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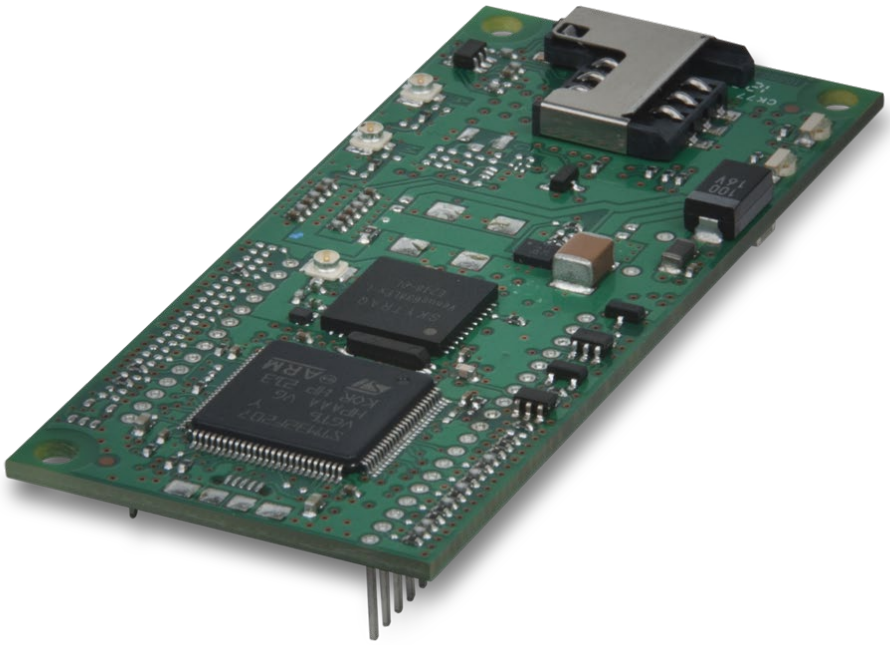

SocketModem® Cell HSPA+
SocketModem® iCell HSPA+

MTSMC-H5 Device Guide

SocketModem Cell HSPA+ and SocketModem iCell HSPA+ MTSMC-H5 Device Guide

S000540, Version J
MTSMC-H5-xx, MTSMC-H5-U-xx, MTSMC-H5-IP-xx, MTSMC-H5-GP-xx, MTSCMC-H5-MI-IP-xx, MTSMC-H5-MI-GP

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Warranty

To read the warranty statement for your product, please visit: http://www.multitech.com/warranty.go.

Contents

Chapter 1 – Device Overview

Description

The SocketModem Cell and iCell HSPA+ models are complete, ready-to-integrate communications devices that offer standards-based HSPA+ 21 performance. These quick-to-market communications devices allow developers to add wireless communication and GPS tracking to products with a minimum of development time and expense. Both models are based on industry-standard open interfaces and use MultiTech's Universal Socket design. The SocketModem iCell features the intelligence of the embedded Universal IP stack, which allows for automatic/persistent connectivity for mission critical applications and enhanced M2M functionality.

Product Build Options

Product	Description
MTSMC-H5-MI-GP	Global HSPA+ 21M - Data Only, MTS GPS, Serial, USB, GPIO, Universal IP
MTSMC-H5-MI-IP	Global HSPA+ 21M - Data Only, Serial, USB, GPIO, Universal IP
MTSMC-H5-GP	Global HSPA+ 21M - Data Only, MTS GPS, Serial, Universal IP
MTSMC-H5-IP	Global HSPA+ 21M - Data Only, Serial, Universal IP
MTSMC-H5 (RED compliant)	Global HSPA+ 21M - Data Only, Serial
MTSMC-H5-U (RED compliant)	Global HSPA+ 21M - Data Only, USB
MTSMI-UDK	Universal Developer Kit

Notes:

- These units ship without network activation. To connect them to the cellular network, you need a cellular account. For more information, refer to Account Activation for Cellular Devices in the Universal Socket Developer's Guide.
- GP devices have a dedicated GPS receiver.
- MI devices have multiple interfaces.
- The complete product code may end in **.Rx**. For example, MTSMC-H5.Rx, where R is revision and x is the revision number.
- All builds can be ordered individually or in 50-packs.

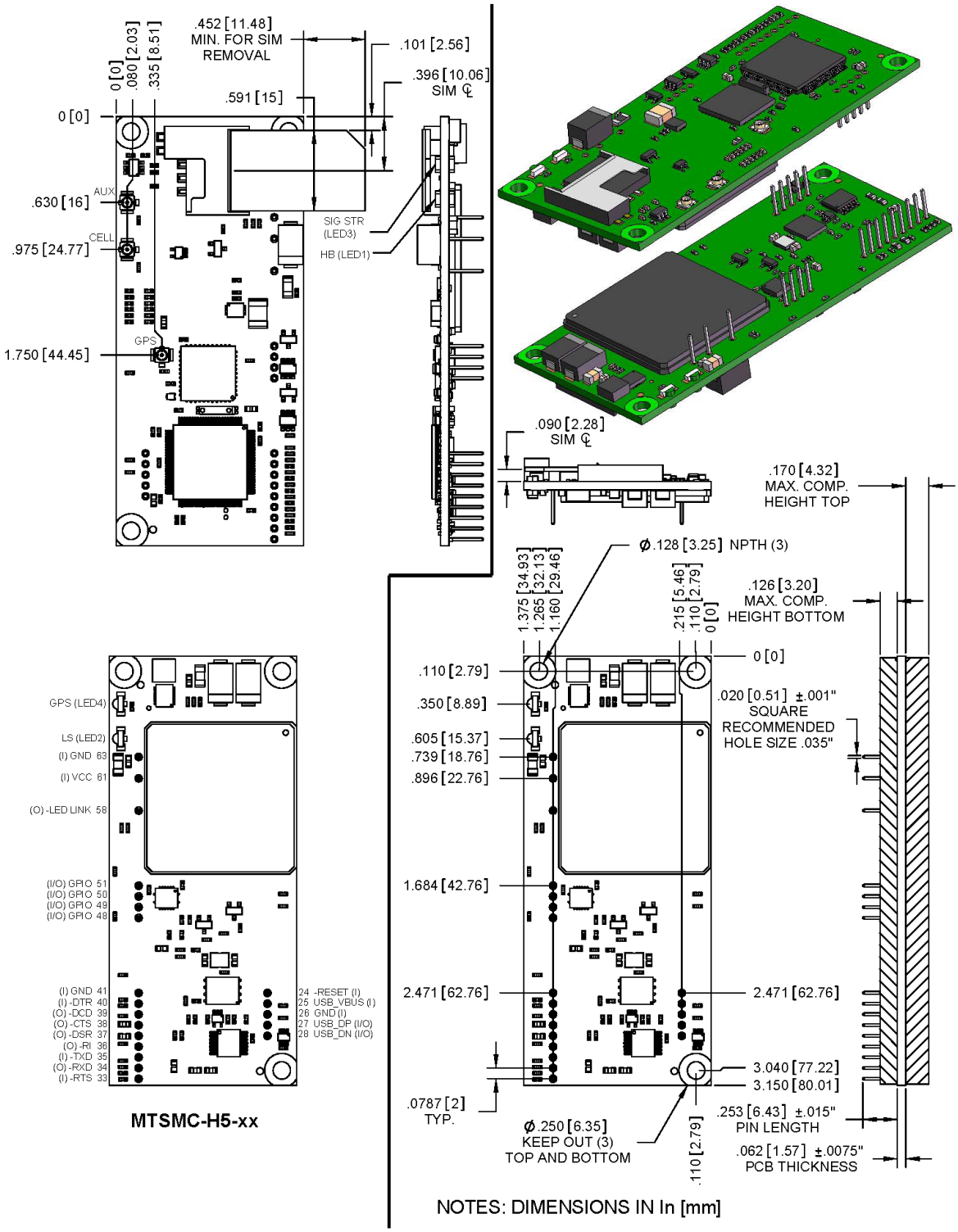
Documentation

The following documentation is available by email to oemsales@multitech.com or by using the Developer Guide Request Form on the multitech.com

