	--
J25	USB VBUS	-0.3	0.8	2.0	8.7	--	--	--	--
J26	GND	--	--	--	--	--	--	--	--
J27	USB DP	--	0.8	2	--	--	0.3	2.8	--
J28	USB DN	--	0.8	2	--	--	0.3	2.8	--
J41	GND	--	--	--	--	--	--	--	--
J58	-LED LINK	--	--	--	--	0	0.45	2.85	3.3
J61	VCC	--	--	--	--	--	--	--	--
J63	GND	--	--	--	--	--	--	--	--

Pinout Specifications

Pin	Signal Name	Logic Level Voltage ¹	In/Out	Description
J24	-RESET	3.3 – 5.0	Input with 47K Ω pull-up	Device reset (active low)
J25	USB VBUS	3.3 – 5.0	Input with 47K Ω pull-down	USB power supply input
J26	GND	GND	N/A	Ground
J27	USB DP	3.3	3.3V I/O	USB data
J28	USB DN	3.3	3.3V I/O	USB data
J33	-RTS	5.0	Input with 47K Ω pull-down	Request to send (active low)
J34	-RXD	5.0	Output with 47K Ω pull-up	Received data (active low)
J35	-TXD	5.0	Input with 47K Ω pull-down	Transmitted data (active low)
J36	-RI	5.0	Output with 47K Ω pull-up	Ring indicator (active low)

Pin	Signal Name	Logic Level Voltage ¹	In/Out	Description
J37	–DSR	5.0	Output with 47K Ω pull-up	Data set ready (active low)
J38	–CTS	5.0	Output with 47K Ω pull-up	Clear to send (active low)
J39	–DCD	5.0	Output with 47K Ω pull-up	Data carrier detect (active low)
J40	–DTR	5.0	Input with 47K Ω pull-down	Data terminal ready (active low)
J41	GND	GND	N/A	Ground
J58	–LED LINK	3.3	Open Drain	Link status (active low, can sink up to 150mA)
J61	VCC	5.0	Power	DC input power
J63	GND	GND	N/A	Ground

¹ A hyphen (-) indicates a range of acceptable logic levels.

Note: Except for RESET, connect unused I/O pins to GND. If RESET is unused, connect it to VCC

Pin Availability by Build

Pin	Signal Name	Serial Only	USB Only
J24	–RESET	X	X
J25	USB VBUS		X
J26	GND	X	X
J27	USB DP		X
J28	USB DN		X
J33	–RTS	X	
J34	–RXD	X	
J35	–TXD	X	
J36	–RI	X	
J37	–DSR	X	
J38	–CTS	X	
J39	–DCD	X	
J40	–DTR	X	
J41	GND	X	X
J58	–LED LINK		X
J61	VCC	X	X

Pin	Signal Name	Serial Only	USB Only
J63	GND	X	X

DSR Signal

The contained cellular module does not provide a signal output for Data Set Ready (DSR). To support legacy applications, the SocketModem provides a controllable output signal on that pin. Refer to the commands below to control the output.

Set the pin to output, with no pull, with 2mA drive strength:

```
AT+QGPiOS=4,0,1,0,0
```

Set the signal level high:

```
AT+QGPiOW=4,1
```

Set the signal level low:

```
AT+QGPiOW=4,0
```

Power Measurements

Multi-Tech Systems, Inc. recommends that you incorporate a 10% buffer into your power source when determining product load.

Note: The following notes apply to the following tables.

- **TX Pulse:** The average peak current during a GSM850 transmission burst period or LTE connection. The transmission burst duration for GSM850 can vary, depending on what transmission scheme is being deployed (GPRS Class 8, Class 10, GSM, etc.).
- **Maximum Power:** The continuous current during maximum data rate with the radio transmitter at maximum power.
- **Inrush Charge:** The input current at power on.

MTSMC-L4G1 Power Draw

Radio Protocol	Sleep Mode Current	Power Down Mode (via AT+QPOWD)	Power Down Mode (via Reset line)	Callbox Connection Idle (No Data)	Live Connection Idle (No Data)
3.3 Volts					
GSM 850	25 mA	26 mA	233 uA	51 mA	N/A
WCDMA Band 2 (1854 Mhz)	24.4 mA	33 mA	234 uA	50 mA	51 mA
LTE Band 8 (897.5 Mhz)	24.4 mA	33 mA	232 uA	51 mA	58 mA
5 Volts					

Radio Protocol	Sleep Mode Current	Power Down Mode (via AT+QPOWD)	Power Down Mode (via Reset line)	Callbox Connection Idle (No Data)	Live Connection Idle (No Data)
GSM 850	23 mA	26 mA	5 mA	37 mA	N/A
WCDMA Band 2 (1854 Mhz)	22.6 mA	31 mA	4.88 mA	41 mA	40 mA
LTE Band 8 (897.5 Mhz)	22.6 mA	31 mA	2.37 mA	42 mA	46 mA

Radio Protocol	Average Measured Current at Max Power	TX Pulse (AVG) Amplitude Current for Peak Current for LTE	Total Inrush Charge measured in MilliCoulombs (mC)	Total Inrush Charge DURATION during Powerup (INRUSH Duration)
3.3 Volts				
GSM 850	628 mA	3.0 A	0.912 mC	755 us
WCDMA Band 2 (1854 Mhz)	687 mA	784 mA	0.912 mC	755 us
LTE Band 8 (897.5 Mhz)	922 mA	1.05 A	0.912 mC	755 us
5 Volts				
GSM 850	308 mA	2.01 A	0.204 mC	1.23 ms
WCDMA Band 2 (1854 Mhz)	444 mA	524 mA	0.204 mC	1.23 ms
LTE Band 8 (897.5 Mhz)	562 mA	652 mA	0.204 mC	1.23 ms

MTSMC-L4G1-U Power Draw

Radio Protocol	Sleep Mode Current	Power Down Mode (via AT+QPOWD)	Power Down Mode (via Reset line)	Callbox Connection Idle (No Data)	Live Connection Idle (No Data)
3.3 Volts					
GSM 850	N/A	32 mA	296 uA	50 mA	62 mA
WCDMA Band 2 (1854 Mhz)	N/A	33 mA	297 uA	63 mA	55 mA
LTE Band 8 (897.5 Mhz)	N/A	33 mA	295 uA	64 mA	63 mA
5 Volts					
GSM 850	N/A	27.5 mA	373 uA	46 mA	46 mA

Radio Protocol	Sleep Mode Current	Power Down Mode (via AT+QPOWD)	Power Down Mode (via Reset line)	Callbox Connection Idle (No Data)	Live Connection Idle (No Data)
WCDMA Band 2 (1854 Mhz)	N/A	27.7 mA	374 uA	47 mA	41 mA
LTE Band 8 (897.5 Mhz)	N/A	28 mA	376 uA	47 mA	46 mA

Radio Protocol	Average Measured Current at Max Power	TX Pulse (AVG) Amplitude Current for Peak Current for LTE	Total Inrush Charge measured in MilliCoulombs (mC)	Total Inrush Charge DURATION during Powerup (INRUSH Duration)
3.3 Volts				
GSM 850	N/A	N/A	0.134 mC	713 us
WCDMA Band 2 (1854 Mhz)	705 mA	768 mA	0.134 mC	713 us
LTE Band 8 (897.5 Mhz)	944 mA	1.00A	0.134 mC	713 us
5 Volts				
GSM 850	258 mA	2.03 A	0.201 mC	1.29 ms
WCDMA Band 2 (1854 Mhz)	465 mA	552 mA	0.201 mC	1.29 ms
LTE Band 8 (897.5 Mhz)	577 mA	676 mA	0.201 mC	1.29 ms

Power Down the Device

CAUTION: Failing to properly power down the device before removing power may corrupt your device's file system.

To properly power down your device, use the following sequence:

1. Issue the AT+QPOWD command or hold the reset line (pin J24) LOW.
2. Wait up to 65 seconds for POWERED DOWN message.
3. Remove power to the MTSMC.

Device RESET (Pin J24)

Note: Take note of how your software controls this pin to avoid unnecessary power cycling.

The RESET pin takes care of properly powering up and powering down the cellular radio module.

Holding the RESET pin LOW for >50ms initiates a power up or power down sequence, depending on its previous state.