- **Device Guide** – This document. Provides model-specific specifications and developer information.
- **Universal Socket Developer Guide** – Provides an overview, safety and regulatory information, design considerations, schematics, and general device information. (S000342)
- **USB Driver Installation Guide for H5 and G3 Devices** – Provides steps for installing USB drivers. (S000533)
- **AT Command Guide** – Use the following AT Command Guides with HSPA devices:
  - S000574 for H5-xx.R1 Modems
  - 80378ST10091A Rev 9 Telit 3G Modules AT Commands Guide for H5-xx.R2 Modems
  - S000528 for H5-xx Modems (not .R1 or .R2)
    S000457 Universal IP Commands

Chapter 2 – Mechanical Drawing

MTSMC-H5 All Builds



Chapter 3 – Specifications

Technical Specifications

Category	Description
General	
Standards	Penta-band HSPA+ 21 Quad-band GSM/GPRS/EDGE SMS is based on CS/Packet-Switched (PS) domain of GSM and WCDMA USB Interface is CDC-ACM compliant
Frequency Bands	Refer to the following Frequency Bands table for details.
Speed	
Data Speed	HSPA+: Up to 21.0 Mbps downlink/5.76 Mbps uplink EDGE: Up to 296 Kbps downlink/236.8 Kbps uplink GPRS: Up to 107 Kbps downlink/85.6 Kbps uplink
Interface, Ports	
USB Interface	MI builds: USB 2.0 full speed High speed on other builds: 480 Mbps
Serial Modem Interface	Up to 921.6 Kbps
Ports	GPIO ports – MI builds only
Physical Description	
Weight	0.4 oz. (10g)
Dimensions	Refer to mechanical drawing for details.
Connectors	
Antenna Connector	3 surface mount UFL: main cellular, GPS, Auxiliary (for diversity)
SIM Holder	Standard 1.8V and 3V.
Environment	
Operating Temperature	-40° C to +85° C
Storage Temperature	-40° C to +85° C
Humidity	20%-90% RH, non-condensing
Power Requirements	
Operating Voltage	3.3V - 5V (+/- 10%)
IP, M2M, SMS	
Supported IP Protocols	DNS resolve, FTP client, Ping, POP3 client, PPP (dialout), SMTP client, TCP RAW client & server
M2M Applications	Universal IP models: Automatic connect/reconnect, device monitor, modem emulation, Ping & TCP keep alive, wake-up on caller ID, wake-up on ring, GPS tracking (GP model only)
SMS	Point-to-Point messaging Mobile-Terminated SMS Mobile-Originated SMS

Category	Description
Certifications, Compliance, Warranty	
EMC Compliance	FCC Part 15 Class B FCC Part 15.31 (Co-location) EN55022 Class B EN55024
Radio Compliance	FCC Part 22 FCC Part 24 RSS 132 RSS 133 EN 301 511 EN 301 489-1 EN 301 489-52 CE RED Radio/SAR
Safety Compliance	UL 60950-1 cUL 60950-1 EN 60950-1 AS/NZS 60950-1
Network Compliance	PTCRB AT&T
Warranty	Two years

Notes:

- Radio performance may be affected by temperature extremes. This is normal. The radio is designed to automatically fallback in class and reduces transmitter power to avoid damage to the radio. When this occurs depends on the interaction of several factors, such as ambient temperature, operating mode, and transmit power.

Frequency Bands

Mode	Freq. TX (MHz)	Freq. RX (MHz)	Channels	TX - RX offset
GSM850	824.2- 848.8	869.2 - 893.8	128 - 251	45 MHz
EGSM900	890.0 - 914.8	935.0 - 959.8	0 - 124	45 MHz
	880.2 - 889.8	925.2 - 934.8	975 - 1023	45 MHz
DCS1800	1710.2 - 1784.8	1805.2 - 1879.8	512 - 885	95MHz
PCS1900	1850.2 - 1909.8	1930.2 - 1989.8	512 - 810	80MHz
WCDMA850 (band V)	826.4 - 846.6	871.4 - 891.6	Tx: 4132 - 4233 Rx: 4357 - 4458	45MHz
WCDMA900 (band VIII)	882.4 - 912.6	927.4 - 957.6	Tx: 2712 - 2863 Rx: 2937 - 3088	45MHz
WCDMA1700 (band IV)	1710.4 - 1755.6	2112.4 - 2167.6	Tx: 1312 - 1513 Rx: 9662 - 9938	400MHz
WCDMA1900 (band II)	1852.4 - 1907.6	1932.4 - 1987.6	Tx: 9262 - 9538 Rx: 9662 - 9938	80MHz
WCDMA2100 (band I)	1922.4 - 1977.6	2112.4 - 2167.6	Tx: 9612 - 9888 Rx: 10562 - 10838	190MHz

HE910 Telit Transmission Output Power

Band	Power Class
GSM 850/900 MHz	4 (2W)
DCS 1800, PCS 1900 MHz	1 (1W)
EDGE, 850/900 MHz	E2 (0.5W)
EDGE, 1800/1900 MHz	Class E2 (0.4W)
WCDMA 850/900, AWS 1700, 1900/2100 MHz	Class 3 (0.25W)

Mounting Hardware

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

Recommended Parts

Manufacturer	Part	Part Number
PEM PennEngineering	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

Device Reset

The SocketModem is ready to accept commands after a fixed amount of time (“X” Time) after power-on or reset.

Model	Time Constant	"X" Time	Minimum Reset Pulse[1]	Maximum Reset Pulse
MTSMC-H5	250 ms	10 seconds	200 µs	Less than 1 second

[1]The SocketModem may respond to a shorter reset pulse.

Powering Down Your Device

CAUTION: Failing to properly shutdown 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#SHDN command.
2. Wait 30 seconds.
3. Power off the device. Disconnect power from the device.

Serial Signal DC Electrical Characteristics

Units: Volts

Applies to the following pins:

Pin	Signal Name	Pin	Signal Name
J33	-RTS	J37	-DSR
J34	-RXD	J38	-CTS
J35	-TXD	J39	-DCD
J36	-RI	J40	-DTR

Parameter	Minimum	Maximum
3.3 Volt Powered		
Input Low Level	0	0.55
Input High Level	1.5	3.3
Output Low Level	0	0.55
Output High Level	2.35	3.3
5 Volt Powered		
Input Low Level	0	0.8
Input High Level	2.3	5
Output Low Level	0	0.55
Output High Level	3.7	5

Absolute Maximum Rating

All models can run with an input voltage of either 3.3V or 5V. The maximum voltage on any signal pin equals the input voltage.

Electrical Characteristics Other Pins

Pin	Signal Name	VIL		VIH		VOL		VOH	
		Min	Max	Min	Max	Min	Max	Min	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	--	--	--	--	--	--	--	--
J48	GPIO0	-0.3	0.8	2.0	5.5		0.4	2.9	
Pin	**Signal Name**	**VIL**		**VIH**		**VOL**		**VOH**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
J49	GPIO1	-0.3	0.8	2.0	5.5		0.4	2.9	
J50	GPIO2	-0.3	0.8	2.0	5.5		0.4	2.9	
J51	GPIO3	-0.3	0.8	2.0	5.5		0.4	2.9	
J58	-LED LINK	--	--	--	--	0	0.45	2.85	3.3
J61	VCC	--	--	--	--	--	--	--	--
J63	GND	--	--	--	--	--	--	--	--

Pinout Specifications

Pin	Signal Name	Logic Level Voltage[1]	I/O	Description
J24	–RESET	3.3 – 5.0	I	Device reset (active low)
J25	VUSB	4.4 – 5.25	I	USB power supply input
J26	GND	GND	GND	Ground
J27	USB DP	3.3	I/O	USB data
J28	USB DN	3.3	I/O	USB data
J33	–RTS	5.0	I	Request to send (active low)
J34	–RXD	5.0	O	Received data (active low)
J35	–TXD	5.0	I	Transmitted data (active low)
J36	–RI	5.0	O	Ring indicator (active low)
J37	–DSR	5.0	O	Data set ready (active low)
J38	–CTS	5.0	O	Clear to send (active low)
J39	–DCD	5.0	O	Data carrier detect (active low)
J40	–DTR	5.0	I	Data terminal ready (active low)
J41	GND	GND	GND	Ground
J48	GPIO0	3.3	I/O	User configurable general purpose I/O
J49	GPIO1	3.3	I/O	User configurable general purpose I/O
J50	GPIO2	3.3	I/O	User configurable general purpose I/O
J51	GPIO3	3.3	I/O	User configurable general purpose I/O
J58	–LED LINK	3.3	O	Link status (active low, can sink up to 150mA)
J61	VCC	5.0	PWR	DC input power
J63	GND	GND	GND	Ground

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

Pin 58

Note: Pin 58 may or may not be available on some SocketModems.

Pin 58 LED Mode	Operating Status
OFF	Device is off
Slow blink	Registered full service
ON	Net search or not registered, or in the process of turning off

VUSB

The VUSB pin is the USB power input. This pin tells the modem that the USB bus exists. Its input range is 4.4-5.25V.

To use the power saving mode, pull VUSB to LOW.

Pin Availability by Build

Pin and Function	H5	H5-GP	H5-IP	H5-MI-GP
J24 Reset	x	x	x	x
J25 USB_VBUS	x			x
J26 GND	x	x	x	x
J27 USB_DP	x			x
J28 USB_DN	x			x
J33 -RTS	x	x	x	
J34 -RXD	x	x	x	
J35 -TXD	x	x	x	
J36 -RI	x	x	x	
J37 -DSR	x	x	x	
J38 -CTS	x	x	x	
J39 -DCD	x	x	x	
J40 -DTR	x	x	x	
J41 GND	x	x	x	x
J48 GPIO	x			
J49 GPIO	x			
J50 GPIO	x			
J51 GPIO	x			
J58 -LED LINK	x			x
J61 VCC	x	x	x	x
J63 GND	x	x	x	x

Power Measurements

MultiTech recommends that you incorporate a 10% buffer into your power source when determining product load.

MTSMC-H5

Radio Protocol	AT command used to set radio function and power mode	Time (sec) to reduced power from command or DTE signal change	Time (sec) to "ready for data connection" from reduced power	Registered Power Radio Idle, SIM installed and connected to tower
3.3 Volts				
GSM850/HSDPA	AT+CFUN=1	N/A	N/A	30mA
	AT+CFUN=5	Approx. 1 second	Approx. 1 second	17mA
	AT+CFUN=7	Approx. 1 second	Approx. 2 seconds	17mA/30mA
5 Volts				
GSM850/HSDPA	AT+CFUN=1	N/A	N/A	28mA
	AT+CFUN=5	Approx. 1 second	Approx. 1 second	19mA
	AT+CFUN=7	Approx. 1 second	Approx. 2 seconds	17mA/30mA

Radio Protocol	Low Power			Half Power			Max Power		
	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)
3.3 Volts									
GSM850	100mA	28	4.70	104mA	15	13	481mA	0	32.9
HSDPA	286mA	Alternating Bits	N/A	288mA	Active Bits	N/A	610mA	All Up Bits	N/A
5 Volts									
GSM850	72mA	28	4.75	74mA	15	13.02	226mA	0	32.88
HSDPA	162mA	Alternating Bits	N/A	173mA	Active Bits	N/A	397mA	All Up Bits	N/A

Note: This data is measured using an Agilent call box connected to the cellular radio.

Radio Protocol	Instant Peak TX Current (Amps)	Peak Reset Current (InRush) (Amps)	Peak Reset Current (InRush) Duration
3.3 Volts			
GSM850	3.81A	1.82A	3.68ms
HSDPA	700mA	1.82A	3.68ms
5 Volts			
GSM850	1.73A	1.95A	3.12ms
HSDPA	390mA	1.95A	3.12ms

Notes:

- AT+CFUN=1 used to set radio function and power mode.
- **Instant Peak Tx:** The peak current during a GSM850 transmission burst period or HSDPA connection. This current is handled by bulk capacitance in a design.
- **Measured Current:** The continuous current during a Transmit with the radio transmitter at specified power.
- **Inrush Current:** The input current during power up, or a reset.
- **Registered Power:** Registered to tower. Receive active for SMS. No data is sent.

MTSMC-H5-U

Radio Protocol	AT command used to set radio function and power mode	Registered Power Radio Idle, SIM installed and connected to tower
3.3 Volts		
GSM850/HSDPA	AT+CFUN=1	62mA
5 Volts		
GSM850/HSDPA	AT+CFUN=1	46mA

Radio Protocol	Low Power			Half Power			Max Power		
	Measured Current (Amps)	MS Xmit or Power Control Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)	Measured Current (Amps)	MS Xmit or Power Control Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)	Measured Current (Amps)	MS Xmit or Power Control Level	GSM Xmit Powr or HSDPA Ch Power Meas. (avg)
3.3 Volts									
GSM850	126mA	28	4.70	130mA	15	13	492mA	0	32.9
HSDPA	250mA	Alternating bits		294mA	Active bits		672mA	All up bits	
5 Volts									
GSM850	81mA	28	4.75	89mA	15	13.02	231mA	0	32.88
HSDPA	163mA	Alternating bits		192mA	Active bits		416mA	All up bits	

Note: This data is measured using an Agilent call box connected to the cellular radio.

Radio Protocol	Instant Peak TX Current (Amps)	Peak Reset Current (InRush) (Amps)	Peak Reset Current (InRush) Duration
3.3 Volts			
GSM850	3.53A	2.14A	4.80ms
HSDPA	620mA	2.14A	4.80ms
5 Volts			
GSM850	1.48A	2.11A	3.00ms
HSDPA	407mA	2.11A	3.00ms

Notes:

- The USB model does not have sleep mode.
- AT+CFUN=1 used to set radio function and power mode.
- **Instant Peak Tx:** The peak current during a GSM850 transmission burst period or HSDPA connection. This current is handled by bulk capacitance in a design.
- **Measured Current:** The continuous current during a Transmit with the radio transmitter at specified power.
- **Inrush Current:** The input current during power up or a reset.
- **Registered Power:** Registered to tower. Receive active for SMS. No data is sent.