RESET Function on Initial Power Up

Regardless of the RESET pin's state, the cell radio initiates a power up sequence on the first power up. At the end of the power up cycle, the state of the RESET pin is sampled again.

- The full power up cycle may take up to 30 seconds before all AT commands are available.
- If the RESET pin is LOW when the radio completes the power up sequence, the radio initiates a power down sequence.

RESET Function when the Radio Module is Powered

If the RESET pin is LOW, the radio initiates a power down sequence.

- The full power down cycle may take up to 65 seconds, during which time the radio is properly deregistered.
- If the RESET pin is in a continuous LOW state, the radio will stay off.
- If the RESET pin is set to HIGH, it will initiate a power up sequence.

Mounting Hardware

The board has three mounting holes at corners. Use #4 or M3 hardware for mounting the SocketModem to the board. Refer to *Dimensions* for more information.

Recommended Parts

Manufacturer	Part	Part Number
PEM (Penn Engineering & Manufacturing)	Surface Mount Standoff	SMTSO-M3-4ET
RAF Electronic Hardware	3/16" Hex Female Standoff	2051T-440-S-12-Zinc
RAF Electronic Hardware	4.5mm Hex Female Standoff	1251-3005-S-12-Zinc

Chapter 4 Antennas

Antenna System Cellular Devices

The cellular/wireless performance depends on the implementation and antenna design. The integration of the antenna system into the product is a critical part of the design process. Therefore, it is essential to consider it early so that the performance is not compromised. Devices were approved with the antenna(s) described below and for alternate antennas meeting the given specifications.

The antenna system is defined as the U.FL connection point from the device to the specified cable specifications and specified antenna specifications.

The antenna system is defined as the SMA connection point from the device to the specified cable specifications and specified antenna specifications.

FCC Requirements

There cannot be any alteration to the authorized antenna system. The antenna system must be the same type with similar in-band and out-of-band radiation patterns and should not exceed the maximum gain information detailed in the FCC Grant.

Antenna

Devices were approved with the following antenna:

Manufacturer:	Wieson
Description:	LTE Antenna with SMA-Male Connector
Model Number	GY115IE002-001

MultiTech ordering information:

Model	Quantity
ANLTE4-1HRA	1
ANLTE4-2HRA	2
ANLTE4-10HRA	10
ANLTE4-50HRA	50

Antenna Specifications

Category	Description
Frequency Range	0.698 - 0.96 GHz 1.710 - 2.170 GHz 2.30 - 2.69 GHz

Category	Description
VSWR	3:1 maximum
Gain	2.06 dBi
Impedance	50Ω nominal
Radiation	Omni-directional
Polarization	Linear, vertical

LTE Antenna MISO

LTE devices use multiple input and single output (MISO) to improve the downlink connection (cell tower to mobile). It has no effect on the uplink (mobile to cell tower).

Important: Always connect all included antennas for increased downlink bandwidth and better signal handling in diverse locations. You must deploy with two antennas, unless your network operator has authorized you to deploy with one antenna.

Selecting Antennas

Select an antenna based on your product and application. Typically, both antennas are the same and either can be the main receive antenna.

Antenna Approvals and Safety Considerations

- Network operators conduct antenna diversity tests.
- There are no EMC concerns about antenna diversity.
- All antennas that contain plastics require a minimum flammability rating (UL94-HB).
- Safety requirements depend on your final product.
- Unless otherwise noted, antennas are not approved for outdoor use. Do not extend any antenna outside of any building, dwelling, or campus.

Power Draw

There are no significant power draw differences.

OEM Integration

FCC & IC Information to Consumers

The user manual for the consumer must contain the statements required by the following FCC and IC regulations: 47 C.F.R. 15.19(a)(3), 15.21, 15.105 and RSS-Gen Issue 4 Sections 8.3 and 8.4.

FCC Grant Notes

The OEM should follow all the grant notes listed below. Otherwise, further testing and device approvals may be necessary.

FCC Definitions

Portable: (§2.1093) — A portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

Mobile: (§2.1091) — A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

Actual content pending Grant: *This device is a mobile device with respect to RF exposure compliance. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons, and must not be collocated or operate in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product guidelines. Installers and end-users must be provided with specific information required to satisfy RF exposure compliance for installations and final host devices. (See note under Grant Limitations.) Compliance of this device in all final host configurations is the responsibility of the Grantee.*

Note: Host design configurations constituting a device for portable use (<20 cm from human body) require separate FCC/IC approval.

Host Labeling

The following statements are required to be on the host label:

- This device contains FCC ID: XMR201903EG25G
- This device contains equipment certified under IC ID: 10224A - 201903EG25G

For labeling examples, see *Approvals and Certification*

Chapter 5 Carrier Specific Notice

Firmware Over the Air (FOTA) for Verizon

Also known as Firmware Update Over the Air (FUOTA). At times, your device may require a critical update to radio firmware for devices connecting to the network. To stay compliant to Verizon's requirements you must implement FOTA. Failure to perform a critical update could result in losing access to the Verizon network. For information and examples go to <https://multitech.com/verizon-firmware-over-the-air-fota>.

Chapter 6 Safety Information

Handling Precautions

To avoid damage due to the accumulation of static charge use proper precautions, such as an ESD strap, when handling any cellular device to avoid exposure to electronic discharge during handling and mounting the device.

Radio Frequency (RF) Safety

Due to the possibility of radio frequency (RF) interference, it is important that you follow any special regulations regarding the use of radio equipment. Follow the safety advice given below.

- Operating your device close to other electronic equipment may cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers' recommendations.
- Different industries and businesses restrict the use of cellular devices. Respect restrictions on the use of radio equipment in fuel depots, chemical plants, or where blasting operations are in process. Follow restrictions for any environment where you operate the device.
- Do not place the antenna outdoors.
- Turn off your wireless device when in an aircraft. Using portable electronic devices in an aircraft may endanger aircraft operation, disrupt the cellular network, and may be illegal. Failing to observe this restriction may lead to suspension or denial of cellular services to the offender, legal action, or both.
- Turn off your wireless device when around gasoline or diesel-fuel pumps and before filling your vehicle with fuel.
- Turn off your wireless device in hospitals and any other place where medical equipment may be in use.

Sécurité relative aux appareils à radiofréquence (RF)

À cause du risque d'interférences de radiofréquence (RF), il est important de respecter toutes les réglementations spéciales relatives aux équipements radio. Suivez les conseils de sécurité ci-dessous.

- Utiliser l'appareil à proximité d'autres équipements électroniques peut causer des interférences si les équipements ne sont pas bien protégés. Respectez tous les panneaux d'avertissement et les recommandations du fabricant.
- Certains secteurs industriels et certaines entreprises limitent l'utilisation des appareils cellulaires. Respectez ces restrictions relatives aux équipements radio dans les dépôts de carburant, dans les usines de produits chimiques, ou dans les zones où des dynamitages sont en cours. Suivez les restrictions relatives à chaque type d'environnement où vous utiliserez l'appareil.
- Ne placez pas l'antenne en extérieur.
- Éteignez votre appareil sans fil dans les avions. L'utilisation d'appareils électroniques portables en avion est illégale: elle peut fortement perturber le fonctionnement de l'appareil et désactiver le réseau cellulaires. S'il ne respecte pas cette consigne, le responsable peut voir son accès aux services cellulaires suspendu ou interdit, peut être poursuivi en justice, ou les deux.

- Éteignez votre appareil sans fil à proximité des pompes à essence ou de diesel avant de remplir le réservoir de votre véhicule de carburant.
- Éteignez votre appareil sans fil dans les hôpitaux ou dans toutes les zones où des appareils médicaux sont susceptibles d'être utilisés.

Interference with Pacemakers and Other Medical Devices

Radio frequency energy (RF) from cellular devices can interact with some electronic devices. This is electromagnetic interference (EMI). The FDA helped develop a detailed test method to measure EMI of implanted cardiac pacemakers and defibrillators from cellular devices. This test method is part of the Association for the Advancement of Medical Instrumentation (AAMI) standard. This standard allows manufacturers to ensure that cardiac pacemakers and defibrillators are safe from cellular device EMI.

The FDA continues to monitor cellular devices for interactions with other medical devices. If harmful interference occurs, the FDA will assess the interference and work to resolve the problem.