MTSMC-H5-IP

Radio Protocol	AT command used to set radio function and power mode	Radio Registration Data			Radio Idle, SIM installed and connected to tower (Amps)
		Peak Current Amplitude during radio registration (Amps)	Peak Current Pulse Duration during radio registration	Time (sec) to Peak Registration Current Pulse	
3.3 Volts					
GSM850	AT+CFUN=1	2.2A	.720ms	54	0.117mA
HSDPA	AT+CFUN=1	N/A	N/A	N/A	0.115mA
5 Volts					
GSM850	AT+CFUN=1	1.11A	.720ms	54	0.078mA
HSDPA	AT+CFUN=1	N/A	N/A	N/A	0.078mA

Radio Protocol	Low Power			Half Power			Max Power		
	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)
3.3 Volts									
GSM850	0.173mA	28	4	0.178mA	15	12.4	0.566mA	0	31.7
HSDPA	0.262mA	All Down	N/A	0.318mA	Active	N/A	0.804mA	All Up	N/A

Radio Protocol	Low Power			Half Power			Max Power		
	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)
5 Volts									
GSM850	0.114mA	28	4	0.116mA	15	12.4	0.275mA	0	31.7
HSDPA	0.169mA	All Down	N/A	0.211mA	Active	N/A	0.476mA	All Up	N/A

Note: This data is measured using an Agilent call box connected to the cellular radio.

Radio Protocol	Peak Amplitude TX Current (Amps) for GSM850 or Peak Current for HSDPA	Peak Current during power up (InRush Amps)	Peak Current Duration during powerup (InRush duration)	Peak Current during Reset (InRush Amps)	Peak Current Duration during Reset (InRush Duration)
3.3 Volts					
GSM850	3.37A	3.84	2.04ms	3.31A	0.640ms
HSDPA	0.856mA	3.84	2.04ms	N/A	N/A
5 Volts					
GSM850	1.95A	3.78	2.00ms	1.73A	0.560ms
HSDPA	0.536mA	3.78	2.00ms	N/A	N/A

Notes:

- AT+CFUN=1 used to set radio function and power mode.
- **Instant Peak Tx:** The peak current during a GSM850 transmission burst period or HSDPA connection. This current is handled by bulk capacitance in a design.
- **Measured Current:** The continuous current during a Transmit with the radio transmitter at specified power.
- **Inrush Current:** The input current during power up, or a reset.
- **Registered Power:** Registered to tower. Receive active for SMS. No data is sent.

MTSMC-H5-GP

Radio Protocol	AT command used to set radio function and power mode	Radio Registration Data			Radio Idle, SIM installed and connected to tower (Amps)
		Peak Current Amplitude during radio registration (Amps)	Peak Current Pulse Duration during radio registration	Time (sec) to Peak Registration Current Pulse	
3.3 Volts					
GSM850	AT+CFUN=1	2.37A	.760ms	10	0.24mA
HSDPA	AT+CFUN=1	N/A	N/A	N/A	0.241mA
5 Volts					
GSM850	AT+CFUN=1	1.2A	.460ms	10	0.155mA
HSDPA	AT+CFUN=1	N/A	N/A	N/A	0.155mA

Radio Protocol	Low Power			Half Power			Max Power		
	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)
3.3 Volts									
GSM850	0.308mA	28	3.5	0.313mA	15	12.1	0.731mA	0	31.9
HSDPA	0.395mA	All Down	N/A	0.457mA	Active	N/A	1.15mA	All Up	N/A
5 Volts									
GSM850	0.197mA	28	3.5	0.198mA	15	12.1	0.358mA	0	31.9
HSDPA	0.249mA	All Down	N/A	0.286mA	Active	N/A	0.678mA	All Up	N/A

Note: This data is measured using an Agilent call box connected to the cellular radio.

Radio Protocol	Peak Amplitude TX Current (Amps) for GSM850 or Peak Current for HSDPA	Peak Current during power up (InRush Amps)	Peak Current Duration during powerup (InRush duration)	Peak Current during Reset (InRush Amps)	Peak Current Duration during Reset (InRush Duration)
3.3 Volts					
GSM850	3.56A	3.96A	2.00ms	2.4A	0.760ms
HSDPA	1.236A	3.96A	2.00ms	2.4A	0.760ms
5 Volts					
GSM850	1.92A	3.96A	1.88ms	1.2A	0.400ms
HSDPA	0.728mA	3.96A	1.88ms	1.2A	0.400ms

Notes:

- AT+CFUN=1 used to set radio function and power mode.
- **Instant Peak Tx:** The peak current during a GSM850 transmission burst period or HSDPA connection. This current is handled by bulk capacitance in a design.
- **Measured Current:** The continuous current during a Transmit with the radio transmitter at specified power.
- **Inrush Current:** The input current during power up, or a reset.
- **Registered Power:** Registered to tower. Receive active for SMS. No data is sent.

MTSMC-H5-MI-IP

Radio Protocol	AT command used to set radio function and power mode	Radio Registration Data			Radio Idle, SIM installed and connected to tower (Amps)
		Peak Current Amplitude during radio registration (Amps)	Peak Current Pulse Duration during radio registration	Time (sec) to Peak Registration Current Pulse	
3.3 Volts					
GSM850	AT+CFUN=1	1.9A	.390ms	32	0.123mA
HSDPA	AT+CFUN=1	N/A	N/A	N/A	0.123mA
5 Volts					
GSM850	AT+CFUN=1	0.911A	.390ms	32	0.081mA
HSDPA	AT+CFUN=1	N/A	N/A	N/A	0.081mA

Radio Protocol	Low Power			Half Power			Max Power		
	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)
3.3 Volts									
GSM850	0.179mA	28	3.8	0.185mA	15	12.4	0.669mA	0	32
HSDPA	0.265mA	All Down	N/A	0.321mA	Active	N/A	0.831mA	All Up	N/A
5 Volts									
GSM850	0.12mA	28	3.8	0.122mA	15	12.4	0.264mA	0	32
HSDPA	0.174mA	All Down	N/A	0.211mA	Active	N/A	0.502mA	All Up	N/A

Note: This data is measured using an Agilent call box connected to the cellular radio.

Radio Protocol	Peak Amplitude TX Current (Amps) for GSM850 or Peak Current for HSDPA	Peak Current during power up (InRush Amps)	Peak Current Duration during powerup (InRush duration)	Peak Current during Reset (InRush Amps)	Peak Current Duration during Reset (InRush Duration)
3.3 Volts					
GSM850	2.33A	2.33	1.41ms	3.31A	0.400ms
HSDPA	0.904mA	2.23	1.41ms	N/A	N/A
5 Volts					
GSM850	1.22A	2.95	1.68ms	1.23A	0.360ms
HSDPA	0.572mA	2.95	1.68ms	N/A	N/A

Notes:

- AT+CFUN=1 used to set radio function and power mode.
- **Instant Peak Tx:** The peak current during a GSM850 transmission burst period or HSDPA connection. This current is handled by bulk capacitance in a design.
- **Measured Current:** The continuous current during a Transmit with the radio transmitter at specified power.
- **Inrush Current:** The input current during power up, or a reset.
- **Registered Power:** Registered to tower. Receive active for SMS. No data is sent.

MTSMC-H5-MI-GP

Radio Protocol	AT command used to set radio function and power mode	Radio Registration Data			Radio Idle, SIM installed and connected to tower (Amps)
		Peak Current Amplitude during radio registration (Amps)	Peak Current Pulse Duration during radio registration	Time (sec) to Peak Registration Current Pulse	
3.3 Volts					
GSM850	AT+CFUN=1	2.37A	.400ms	28	0.238mA
HSDPA	AT+CFUN=1	N/A	N/A	N/A	0.238mA
5 Volts					
GSM850	AT+CFUN=1	1.07A	.400ms	28	0.157mA
HSDPA	AT+CFUN=1	N/A	N/A	N/A	0.156mA

Radio Protocol	Low Power			Half Power			Max Power		
	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)	Measured Current (Amps)	MS Xmit or Power Cntrl Level	GSM Xmit Power or HSDPA Ch Power Meas. (avg)
3.3 Volts									
GSM850	0.295mA	28	3.7	0.3mA	15	12.6	0.862mA	0	31.8
HSDPA	0.386mA	All Down	N/A	0.445mA	Active	N/A	0.945mA	All Up	N/A
5 Volts									
GSM850	0.195mA	28	3.7	0.198mA	15	12.6	0.368mA	0	32.1
HSDPA	0.253mA	All Down	N/A	0.290mA	Active	N/A	0.581mA	All Up	N/A

Note: This data is measured using an Agilent call box connected to the cellular radio.

Radio Protocol	Peak Amplitude TX Current (Amps) for GSM850 or Peak Current for HSDPA	Peak Current during power up (InRush Amps)	Peak Current Duration during powerup (InRush duration)	Peak Current during Reset (InRush Amps)	Peak Current Duration during Reset (InRush Duration)
3.3 Volts					
GSM850	2.500A	2.18A	1.48ms	3.59A	0.400ms
HSDPA	1.036A	2.18A	1.48ms	N/A	N/A
5 Volts					
GSM850	1.560A	2.95A	1.60ms	1.51A	0.400ms
HSDPA	0.656mA	2.95A	1.60ms	N/A	N/A

Notes:

- AT+CFUN=1 used to set radio function and power mode.
- **Instant Peak Tx:** The peak current during a GSM850 transmission burst period or HSDPA connection. This current is handled by bulk capacitance in a design.
- **Measured Current:** The continuous current during a Transmit with the radio transmitter at specified power.
- Inrush Current: The input current during power up, or a reset.
- Registered Power: Registered to tower. Receive active for SMS. No data is sent.

Additional Information for the MTSMC-H5 Serial Device

Mode	Average (mA)	Mode description
IDLE mode (WCDMA)		
AT+CFUN=5	17ma	Full Function with power save
IDLE mode (GSM/EDGE)		
AT+CFUN=1	30ma	Normal mode: full functionality of the module
AT+CFUN=5 Reset hold AT+CFUN=7	17ma 13ma 17-30	Full function with power save. Deep sleep mode. Need to hold unit in reset event until wake up. Disabled TX and RX and AT commands. Full Function w/periodic power save.
Operative mode (WCDMA)		
WCDMA HSPA+ (0dBm)	286	WCDMA data call (Cat 14, TX = 0dBm)
WCDMA HSPA+ (22dBm)	610	WCDMA data call (Cat 14, TX = 22dBm)
Operative mode (EDGE)		
EDGE 4TX+2RX		EDGE Sending data mode
GSM900 PL5	495	
DCS1800 PL0	484	
Operative mode (GSM)		
GPRS 4TX+2RX		GPRS Sending data mode
GSM900 PL5	580	
DCS1800 PL0	438	

Set Phone and Registration Functionality +CFUN

AT+CFUN=[<fun>[,<rst>]]	Sets the functionality level in the ME.
<fun>	Power saving function mode.
0	+CFUN=0 is not operational. The board wakes it.
1	Mobile full functions with power saving disabled. **Default: 1.**
4	Disable both TX and RX.
5	Mobile full functions with power saving enabled.
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.
<rst>	Reset flag.
0	Do not reset the ME before setting it to <fun> function level.
1	Reset the device. The device is fully functional after the reset. This value is available only for <fun> = 1

Notes

- Issuing **AT+CFUN=4[,0]** actually causes the device to perform either a network deregistration or a SIM deactivation.
- Issuing the &W command while in **+CFUN=7** or **+CFUN=9** modes will result in blocking access to the command parser from all interfaces (USB and serial) after a power cycle.
- Enabling power saving reduces power consumption during idle time, thus allowing a longer standby time with a given battery capacity.
  - To place the device in power saving mode, set the **<fun>** parameter to value = 5 and the line **DTR** (RS232) to **OFF**.
  - Once in power saving, the **CTS** line switch to the **OFF** status to signal that the device is really in power saving condition.
  - During the power saving condition, before sending any **AT** command on the serial line, set the **DTR** to **ON** (0V) to exit from power saving and wait for the **CTS** (RS232) line to go in **ON** status.
- Power saving does not affect the network behavior of the device. Even during the power save condition the device remains registered on the network and reachable for incoming calls or SMS. If a call comes in during the power save, the device will wake up and proceed normally with the unsolicited incoming call code.
- When the device detects a connected USB port, the power saving mode is not allowed.
- In CYCLIC SLEEP mode (**AT+CFUN=7**) CTS line toggles slowly, the toggle delay is about 2 seconds.
- In CYCLIC SLEEP mode (**AT+CFUN=7**) during incoming voice call the CTS line continues to toggle.

GSM Power Saving Modes for Serial Devices

The H5 serial devices provide a function that reduces the power consumption when they are in IDLE state (waiting for a call), allowing a longer activity with a given battery capacity. You can configure the power saving function in several modes as needed.

To verify the power saving modes supported by your device, use the AT+CFUN=? command.

AT+CFUN=? +CFUN: (0,1,2,4,5,7,9),(0) OK	Legacy device.
AT+CFUN=? +CFUN: (0,1,2,4,5,7,9),(0, 1) OK	Device supports all modes.
AT+CFUN=? +CFUN: (0,1,4,5,7),(0, 1) OK	Device in the H5 family.

To select the power saving mode for your device, use the following AT Command:

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

Example

Check the current mode:

AT+CFUN?
+CFUN: 1
OK
CFUN = 1, device with full functionality and power saving disabled (factory setting)

RTS Control of Power Mode AT+CFUN=9.

Device in power saving mode, this command forces the module to monitor the RTS control line indicating if the user application (DTE) is ready to receive data from the module (DCE):

- **RTS OFF**: This condition causes the module (DCE) to power down its serial port and stays in CFUN=0 or CFUN=9 mode, in accordance with the entered command.
- **RTS ON:** This condition causes the module (DCE) to power up its serial port and enters CFUN=1 mode (Normal Operative Mode, factory setting).

DTR Control of Power Mode AT+CFUN=5

In CFUN=5 mode, the module monitors the DTR line, indicating if the user application (running on the DTE) is ready to operate:

- **DTR OFF:** The module enters power saving mode (11- 20ma)
- **DTR ON:** The module detects this control line condition and exits power saving mode.

In AT+CFUN=7 mode, the module forces CTS=OFF when it enters power saving mode. After exiting power saving mode, it forces CTS=ON.

CTS control line indicates permission from the DCE for the DTE to send data to the DCE. When the module is not ready to receive data (e.g.: commands) it ties up the CTS line, when it is ready to receive data it ties down the CTS line. The user application can monitor the CTS control line to check if the module is ready for commands, in accordance with V.24 Standard

Notes

- When the module is powered ON the power saving function is disabled (CFUN=1, factory setting) in order to guarantee the data exchange between the H5 device and the user device; for this reason the CFUN mode command should be entered after every power up.
- The protocol implementation of the module requires a delay between consecutive activation of CFUN=1 and CFUN=4 (or vice versa) modes. It is suggested you use a delay of 10 sec.
- The power saving function does not affect the network activity of the module. During the power saving mode the module remains registered on the network and reachable for incoming calls or SMS. If a call comes in during the power saving mode, the module will wake up and proceed normally with the unsolicited incoming call code.
- Assume that the module is in power saving mode. The paging time range is 0.5 - 2.1 sec, depending on DRX time set by network. When the module wakes up from the power saving mode, it takes a maximum of 150 ms before checking the DTR line coming from the DTE. If a command is received during power saving, the module needs at least 0.5-2.1 sec +150 ms to be ready. Use a delay of at least 2250 ms between opening the port (DTR=ON) and sending commands.