Precautions for Pacemaker Wearers

If EMI occurs, it could affect a pacemaker in one of three ways:

- Stop the pacemaker from delivering the stimulating pulses that regulate the heart's rhythm.
- Cause the pacemaker to deliver pulses irregularly.
- Cause the pacemaker to ignore the heart's own rhythm and deliver pulses at a fixed rate.

Based on current research, cellular devices do not pose a significant health problem for most pacemaker wearers. However, people with pacemakers may want to take simple precautions to be sure that their device doesn't cause a problem.

- Keep the device on the opposite side of the body from the pacemaker to add extra distance between the pacemaker and the device.
- Avoid placing a turned-on device next to the pacemaker (for example, don't carry the device in a shirt or jacket pocket directly over the pacemaker).

Vehicle Safety

When using your device in a vehicle:

- Do not use this device while driving.
- Respect local regulations on the use of cellular devices in vehicles.
- If incorrectly installed in a vehicle, operating the wireless device could interfere with the vehicle's electronics. To avoid such problems, use qualified personnel to install the device. The installer should verify that the vehicle electronics are protected from interference.
- Using an alert device to operate a vehicle's lights or horn is not permitted on public roads.
- UL evaluated this device for use in ordinary locations only. UL did *not* evaluate this device for installation in a vehicle or other outdoor locations. UL certification does not apply or extend to use in vehicles or outdoor applications.

Operation Safety

CAUTION: Read all instructions and safety information before installing or using this device.

Attention: Lisez toutes les instructions et consignes de sécurité avant d'installer ou d'utiliser cet appareil.

- Follow all local laws, regulations, and rules for operating a wireless device.
- Use the device security features to block unauthorized use and theft.
- Unless otherwise noted, antennas are not approved for outdoor use. Do not extend any antenna outside of any building, dwelling, or campus.
- Do not attempt to disassemble the device. There are no user-serviceable parts inside.
- Do not misuse the device. Follow instructions on proper operation and only use as intended. Misuse could make the device inoperable, damage the device or other equipment, or harm users.
- Do not apply excessive pressure or place unnecessary weight on the device. This could result in damage to the device or harm to users.
- Do not use this device in explosive or hazardous environments unless the model is specifically approved for such use. The device may cause sparks. Sparks in explosive areas could cause an explosion or fire that may result in property damage, severe injury, or death.
- Do not expose the device to any extreme environment where the temperature or humidity is high. Such exposure could result in damage to the device or cause a fire. See the device specifications for recommended operating temperature and humidity.
- Do not expose the device to water, rain, or other liquids. It is not waterproof. Exposure to liquids could result in damage to the device.
- Using accessories, such as antennas, that MultiTech has not authorized or that are not compliant with the device accessory specifications may invalidate the warranty.

If the device is not working properly, contact MultiTech technical support.

Chapter 7 Regulatory Information

FCC 47 CFR Part 15 Regulation Class B Devices

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Grant Information

FCC Identifier:	XMR201903EG25G
Equipment Class:	PCS Licensed Transmitter
Notes:	LTE Module
Modular Type:	Single Modular
FCC Rule Parts:	22H, 24E, 27, 90

Rule Parts	Frequency Range	Output Watts	Frequency Tolerance	Emission Designator
22H	824.2 - 848.8	1.8493	0.1 PPM	247KGXW
22H	824.2 - 848.8	0.4797	0.1 PPM	245KG7W
24E	1850.2 - 1909.8	1.3335	0.1 PPM	249KGXW
24E	1850.2 - 1909.8	0.6012	0.1 PPM	249KG7W
24E	1852.4 - 1907.6	0.3524	0.1 PPM	4M15F9W
27	1712.4 - 1752.6	0.3819	0.1 PPM	4M14F9W
22H	826.4 - 846.6	0.2512	0.1 PPM	4M13F9W
24E	1860.0 - 1900.0	0.4198	0.1 PPM	17M9G7D

Rule Parts	Frequency Range	Output Watts	Frequency Tolerance	Emission Designator
24E	1860.0 - 1900.0	0.2259	0.1 PPM	17M9W7D
24E	1850.7 - 1909.3	0.2547	0.1 PPM	1M09W7D
27	1720.0 - 1745.0	0.4887	0.1 PPM	17M9G7D
27	1720.0 - 1745.0	0.2612	0.1 PPM	17M9W7D
27	1710.7 - 1754.3	0.2877	0.1 PPM	1M09W7D
22H	829.0 - 844.0	0.2333	0.1 PPM	8M93G7D
22H	829.0 - 844.0	0.1703	0.1 PPM	8M93W7D
22H	825.5 - 847.5	0.235	0.1 PPM	2M70G7D
22H	824.7 - 848.3	0.1936	0.1 PPM	1M09W7D
27	2510.0 - 2560.0	0.4864	0.1 PPM	17M9G7D
27	2510.0 - 2560.0	0.3177	0.1 PPM	17M9W7D
27	2502.5 - 2567.5	0.3192	0.1 PPM	4M49W7D
27	704.0 - 711.0	0.3475	0.1 PPM	8M93G7D
27	704.0 - 711.0	0.2183	0.1 PPM	8M93W7D
27	699.7 - 715.3	0.2472	0.1 PPM	1M09W7D
27	782.0 - 782.0	0.4217	0.1 PPM	8M91G7D
27	782.0 - 782.0	0.2911	0.1 PPM	8M91W7D
27	779.5 - 784.5	0.4395	0.1 PPM	4M48G7D
27	779.5 - 784.5	0.309	0.1 PPM	4M49W7D
24E	1860.0 - 1905.0	0.3516	0.1 PPM	17M9G7D
24E	1860.0 - 1905.0	0.2489	0.1 PPM	17M9W7D
24E	1855.0 - 1910.0	0.4111	0.1 PPM	8M91G7D
24E	1850.7 - 1914.3	0.2429	0.1 PPM	1M09W7D
90	819.0 - 819.0	0.2198	0.1 PPM	8M91G7D
90	819.0 - 819.0	0.1738	0.1 PPM	8M91W7D
90	814.7 - 823.3	0.2455	0.1 PPM	1M09G7D
90	814.7 - 823.3	0.1972	0.1 PPM	1M09W7D
22H	831.5 - 841.5	0.2582	0.1 PPM	13M5G7D
22H	831.5 - 841.5	0.1828	0.1 PPM	13M4W7D
22H	826.5 - 846.5	0.1945	0.1 PPM	4M49W7D
27	2580.0 - 2610.0	0.3926	0.1 PPM	17M8G7D
27	2580.0 - 2610.0	0.2799	0.1 PPM	17M8W7D

Rule Parts	Frequency Range	Output Watts	Frequency Tolerance	Emission Designator
27	2575.0 - 2615.0	0.3936	0.1 PPM	8M91G7D
27	2506.0 - 2680.0	0.4842	0.1 PPM	17M9G7D
27	2506.0 - 2680.0	0.342	0.1 PPM	17M9W7D
27	2501.0 - 2685.0	0.4853	0.1 PPM	8M91G7D
27	2498.5 - 2687.5	0.3451	0.1 PPM	4M50W7D

Single Modular Approval. Power listed is ERP for part 22 and part 27 below 1 GHz, EIRP for part 24 and part 27 above 1 GHz. Approval is limited to OEM installation only. Compliance of this device in all final host configurations is the responsibility of the Grantee. This device is to be used only for mobile and fixed applications. OEM integrators must be provided labeling requirements for finished products. This grant is valid only when the device is sold to OEM integrators and the OEM integrators are instructed to ensure that the end user has no manual instructions to remove or install the device. Separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and different antenna configurations. The module antenna(s) must be installed to meet the RF exposure compliance separation distance of 20 cm and any additional testing and authorization process as required. Co-location of this module with other transmitters that operate simultaneously are required to be evaluated using the FCC multi-transmitter procedures. The antenna installation and operating configurations of this transmitter, including any applicable source-based time-averaging duty factor, antenna gain, and cable loss must satisfy MPE categorical Exclusion Requirements of Part 2.1091. Users must be provided with instructions and transmitter operating conditions for satisfying RF exposure compliance. RF exposure compliance may need to be addressed at the time of licensing, as required by the responsible FCC bureau(s), including antenna co-location requirements of Part 1.1307(b)(3). This module can only be used with a host antenna circuit trace layout design in strict compliance with the OEM instructions provided. This device supports: LTE of 1.4, 3, 5, 10, 15, and 20MHz bandwidth modes for LTE Band 2, 4 and 25; and LTE of 1.4, 3, 5 and 10MHz bandwidth modes for LTE Band 5,12 and 26 (814-824MHz),LTE of 5, 10, 15 and 20MHz bandwidth modes for LTE Band 7, 38 and 41; LTE of 5 and 10 MHz bandwidth modes for LTE Band 13; LTE of 1.4, 3, 5,10 and 15MHz bandwidth mode for LTE Band 26(824-849MHz).