Chapter 4 – Safety Notices

User Responsibility

Respect all local regulations for operating your wireless device. Use the security features to block unauthorized use and theft.

Device Maintenance

When maintaining your device:

- A lithium battery (3V, coin cell, CR1632) located within the product provides backup power for the timekeeping. This battery has an estimated life expectancy of ten years.
- 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 and/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 explosion or fire and may result in property damage, severe injury, and/or death.
- Do not expose your device to any extreme environment where the temperature or humidity is high. Such exposure could result in damage to the device or fire.
- Do not expose the device to water, rain, or spilled beverages. It is not waterproof. Exposure to liquids could result in damage to the device.
- Do not place the device alongside computer discs, credit or travel cards, or other magnetic media. The information contained on discs or cards may be affected by the device.
- Using accessories, such as antennas, that MultiTech has not authorized or that are not compliant with MultiTech's accessory specifications may invalidate the warranty.

If the device is not working properly, contact MultiTech Technical Support.

Vehicle Safety

When using your device in a vehicle:

- Do not use this device while driving.
- Respect national 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 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 vehicles or outdoor applications.

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.

- Do not use this device while driving.
- 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.
- Switch OFF your wireless device when in an aircraft. Using portable electronic devices in an aircraft may endanger aircraft operation, disrupt the cellular network, and is illegal. Failing to observe this restriction may lead to suspension or denial of cellular services to the offender, legal action, or both.
- Switch OFF your wireless device when around gasoline or diesel-fuel pumps and before filling your vehicle with fuel.
- Switch OFF your wireless device in hospitals and any other place where medical equipment may be in use.

Interference with Pacemakers and Other Medical Devices

Potential interference

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 the 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).

Notice Regarding Compliance with FCC, EU, and Industry Canada Requirements for RF Exposure

The antenna intended for use with this unit meets the requirements for mobile operating configurations and for fixed mounted operations, as defined in 2.1091 of the FCC rules for satisfying RF exposure compliance. This device also meets the European RF exposure requirements of EN 62311. If an alternate antenna is used, consult user documentation for required antenna specifications.

Compliance of the device with the FCC, EU and IC rules regarding RF Exposure was established and is given with the maximum antenna gain as specified above for a minimum distance of 20 cm between the devices radiating structures (the antenna) and the body of users. Qualification for distances closer than 20 cm (portable operation) would require re-certification.

Wireless devices could generate radiation. Other nearby electronic devices, like microwave ovens, may also generate additional radiation to the user causing a higher level of RF exposure.

Chapter 5 – Regulatory Information

The following is device specific FCC and Industry Canada information. For additional approval and regulatory information, see the Universal Socket Developer Guide.

FCC Part 15

FCC Identifier	RI7HE910
Equipment Class	Part 15 Class Computing Device Peripheral
Notes	WWAN Module
FCC Rule Parts	15B
Approval	Single Modular

FCC Grant Parts 22, 24, and 27

FCC Identifier	RI7HE910
Equipment Class	PCS Licensed Transmitter
Notes	WWAN Module
Approval	Single Modular

FCC Rule Parts	Frequency Range (MHz)	Output Watts	Frequency Tolerance	Emission Designators
22H	824.2 - 824.2	1.995	1.0 PM	300KGXW
22H	824.2 - 848.8	0.997	1.0 PM	300KG7W
22H	826.4 - 846.4	0.446	1.0 PM	4M20F9W
27	1712.4 - 1752.6	0.226	1.0 PM	4M20F9W
24E	1850.2 - 1909.8	0.993	1.0 PM	300KGXW
24E	1850.2 - 1909.8	0.38	1.0 PM	300KG7W
24E	1852.4 - 1907.6	0.243	1.0 PM	4M20F9W

Power listed is conducted. The maximum antenna gain including cable loss for compliance with radiated power limits, RF exposure requirements and the categorical exclusion requirements of 2.1091 is 5.22 dBi for part 22H, 3.31 dBi for part 24E and 6.45 dBi for part 27. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operated in conjunction with any antenna or transmitter not described under this FCC id, except in accordance with FCC multi-transmitter product procedures. The final product operating with this transmitter must include operating instructions and antenna installation instructions, for end-users and installers to satisfy RF exposure compliance requirements. Compliance of this device in all final product configurations is the responsibility of the Grantee. Installation of this device into specific final products may require the submission of a Class II permissive change application containing data pertinent to RF Exposure, spurious emissions, ERP/EIRP, and host/module authentication, or new application if appropriate.

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

Industry Canada

Certification Number/No. de Certification	5131A-HE910
Type of Radio Equipment/Genre de Matériel	Advanced Wireless Services Equipment (1710-1755 MHz and 2110-2155 MHz) Cellular Mobile GSM (824-849 MHz) Modular Approval PCS Mobile (1850-1910 MHz)
Model/Modele	HE910

Specification/ Cahier des Charges	Issue/ Édition	From Frequency/ De Fréquences	To Frequency/ Á Fréquences	Emission Designation/ Designation D'émission	Minimum Power	Maximum Power
RSS133	5.0	1.85 G	1.91 G	241KGXW	993 mW	993 mW
RSS133	5.0	1.852 G	1.908 G	4M09F9W	243 mW	243 mW
RSS132	2.0	824.2 M	848.8 M	248KG7W	997 mW	997 mW
RSS139	2.0	1.712 G	1.753 G	4M06F9W	226 mW	226 mW
RSS133	5.0	1.85 G	1.91 G	252KG7W	380 mW	380 mW
RSS132	2.0	826.4 M	846.4 M	4M07F9W	446 mW	446 mW
RSS132	2.0	824.2 M	848.8 M	240KGXW	1.995 mW	1.995 mW

EMC, Safety, and Radio Equipment Directive (RED) Compliance (H5 and H5-U only)

CE

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 requested at https://support.multitech.com.

Chapter 6 – Carrier Specific Information

Notice for Devices that Use Aeris Radios

One component of your device is a radio. A radio algorithm prevents your device from repeatedly attempting to connect to the network when the radio:

- cannot establish a packet data connection or
- fails to access the application server.

When writing applications for your devices, ensure that your applications do not interfere with the radio's connection retry algorithm. If you fail to do so, Aeris might block network access for your devices.

After your devices reach the end of their commercial lifespan, you must remove them from the Aeris network. To do so, remove power from the devices and remove their antennas. If your devices continue to attempt to register with the network after you cancel device subscriptions, Aeris can bill you for any traffic generated by those devices.

Chapter 7 – Application Notes

LED Interface

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

LED 1 – Heartbeat – IP and –GP Builds Only

LED 1 Signal	Heartbeat LED
OFF	No power to the unit.
Blinking	Power on.

LED 2 – Link Status – All Builds

LED 2 Signal	Link Status LED	
OFF	No power to the unit.	
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.

Note:

For non-IP builds, to ensure that the Link Status LED works properly, issue the following AT Command sequence to the GPIO:

AT#GPIO=1,0,2

AT#SLED=2

LED 3 – Signal Strength –IP and –GP Builds Only

LED 3 Signal	Signal Strength LED	
OFF	No signal.	
		+CSQ
	GSM	99
	HSDPA	99
Blinking	The faster the LED blinks, the stronger the signal.	
	1.5 s flash	**+CSQ**
	GSM	5-10
	HSDPA	4-10
	600ms flash	**+CSQ**
	GSM	11-20
	HSDPA	11-20
	200ms flash	**+CSQ**
	GSM	21-31
	HSDPA	21-31

LED 4 – GPS Status – GP Builds

LED 4 Signal	GPS Status LED	
OFF	No power to the unit.	
ON	Continuously lit	Satellite not acquired.
	Blinking	Satellite acquired.