The allowed maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed: 8dBi in WCDMA Band 2/LTE Band 2/7/25/38/41; 5dBi in WCDMA /LTE Band 4, and 8.6dBi in GSM850;10.19dBi in PCS1900; 9.42dBi in WCDMA Band 5; 9.41dBi in LTE Band 5; 8.7dBi in LTE Band 12; 9.16dBi in LTE Band 13; 9.36dBi in LTE Band 26(814-824); 9.41dBi in LTE Band 26(824-849).

This device contains functions that are not operational in U.S. Territories. This filing is only applicable for U.S. operations.

Industry Canada Class B Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

This device complies with Industry Canada license-exempt RSS standard(s). The operation is permitted for the following two conditions:

1. The device may not cause interference, and

2. This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement Canadien sur le matériel brouilleur.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage, et
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Industry Canada Grant Information

Company Number/Numéro de compagnie:	10224A
Company Name/Nom de compagnie::	Quectel Wireless Solutions Co.,Ltd
Certification Number/Numéro d'homologation:	10224A-201903EG25G
Approval Date/Date d'approbation:	Wed Apr 03 00:00:00 EDT 2019
Hardware Version Identification Number (HVIN)/Numéro d'identification de la version du matériel (NIVM):	EG25-G
Product Marketing Name (PMN)/Nom de marque du produit (NMP):	Quectel EG25-G
Equipment Description/Description de l'équipement:	LTE Module
Type of Radio Equipment/Genre d'équipement radio:	PCS Mobile (1850-1910 MHz)
	Cellular Telephones Employing New Technologies (824-849 MHz)
	Broadband Radio Service (2500-2690 MHz)
	Mobile Broadband Service (MBS) Equipment (698-756/777-787 MHz)
	Advanced Wireless Services Equipment (1710-1780 MHz and 2110-2180 MHz)
	Modular Approval
	Cellular Mobile GSM (824-849 MHz)

RF Exposure Results/Résultats d'exposition humaine aux RF

Type	Value/Valeur	Compliance Distance/Distance de conformité
RF	5.6 W/m ²	200 mm

Specification/Cahiers des charges	Issue Number/Numéro de la version	Frequency Range/Gamme de fréquence		Emission Designator/Désignatif d'émission	Power/Puissance		Field Strength/Intensité de champ	Dist.
		From/De	To/À		Min.	Max.		
RSS132	3	825.5 MHz	847.5 MHz	2M69W7D--	137.0 mW	170.0 mW	--	--
RSS132	3	829.0 MHz	844.0 MHz	8M93W7D--	139.0 mW	170.0 mW	--	--
RSS132	3	824.7 MHz	848.3 MHz	1M09W7D--	139.0 mW	194.0 mW	--	--
RSS132	3	826.5 MHz	846.5 MHz	4M49W7D--	145.0 mW	195.0 mW	--	--
RSS132	3	831.5 MHz	841.5 MHz	13M4W7D--	150.0 mW	183.0 mW	--	--
RSS130	2	829.0 MHz	844.0 MHz	8M93G7D--	175.0 mW	233.0 mW	--	--
RSS130	2	699.7 MHz	715.3 MHz	1M09W7D--	175.0 mW	247.0 mW	--	--
RSS133	6	704.0 MHz	711.0 MHz	8M93W7D--	178.0 mW	218.0 mW	--	--
RSS133	6	1850.7 MHz	1909.3 MHz	1M09W7D--	180.0 mW	255.0 mW	--	--
RSS132	3	1860.0 MHz	1905.0 MHz	17M9W7D--	183.0 mW	249.0 mW	--	--
RSS133	6	831.5 MHz	841.5 MHz	13M5G7D--	186.0 mW	258.0 mW	--	--
RSS133	6	1860.0 MHz	1900.0 MHz	17M9W7D--	187.0 mW	226.0 mW	--	--
RSS133	6	1850.7 MHz	1914.3 MHz	1M09W7D--	196.0 mW	273.0 mW	--	--
RSS133	6	1855.0 MHz	1910.0 MHz	8M91G7D--	198.0 mW	411.0 mW	--	--
RSS139	3	1860.0 MHz	1905.0 MHz	17M9G7D--	203.0 mW	352.0 mW	--	--
RSS139	3	1720.0 MHz	1745.0 MHz	17M9W7D--	208.0 mW	377.0 mW	--	--
RSS199	3	1710.7 MHz	1754.3 MHz	1M09W7D--	212.0 mW	288.0 mW	--	--

Specification/Cahiers des charges	Issue Number/Numéro de la version	Frequency Range/Gamme de fréquence		Emission Designator/Désignatif d'émission	Power/Puissance		Field Strength/Intensité de champ	Dist.
		From/De	To/À		Min.	Max.		
RSS132	3							
RSS133	6	2580.0 MHz	2610.0 MHz	17M8W7D--	215.0 mW	280.0 mW	--	--
RSS130	2	1860.0 MHz	1900.0 MHz	17M9G7D--	218.0 mW	420.0 mW	--	--
RSS130	2	704.0 MHz	711.0 MHz	8M93G7D--	224.0 mW	348.0 mW	--	--
RSS199	3	779.5 MHz	784.5 MHz	4M49W7D--	230.0 mW	309.0 mW	--	--
RSS130	2	2502.5 MHz	2567.5 MHz	4M49W7D--	238.0 mW	319.0 mW	--	--
RSS132	3	782.0 MHz	782.0 MHz	8M91W7D--	244.0 mW	291.0 mW	--	--
RSS199	3	826.4 MHz	846.6 MHz	4M13F9W--	246.0 mW	251.0 mW	--	--
RSS139	3	2510.0 MHz	2560.0 MHz	17M9W7D--	254.0 mW	318.0 mW	--	--
RSS199	3	1720.0 MHz	1745.0 MHz	17M9G7D--	262.0 mW	489.0 mW	--	--
RSS199	3	2575.0 MHz	2615.0 MHz	8M91G7D--	273.0 mW	394.0 mW	--	--
RSS199	3	2580.0 MHz	2610.0 MHz	17M8G7D--	274.0 mW	393.0 mW	--	--
RSS130	2	2510.0 MHz	2680.0 MHz	17M9W7D--	278.0 mW	348.0 mW	--	--
RSS130	2	782.0 MHz	782.0 MHz	8M91G7D--	302.0 mW	422.0 mW	--	--
RSS199	3	779.5 MHz	784.5 MHz	4M48G7D--	303.0 mW	440.0 mW	--	--
RSS133	6	2510.0 MHz	2560.0 MHz	17M9G7D--	313.0 mW	486.0 mW	--	--
RSS199	3	1852.4 MHz	1907.6 MHz	4M15F9W--	343.0 mW	352.0 mW	--	--
RSS139	3	2510.0 MHz	2680.0 MHz	17M9G7D--	349.0 mW	488.0 mW	--	--

Specification/Cahiers des charges	Issue Number/Numéro de la version	Frequency Range/Gamme de fréquence		Emission Designator/Désignatif d'émission	Power/Puissance		Field Strength/Intensité de champ	Dist.
		From/De	To/À		Min.	Max.		
RSS132	3	1712.4 MHz	1752.6 MHz	4M14F9W --	366.0 mW	382.0 mW	--	--
RSS133	6	824.2 MHz	848.8 MHz	245KG7W --	462.0 mW	480.0 mW	--	--
RSS133	6	1850.2 MHz	1909.8 MHz	249KG7W --	532.0 mW	601.0 mW	--	--
RSS132	3	1850.2 MHz	1909.8 MHz	249KGXW --	1194.0 mW	1334.0 mW	--	--
		824.2 MHz	848.8 MHz	247KGXW --	1714.0 mW	1849.0 mW	--	--

EU EMC, Safety, and Radio Equipment Directive (RED) Compliance



The CE mark is affixed to this product to confirm compliance with the following European Community Directives:

- Council Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment; and
- Council Directive 2014/53/EU on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

MultiTech declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. The declaration of conformity may be downloaded at <https://multitech.com/product-support/>.

Chapter 8 Environmental Notices

EU WEEE Directive

Note: This statement may be used in documentation for your final product applications.

The Waste from Electrical and Electronic Equipment (WEEE) Directive places an obligation on EU-based manufacturers, distributors, retailers, and importers to take back electronics products at the end of their useful life. A sister directive, ROHS (Restriction of Hazardous Substances) complements the WEEE Directive by banning the presence of specific hazardous substances in the products at the design phase. The WEEE Directive covers all MultiTech products imported into the EU as of August 13, 2005. EU-based manufacturers, distributors, retailers and importers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

Instructions for Disposal of WEEE by Users in the European Union

The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, contact your local city office, your household waste disposal service or where you purchased the product.

July, 2005



EU RoHS 3 Directive

Multi-Tech Systems, Inc. confirms that all products comply with the chemical concentration limitations set forth in the Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS 3) regulations for CE and UKCA, following the standard EN IEC 63000:2018.

For the current Certificate of Compliance for Hazardous Substances and additional regulatory documents, go to <https://multitech.com/approvals-and-certifications/>.

EU REACH-SVHC Statement

Multi-Tech Systems, Inc. confirms that none of its products or packaging contain any of the Substances of Very High Concern (SVHC) on the REACH Candidate List, in a concentration above the 0.1% by weight allowable limit.

For the current REACH-SVHC statement and additional regulatory documents, go to <https://multitech.com/approvals-and-certifications/>.

Chapter 9 Labels

Approvals and Certifications

This device is an industry and/or carrier approved modem. In most cases, when integrated and used with an antenna system that was part of the MultiTech modem certification, additional approvals or certifications are not required for the device that you develop as long as the following requirements are met:

- **PTCRB Requirements:** The antenna system cannot be altered. The antenna system must be the same type with similar in-band and out-of-band radiation patterns and maintain the same specifications. Refer to the FCC grant information for details.
- **Model Identification:** The MultiTech model identification allows the carrier to verify the modem as one of its approved models. This information is located on the modem's label below the bar code.

Example Labels

Note: Actual labels vary depending on the regulatory approval markings and content.

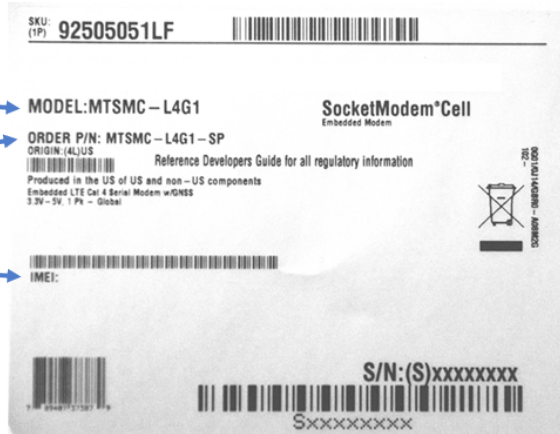
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The label shown is not than actual size.

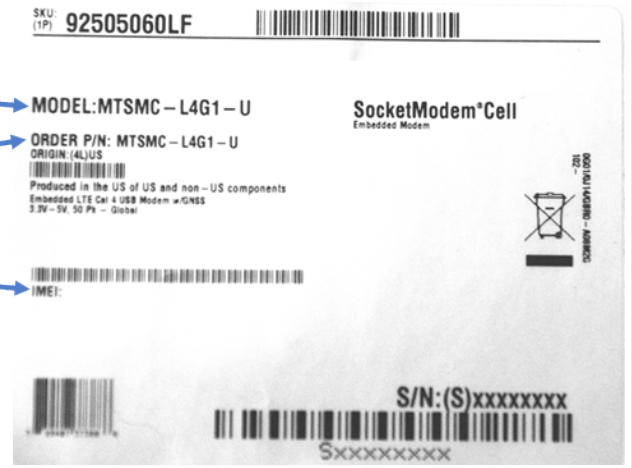
- 1 - Multi-Tech Model Identification.
- 2 - Multi-Tech Ordering Part Number.
- 3 - IMEI (International Mobile Equipment Identity).

MTSMC-L4G1

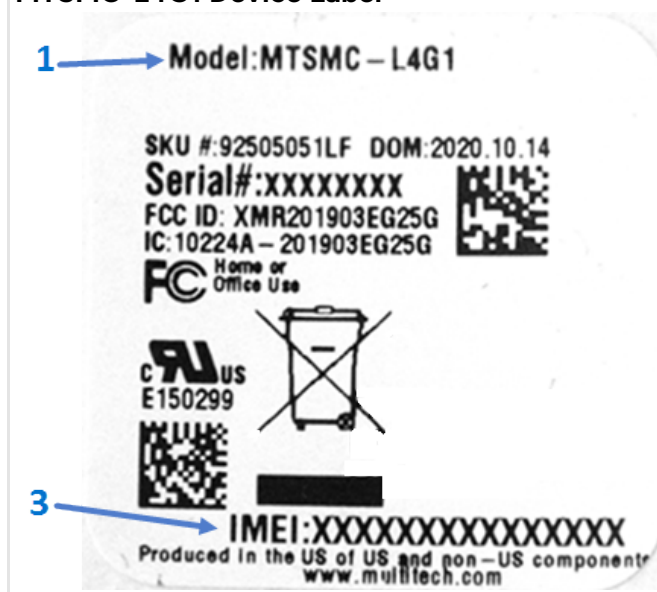
MTSMC-L4G1 Package Label



MTSMC-L4G -U Package Label



MTSMC-L4G1 Device Label



MTSMC-L4G1-U Device Label



Chapter 10 Basic Operations

Introduction

This section describes how to use AT commands to interact with your device. Using terminal software such as TeraTerm, you can issue AT commands to communicate with and configure your modem. The AT commands let you establish, read and modify device parameters and help you control how the device operates. This section documents basic interactions with your device, such as verifying signal strength and network registrations, and sending and receiving data.

Generally, USB modems are used as unintelligent bit pipes. In Windows, this means you create a dial-up network connection that uses the Windows IP stack to use the modem to create a PPP connection to the cellular network. The modem is assigned an IP address from the cellular carrier. This connection provides Internet access and is the basis creating TCP/UDP Sockets and putting and getting files from an FTP server.

In Linux, PPPD is used to dial the modem and create the connection to the cellular TCP/IP network. This provides Internet access for creating TCP/UDP Sockets or putting and getting files from an FTP server.

Before Using the Device

Before using the device:

- Get a SIM card from your network provider. Refer to [SIM Card and Account Activation](#)
- Install the SIM card on your device. Refer to [Installing a SIM Card on a SocketModem Cell](#)
- Attach antennas and cable the hardware. If using with the developer board, refer to the *Universal Developer Kit Developer Guide* for details.
- Install drivers. Refer to [Device Drivers](#)
- Install terminal software that can communicate with the device, such as HyperTerminal, Tera Term, or PuTTY.
- Power up your device and ensure it is connected to your computer that issues AT commands.

Note: Wait 10 seconds after power-up before issuing any AT commands.

To verify the device is connected, enter AT in the terminal program. The device responds with OK.

For additional information, refer to the AT command guide and any related documentation for your device. The AT command guide describes command formatting, syntax, and other basic information.

Using Command Mode and Online Data Mode

Use AT commands to communicate with and configure your modem. These commands establish, read, and modify device parameters and control how the modem works. The device also generates responses to AT commands that help determine the modem's current state.

One way to send AT command to the modem is to use terminal emulation software.

Before configuring the terminal emulation software it will be necessary to find the Windows COM port providing the interface to the modem's AT command interpreter.

To find the COM Port:

1. Connect the MultiTech device to a USB port of the computer.
2. Open Windows Device Manager.
3. Find the "Modems" section and expand the branch in the tree view.
4. Double click on one of the modem entries.
5. Click on the "Modem" tab.
6. Make a note of the COM port displayed in the upper left corner.

Note: COM port numbers may differ from image and instructions.

By default, the MultiTech product will have the following serial settings:

- Speed: 115,200 bps
- Data bits: 8
- Parity: none
- Stop bit: 1
- Flow control: hardware

Configure the terminal emulation software with the COM port and serial settings found previously.

To confirm communication with the device:

- Type **AT** and press **Enter**.