RF Performances

RF performances are compliant with the ETSI recommendation 05.05 and 11.10. The module's radio transceiver meets the requirements of 3GPP Release 5 & 6. All values indicated are conducted.

Receiver Features

Category	Description
GSM 850 Sensitivity	< -109 dBm
E-GSM 900 Sensitivity	< -106 dBm
DCS 1800 Sensitivity	< -105 dBm
PCS 1900 Sensitivity	< -105 dBm
UMTS Band I 2100 Sensitivity	< -109 dBm
UMTS Band II 1900 Sensitivity	< -108 dBm
UMTS Band V 850 Sensitivity	< -110 dBm
UMTS Band VI 800 Sensitivity	< -110 dBm

Transmitter Features

Category	Description
Maximum output power (GSM 850 / GSM 900)	+32 dBm ± 1 dBm GSMK mode (class 4) +27 dBm ± 1 dBm 8PSK mode (class E2)
Maximum output power (DCS 1800 / PCS 1900)	+29 dBm ± 1 dBm GSMK mode (class 1) +26 dBm ± 1 dBm 8PSK mode (class E2)
Maximum output power (UMTS Band II 1900, V 850, &VI 800)	+23 dBm ± 1 dBm (class 3)
Maximum output power (UMTS Band I 2100)	+23 dBm ± 1 dBm (class 3)

RF Connection and Antenna

The RF connector on the SocketModem is a UFL standard type. See the Universal Socket Developer Guide for antenna details.

Chapter 8 – Using Connection Manager

Use Connection Manager to install device drivers, activate your device on your carrier's network, and connect your device to your carrier's network.

Connection Manager can install drivers and connect your device regardless of your CDMA network, however, activation is only supported with Verizon, Aeris, Sprint, and some CDMA Regional Carriers. If you cannot activate your device with Connection Manager, refer to *Account Activation for Cellular Devices.*

Connection Manager supports the following Windows versions:

- Windows 7 and 8 and Windows 10, both 32-bit and 64-bit versions

Installing Connection Manager and Connecting a Device

Follow these steps in order. Attempting to plug in the device before the appropriate drivers are installed can cause the connection to fail.

1. Go to www.multitech.com/connectionmanager.go.
2. Click **Connection Manager**.
3. Open or unzip the **Connection Manager** file and run the installer (.msi file).
4. If installing a **USB** device, follow the prompts to install the Telit drivers. **Make sure that the Telit drivers are fully installed before plugging in the device.**
5. If installing a serial device, refer to *Setting Up a Serial Device.*
6. Once the drivers are installed, plug in the device and click **Next** in the **Connection Manager** installation window.
7. Open **Connection Manager**.
8. In the Settings tab, select **USB Modem** or **Serial Modem** for your device.
9. If you are connecting a serial device, confirm that the serial settings match those listed for the device under **Device Manager** > **Comm Ports**.
10. If desired, set the application to load during Windows startup and automatically connect to the internet:
    a. Click **Settings** and check the boxes for **Run application at Windows startup** and **Connect to the Internet automatically**.
    b. Click **Apply**.
11. If desired, set Connection Manager to re-connect when a connection is lost:
    a. Click **Connection** and check **Enable keep-alive**.
    b. Enter an address to ping in the **Host to ping** box (for example, 8.8.8.8 which is www.google.com).

    Note: If the keep-alive fails, Connection Manager automatically reconnects. When you start the computer, Connection Manager launches and establishes a connection.
12. In the **Connection** tab, enter the **Dial number** and **APN** if different from the default. The dial number and APN is provided by the carrier for the SIM card.

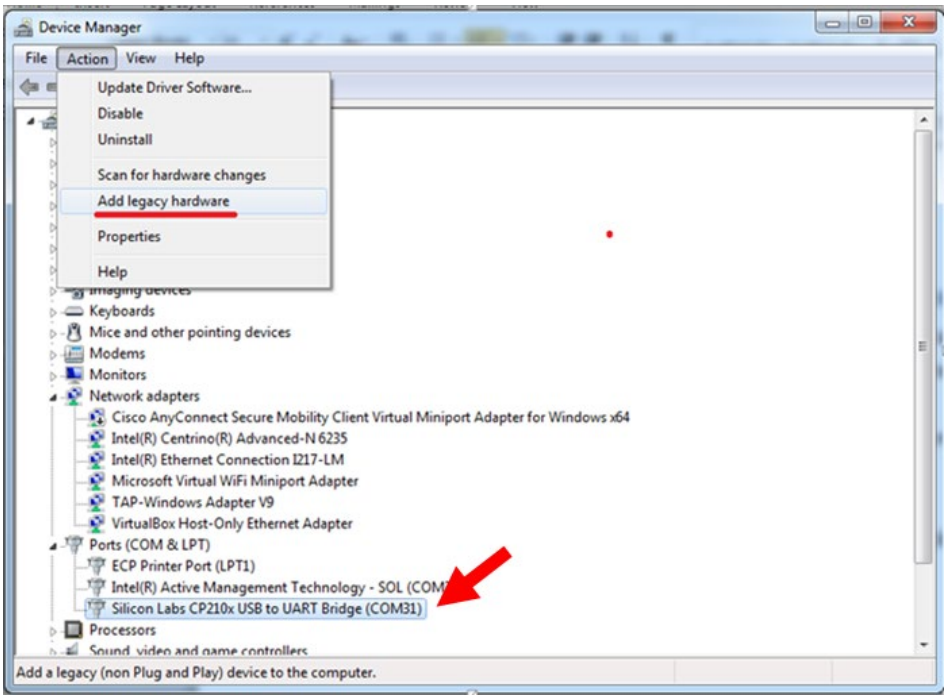
13. Click **Apply** to save settings.
14. Click **Main**, then click **Connect** to start your connection.

    Note: The dial number and APN settings cannot be modified after the device is connected.
15. Browse to a website to confirm the device has Internet access.

Setting Up a Serial Device

1. Connect the serial device to the PC.
2. Navigate to **Control Panel** > **Device Manager**. Make note of the COM port number for the connected device (in COM Ports).

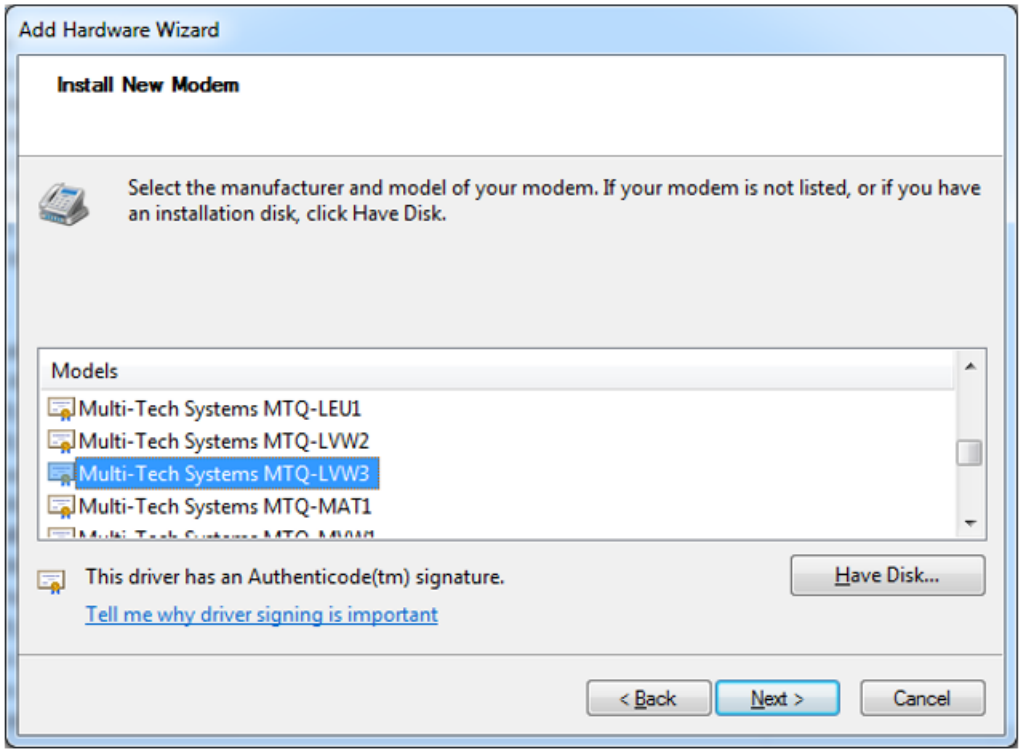
   Example: COM port is **COM31**.
3. In the **Action** drop-down menu, select **Add legacy hardware** to add a new device.



4. Navigate through **Add Hardware Wizard**.
   a. Click **Next** on the Welcome page.
   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 **Have Disk**, then click **Next**.
   f. Click **Browse** and select the installation folder.

      Example: C:\Program Files (x86)\Multi-Tech Systems\Multi-Tech Connection Manager.

   g. The list of available TELIT models appears. Select the model number for your device, then click **Next**.



h. Select the COM port that you noted from COM ports, then click **Next**.

i. Click **Finish** to exit the Wizard.

j. Navigate to **Device Manager** > **Modems** and confirm that the device is added.

Troubleshooting

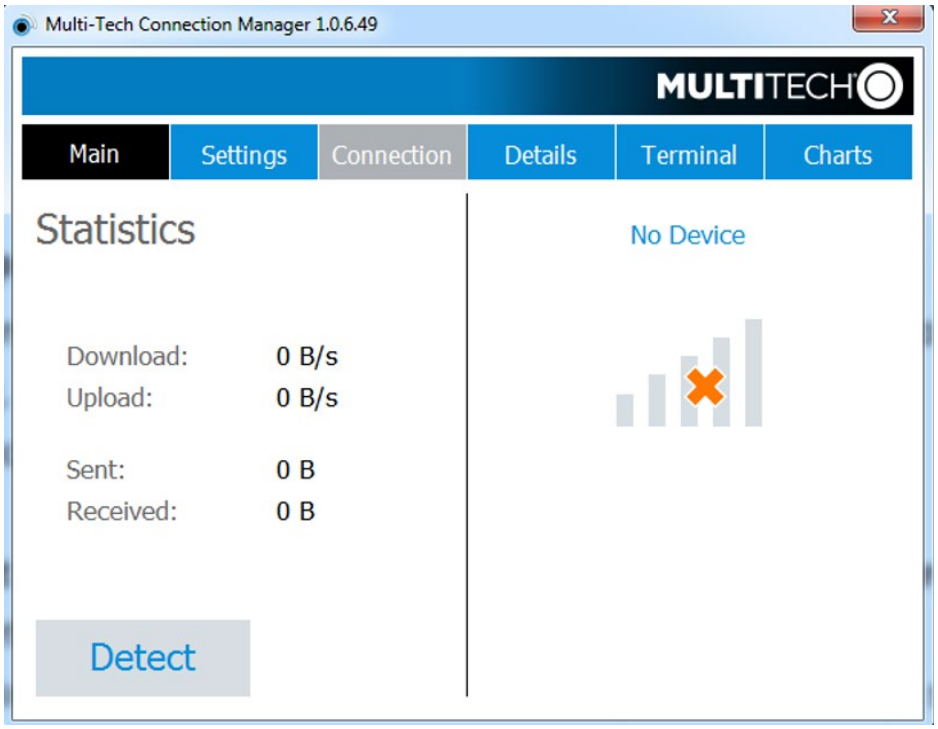
Serial COM port is not available in the Serial Modem Settings

This can happen if the modem was installed while Connection Manager was running.

- Close Connection Manager and reopen it.

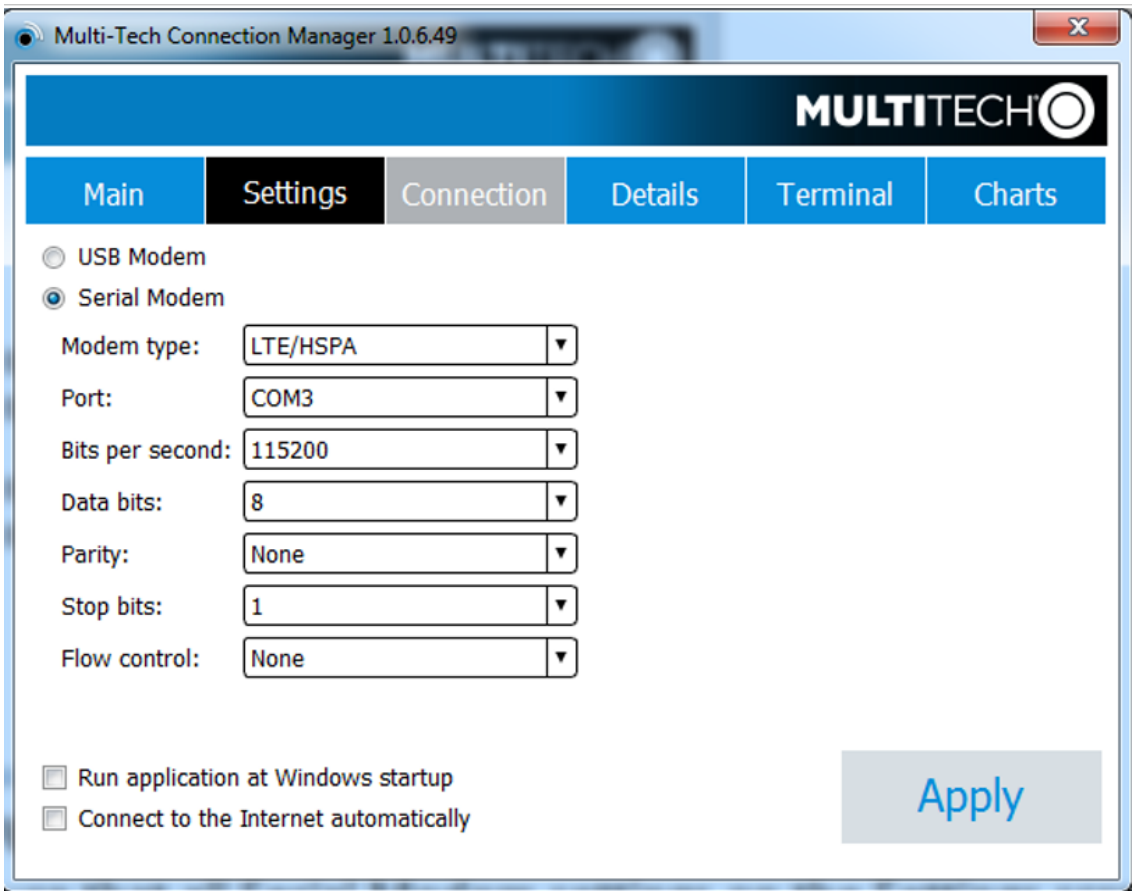
Device is not detected ("No Device")

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 Power and LS LEDs on the device. If they are not continuously lit, 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.