If the device responds with OK, it is properly communicating.

If typed characters are not visible, type **ATE1** and then press **Enter** to turn on character echo.

Chapter 11 Using Connection Manager

Use Connection Manager to:

- Install the latest device drivers.
- Connect your device to your carrier's network.
- Switch the firmware in your device to a different carrier (if supported by your device).
- Manage cellular connection and automatically reconnect with the keep-alive feature.
- View device details.
- View line charts of signal level and data rates.
- Use a terminal window for communicating with and troubleshooting the device.

Note: If you have an older version of Connection Manager, uninstall it before installing a new version. For details, refer to [Uninstalling Connection Manager](#).

Installing Connection Manager

Connection Manager installs the appropriate drivers for USB devices along with the application. Serial devices do not require drivers.

Note: Attempting to plug in the device before the appropriate drivers are installed can cause the connection to fail.

To install Connection Manager and the device drivers:

1. Go to <https://multitech.com/all-products/software-management/connection-manager/>.
2. Click **Connection Manager**.
3. Open or unzip the **Connection Manager** file and run the installer (.msi file).
4. On the MultiTech Connection Manager Setup Wizard Welcome Panel, click **Next**.
5. Read the end-user license agreement and check **I accept the terms in the License Agreement**. Click **Next**.
6. Click **Next** to have the installer automatically disable the native WWAN AutoConfig service in Windows.

The WWAN AutoConfig service manages mobile broadband connections. Connection Manager requires that this service be disabled.

Note: This page appears in Windows 10 and Windows 11.
7. If any Multichannel device is connected to the computer, disconnect it and click **Next**.
8. If you use a USB device, check **Install the modem driver**.

CAUTION: Unless you are certain that the drivers for your USB device are already installed on the computer, make sure that you check **Install the modem driver**. Failure to do this will cause the application to incorrectly detect your device or not detect the device at all.

Note: Because serial devices do not require drivers, it does not matter if you check or uncheck **Install the modem driver** for a serial device.

9. To specify a folder for Connection Manager, use the default folder or click **Change** to browse to the folder you want to use. Click **Next**.
10. Click **Install**. Windows may prompt you to allow the installer to make changes to your computer. Click **Yes**.
11. In the Setup Wizard, click **Finish**.

Note: To open Connection Manager automatically after installation, check **Start the MultiTech Connection Manager when the installation is finished**.

If using a USB device, you can connect the device to the carrier's network with Connection Manager. See [Connecting a Device](#).

If using a serial device, you need to set up the device in Windows Device Manager before connecting the device. See [Setting Up a Serial Device in Windows Device Manager](#).

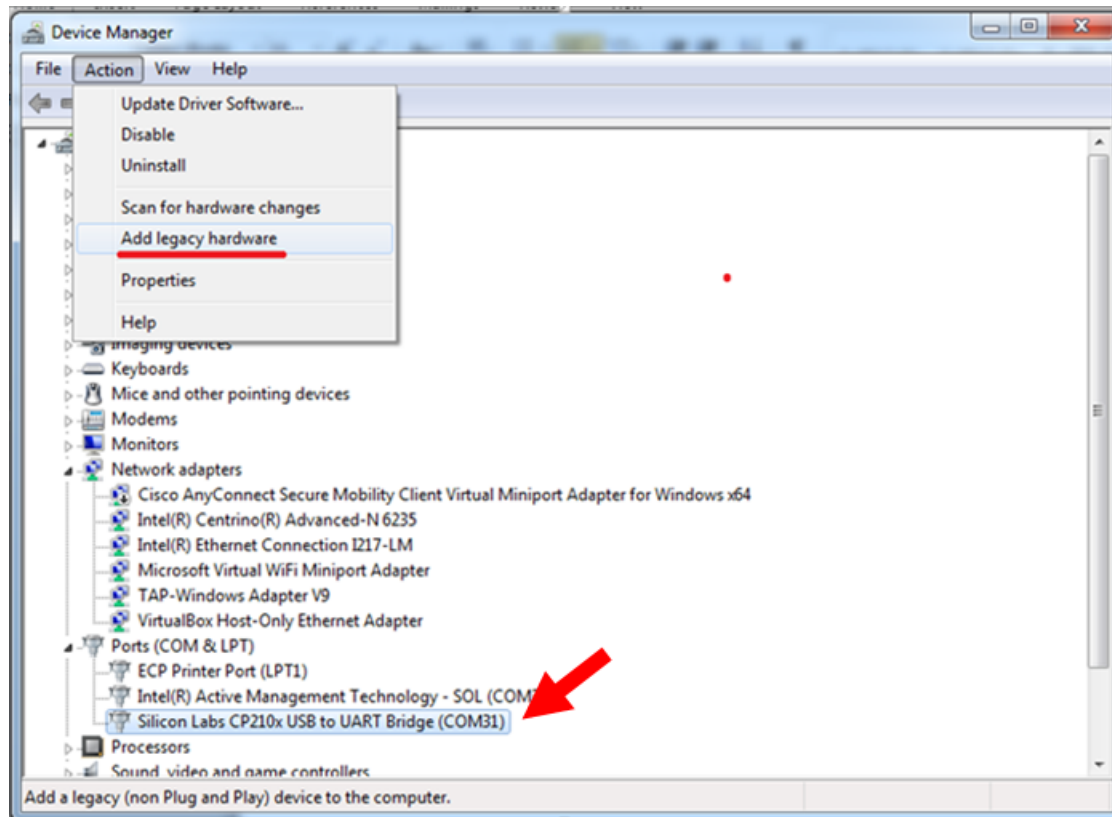
Setting Up a Serial Device in Windows Device Manager

To set up the device in Windows Device Manager:

1. Make sure that your desired COM port for the serial device is available.
2. Connect the serial device to the PC.
3. Go to **Control Panel > Device Manager**. Make a note of the COM port number for the connected device (in **COM Ports**).

Example: The COM port is **COM31**.

4. Go to **Action > Add legacy hardware**.



5. In the **Add Hardware Wizard**:

- a. Click **Next**.
- b. Select **Install the hardware that I manually select from a list**, then click **Next**.
- c. Select **Modems**, then click **Next**.
- d. Check **Don't detect my modem; I will select it from a list**, then click **Next**.
- e. Select **Standard Modem Types**, then select **Standard 33600 bps Modem** on the right.

Important: Make sure that you select *only* **Standard 33600 bps Modem**. Selecting another model may cause your device to work incorrectly or fail.

- f. Select your COM port, then click **Next**.
- g. Click **Finish**.
- h. Go to **Device Manager > Modems** and confirm that the device is added.

6. To verify that the device is set up correctly, query the device:

- a. Go to **Device Manager > Modems**, right-click **Standard 33600 bps Modem**, and select **Properties**.
- b. On the **Diagnostics** tab, click **Query Modem**.

Note: The device cannot be queried if the Connection Manager is running and using the device's port.

If the device is ready, diagnostic information from the device appears in the box above.

To connect the device to your carrier's network, see [Connecting a Device](#).

Connecting a Device

Prerequisite:

- Make sure that your device is connected to the computer where Connection Manager is installed.
- If you have a serial device, set up the device in Device Manager. See [Setting Up a Serial Device in Windows Device Manager](#).

To connect your device to the carrier's network:

1. Open Connection Manager.

Connection Manager automatically detects the connected device, and the **Detect** button on the **Main** tab changes to **Connect**. If the application cannot detect the device automatically, click **Detect** to initiate device detection manually.

2. If you are connecting the device to this computer for the first time, on the **Connection** dialog box, provide values for the connection settings, such as the dial number and access point name (APN).

You may need to ask the carrier for these settings.

- a. To monitor Internet connectivity, have Connection Monitor send periodic pings to a host, check **Enable keep-alive** and enter the IP address or host name to ping in the **Host to ping** box.

For example, you can enter the host name google.com or IP address **8.8.8.8**.

If the keep-alive check fails, Connection Manager automatically reconnects. When the keep-alive feature is enabled, the Connection Manager's **Main** tab displays the keep-alive check status and when the last ping response was received.

- b. If your device supports dual carriers, switch the firmware to the desired carrier by selecting the carrier in the **MNO Firmware** list.

For example, if your device can switch the firmware between AT&T and Verizon, select **Verizon** in the list.

Note:

- The **MNO Firmware** list doesn't appear if your device doesn't support carrier firmware switching.
- When you change the carrier firmware, the modem automatically restarts to apply the selected firmware.

- c. To save the settings, click **Apply**.

You can change the connection settings on the **Connection** tab. The **Dial number**, **APN**, **User name**, and **Password** cannot be changed after the device is connected.

3. On the **Settings** tab, select **USB Modem** or **Serial Modem** depending on whether you are connecting a USB or serial device.
4. If you are connecting a serial device, provide the serial settings on the **Settings** tab:
 - a. In the **Modem type** list, select the appropriate modem type.

- b. For the other settings, provide the values that match the serial-port settings for the device in Device Manager.

For **Port**, expand **Ports** and notice the COM port number next to the device name. Right-click the device name, select **Properties**, and find the values for the other settings on the **Port Settings** tab.

- c. To save the settings, click **Apply**.

Note:

- Settings displayed for a USB device on the **Settings** tab are determined automatically and cannot be changed.
- To set the application to run during Windows startup, check **Run application at Windows startup**.
- To automatically connect to the Internet, check **Connect to the Internet automatically**.

Selecting **Run application at Windows startup** and **Connect to the Internet automatically** is useful in scenarios where Connection Manager is running on a remote computer. If a power failure occurs on the computer, these settings ensure the application will restart and reconnect to the Internet when power is restored.

5. On the **Main** tab, click **Connect**.

When a connection is established, the **Main** tab displays the download and upload speeds, the amount of traffic sent and received, **Connected** status, and the signal strength percentage and bars. The statistics on connection speeds and traffic are available only during a current connection session.

Note:

- For serial modems, the signal strength is available only when the device is *not* connected to the carrier's network. When connection to the network is established, the last signal strength value is displayed.
- View the details for the current connection on the **Details** tab.

To disconnect the device from the carrier's network, click **Disconnect**.

Important: Disconnect the device in Connection Manager before disconnecting a device from the computer.

Uninstalling Connection Manager

Prerequisite:

Make sure that Connection Manager is not running.

Along with uninstalling Connection Manager, the installed device drivers are also removed.

To uninstall Connection Manager:

1. In Windows, go to **Control Panel > Programs > Programs and Features**.
2. Right-click **MultiTech Connection Manager** and select **Uninstall**.
3. Click **Yes** to confirm that you want to uninstall Connection Manager.

The native Windows WWAN AutoConfig service is automatically enabled.

4. When the message "Are you sure you want to uninstall this product?" appears, click **Yes**.

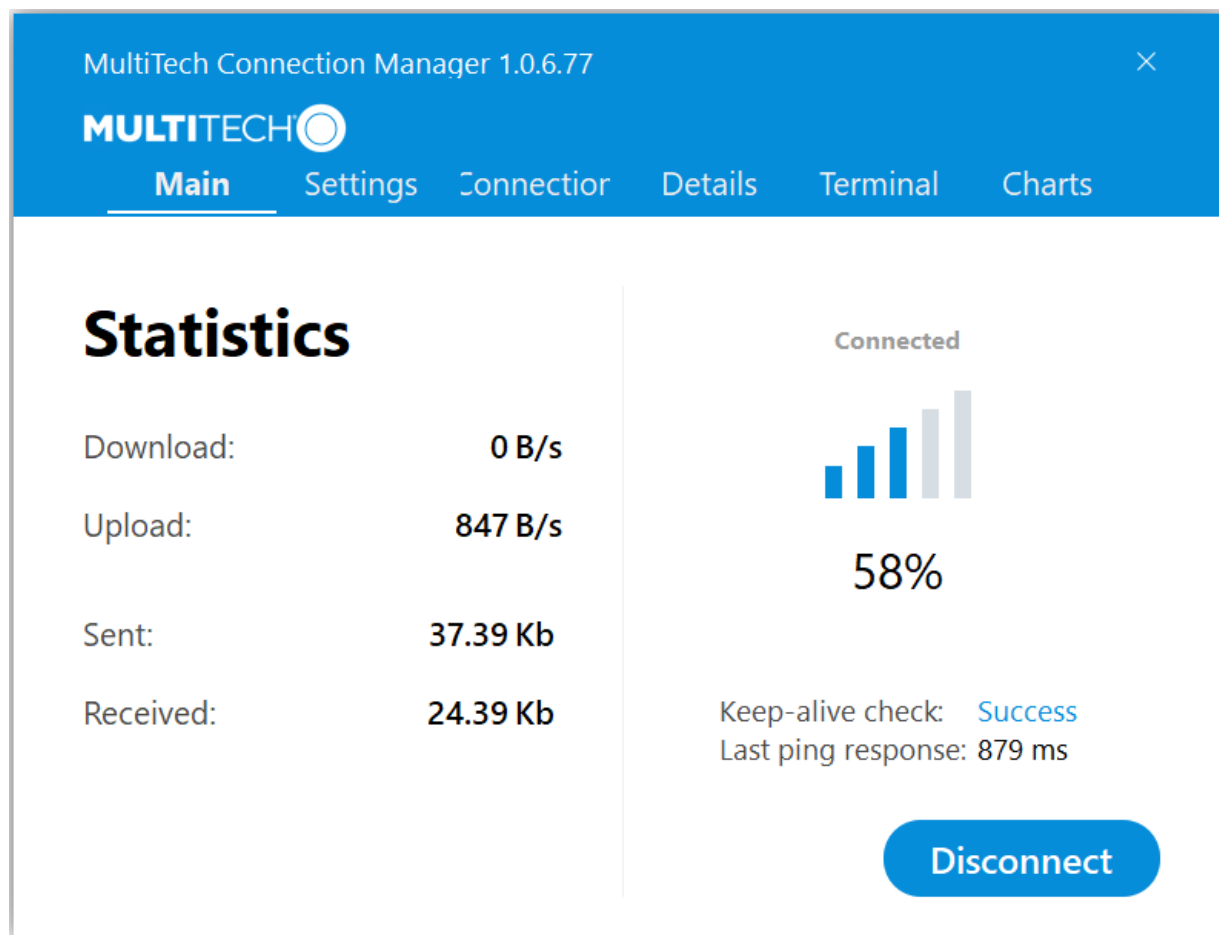
Connection Manager and the installed drivers are removed from the computer.

Note: The steps above describe how to uninstall Connection Manager using Control Panel. You can also uninstall the application by using the installer file (.msi). Double-click the file, in the MultiTech Connection Manager Setup Wizard, click **Next**, and then select **Remove** on the next two pages.

Connection Manager User Interface

Connection Manager consists of the following tabs:

- Main
- Settings
- Connection
- Details
- Terminal
- Charts



Main tab

The **Main** tab displays the following:

- Status of device connection: Searching, Connecting, Connected, Disconnecting, or Disconnected
- The action button, which changes according to the current device connection status: **Detect**, **Connect**, or **Disconnect**
- Signal strength bars and percentage indicator (only when connection to the carrier's network is established)
Note: The signal strength is displayed for a serial device only when the device is not connected to the carrier's network.
- Connection statistics: download and upload speeds, amount of traffic sent and received (only when connection to the carrier's network is established)
- The keep-alive check status and when the last ping response was received if **Enable keep-alive check** is checked on the **Connection** tab

Settings tab

Use the **Settings** tab to specify the type of device: **USB Modem** or **Serial Modem**.

- If **USB Modem** is selected, the tab displays USB settings. These settings cannot be edited.
- If **Serial Modem** is selected, the tab displays the serial settings that match the serial-port settings for the device. You can edit these settings.

The **Settings** tab also contains the **Run application at Windows startup** and **Connect to the Internet automatically** options.

- Check **Run application at Windows startup** to open Connection Manager when Windows starts.
- Check **Connect to the Internet automatically** to set Connection Manager to connect to the carrier's network automatically each time the application opens.

Connection tab

The **Connection** tab displays the following:

- The carrier-provided connection settings.
- The **Enable keep-alive check** box. Check this box to monitor connectivity to the Internet. Check **Enable keep-alive check** and enter the IP address or host name to ping in the **Host to ping** box. Connection Monitor will send periodic pings to the host. If the keep-alive feature fails, Connection Manager will automatically reconnect.
- The **MNO firmware** list. If your device supports dual carriers, you can switch the firmware to the other carrier by selecting the carrier in this list.

Note: The **Connection** tab isn't available if Connection Manager doesn't detect a device.

Details tab

The **Details** tab displays the modem details when a device is detected and the connection details when a connection is established.

Terminal tab

The **Terminal** tab contains a terminal window to communicate with the connected device by entering AT commands. For details, see the AT Commands reference guide for your device.

Note: When a serial device is connected to the carrier's network, the terminal window isn't available.

Charts tab

The **Charts** tab contains line charts that graphically represent signal strength and download and upload speeds for the two-hour interval.

Troubleshooting

Serial COM port is not available in the Serial Modem Settings

Close Connection Manager and reopen it.

Device is not detected ("No Device")

After following the steps to activate your device, the **Main** tab still indicates "No Device."

Try the following steps:

1. Click the **Settings** tab and make sure that the appropriate modem type is selected: USB or Serial.
2. If you are connecting a serial device, make sure that all serial modem settings correspond to the serial modem and serial port configuration.
3. Restart Connection Manager.
4. Disconnect and reconnect the device.

USB Modem is not detected

1. Check the LS LED and Power LED (if available) on the device.
If they are not continuously lit, then the problem is with the power supply. Check the cable and connections.
If the LS LED is not blinking, then the problem is with the power supply. Check the cable and connections.
2. USB device: Make sure that the device is connected to the PC and that the correct USB cable is in use.

Connection Manager is not working, and a device connected to the computer is not detected

Connection Manager cannot detect a connected device because the required drivers are not installed. The most likely cause is that **Install the modem drivers** was not checked during the installation.

Uninstall and reinstall Connection Manager. During the installation, make sure that you check **Install the modem driver**. See [Uninstalling Connection Manager](#) and [Installing Connection Manager](#).

Connection Manager displays "Device Error" status for a serial device

This error has the following causes and solutions.

Cause	Solution
Connection Manager cannot open the COM port that the device was installed on because the port is being used by another program.	If possible, free up the COM port for the device.
The wrong COM port is specified for the device on the Settings tab.	On the Settings tab, select the COM port that matches the port that the device is installed on and click Apply . You can look up the port in Device Manager in Windows. In Device Manager, expand Modems , right-click the name of your device, and select Properties . Note the port on the Modem tab.

System Cannot Connect to Serial Device

If your system cannot establish a connection with a serial device, verify Connection Manager settings match modem and serial port settings on the computer.

In **Connection Manager**, click the **Settings** tab.

The screenshot shows the 'Settings' tab of the MultiTech Connection Manager 2.2.0.4 application. The window has a blue header with the title and a close button. Below the header is a navigation bar with tabs: Main, Settings (selected), Connection, Details, Terminal, and Charts. The main content area has two radio buttons: 'USB Modem' and 'Serial Modem' (which is selected). Below these are two columns of settings, each with a label and a dropdown menu. The left column contains 'Port:' (COM10), 'Bits per second:' (115200), and 'Data bits:' (8). The right column contains 'Parity:' (None), 'Stop bits:' (1), and 'Flow control:' (None). At the bottom left, there are two checkboxes: 'Run application at Windows startup' and 'Connect to the Internet automatically'. At the bottom right, there is a blue 'Apply' button.

MultiTech Connection Manager 2.2.0.4

MULTITECH

Main Settings Connection Details Terminal Charts

☐ USB Modem ☒ Serial Modem

Port: COM10

Parity: None

Bits per second: 115200

Stop bits: 1

Data bits: 8

Flow control: None

☐ Run application at Windows startup

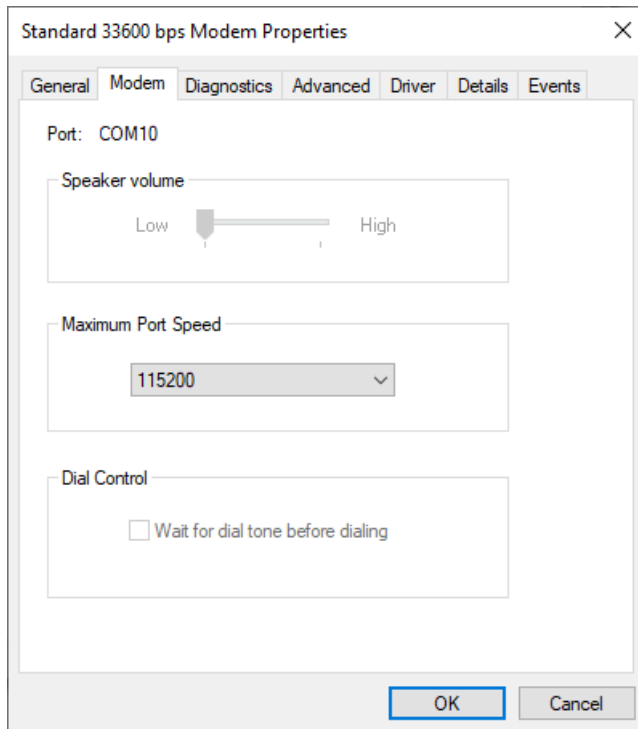
☐ Connect to the Internet automatically

Apply

In **Device Manager**, open **Modems** and then right-click on your device and select open the **Properties**.

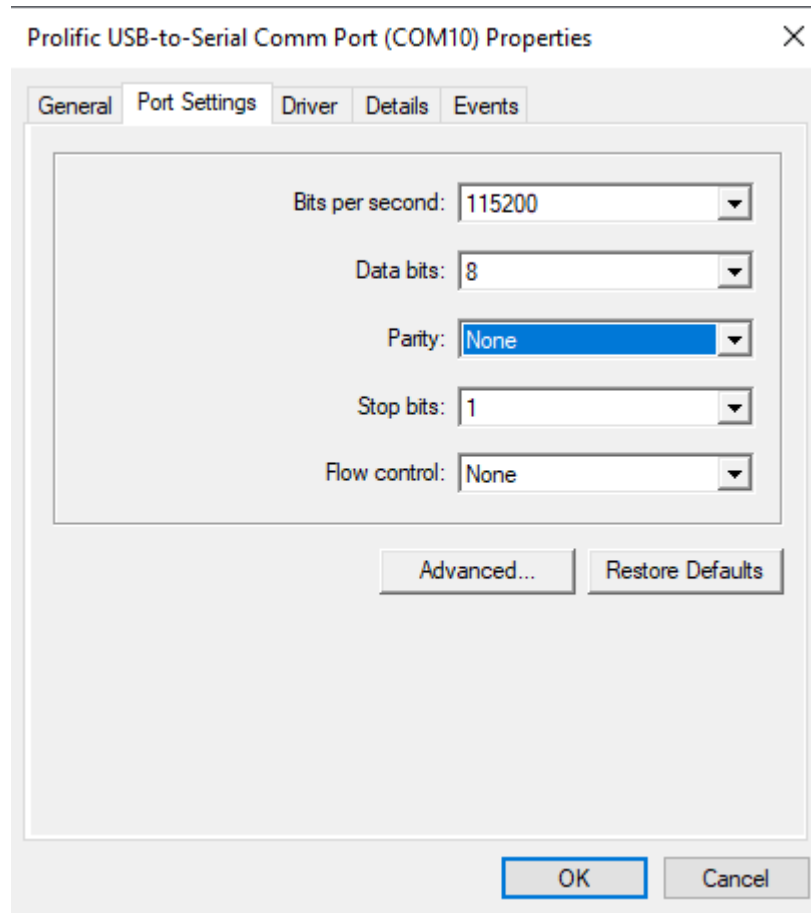
Note: If Modems and Ports don't appear in Device Manager, open the **View** Menu and select **Show hidden devices**.

Click the **Modem** tab to confirm the **Maximum Port Speed** matches Bits per second setting in Connection Manager.



In **Device Manager**, open **Ports (COM & LPT)** and then right-click on the Com Port used by your device and select **Properties**.

Click the Port Settings tab to confirm the **Bits per second**, **Data bits**, **Parity**, **Stop bits** and **Flow control** match those settings in Connection Manager.



Warranty

To read the warranty statement for your product, go to <https://www.multitech.com/warranty>.

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Revision History

Revision Number	Description	Revision Date
1.3	Updated information on how to power down the device and functions of the device reset pin.	March 2025
1.2	Updated the power requirements in the specifications table.	November 2024
1.1	Added Carrier Specific Notice, Firmware Over the Air (FOTA).	July 2024
1.0	Original publication.	February 2021