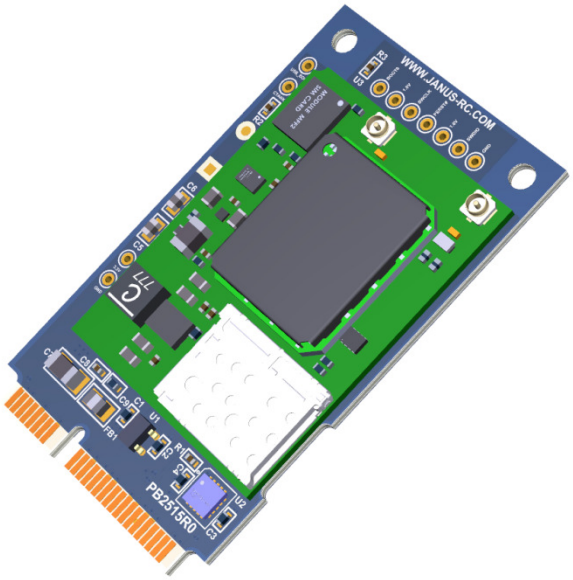
CellBridge LTE310SMT V1.00M mPCIe Card User Manual

Preminiary User Manual

CellBridge™
Global Cellular Modem Solutions



JANUS REMOTE COMMUNICATIONS

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DISCLAIMER

Introduction

The LTE310SMT V1.00M is a Mini PCI Express (mPCIe) card incorporating a cellular modem with LTE-M and NB-IoT cellular connectivity and 2G fallback capability. The modem also incorporates a GNSS receiver with support for GPS, GLONASS, Beidou and Galileo. The product is implemented in a Full-Mini Type-2 form factor.
The mPCIe card uses a Janus Remote Communications LTE310SMT V1.00 modem based on a Telit ME310G1-WW module. More information on the modem is available in reference [1] including basic operating instructions. Note that only the USB communications path is available to the modem. The UART, GPIO, and all other control signals are not available. An on-board microcontroller provides the turn-on signals to the cellular module when power is applied.

USB interface

The modem connects via the USB 2.0 interface on the mPCIe card connector. Many operating systems will support the required modem USB drivers by default. The USB interface will instantiate two modem communication ports, a diagnostic port, and a network interface port.
USB drivers can be found at: https://www.telit.com/evkevb-drivers/

SIM Card

A micro SIM card (4FF size) with an active account associated with a cellular network operator is required.
A 'push-push' (push to lock, push to release) on-board SIM card holder is provided.

Carrier Selection

The LTE310SMT modem has the capability to use firmware for a specific carriers including AT&T centric, Verizon, Worldwide and Australia (Telstra).

The firmware load can be changed by issuing the command:

```
AT#FWSWITCH=<image_number>,1 <cr>
```

where <image_number> is

- 0 for AT&T centric
- 1 for Verizon
- 2 for Worldwide
- 3 for Telstra Australia

The module will automatically reboot with the new firmware image.
Current firmware status can be checked by issuing the command:

```
AT#FWSWITCH? <cr>
```

The response will be #FWSWITCH: <image_number>,n
where <image_number> is as described above.

Note that different SIM cards may be required for operation under the different carrier versions.

Data Operations

Data connections can be achieved using hosted applications (e.g. a PPP connection), or using the internal TCP/IP stack via AT commands.
For information on using the internal TCP/IP internal stack please see references [2] and [3].

Data Contexts:

Data connections require that the carrier's Access Point Name (APN) be properly set in the data contexts using the AT+CGDCONT command. In LTE modules, some contexts may be assigned for the carrier's use. The device may be able to get an APN from the network and auto-attach. In some cases, you may need to set a different APN.
The data contexts can be checked by entering the following command:

```
AT+CGDCONT?<cr>
```

The module will respond with the current data contex settings.
NOTE: A SIM card must be present to read the data contexts.

The default settings for the LTE Cat.M1 modems are as follows:
AT&T centric (#FWSWITCH=0):

```
+CGDCONT: 1,"IPV4V6","","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
+CGDCONT: 2,"IPV4V6","ims","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
+CGDCONT: 3,"IPV4V6","sos","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,1
+CGDCONT: 4,"IPV4V6","attm2mglobal","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
+CGDCONT: 5,"IPV4V6","","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
+CGDCONT: 6,"IPV4V6","","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
```

Context ID 1 is for the user's data connection. It must be set to an appropriate APN.

Verizon (#FWSWITCH=1):

```
+CGDCONT: 1,"IPV4V6","","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
+CGDCONT: 2,"IPV4V6","vzwadmin","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
+CGDCONT: 3,"IPV4V6","vzwinternet","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
+CGDCONT: 4,"IPV4V6","vzwapp","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
+CGDCONT: 5,"IPV4V6","vzwclass6","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
+CGDCONT: 6,"IPV4V6","vzwiotts","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
```

Context ID 3 is for the user's data connection; it is set to the default APN for Verizon.

Worldwide (#FWSWITCH=2) and Australia/Telstra (#FWSWITCH=3):

```
+CGDCONT: 1,"IPV4V6","","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
+CGDCONT: 2,"IPV4V6","","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
+CGDCONT: 3,"IPV4V6","","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
+CGDCONT: 4,"IPV4V6","","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
+CGDCONT: 5,"IPV4V6","","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
+CGDCONT: 6,"IPV4V6","","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
```

Contact your carrier for the appropriate context to use.

Setting Data Contexts:

Cat.M1 devices may require a different APN (Access Point Name) than higher data rate modems (Cat.1, Cat.4, etc.). Make sure you are using an acceptable APN or the device will not register on the network. For example, the general Cat.M1 APN for AT&T is "m2m.attz.com".
To set a data context with this APN, enter the following:

```
AT+CGDCONT=1,"IPV4V6","m2m.attz.com"<cr>
```

and wait for the "OK" response.
NOTE: Carrier services such as a static IP address or VPN may require a specialized APN.

GNSS Operation

The GNSS system on the Telit module includes support for stand-alone operation with GPS and GLONASS.
The GNSS antenna is provided with a 3.3V bias supply for LNA (low noise amplifiers) typically found in GPS antennas. This bias supply is only active when the module GNSS feature is turned on.

A simple example of stand-alone GPS operation follows.
You must give the GNSS system priority over the WWAN (cellular) system unless you have set the cellular system to operate in PSM (Power Saving Mode). Refer to reference [4] for further information.

To set GNSS priority, enter:

```
AT$GPSCFG=0,0<cr>
```

and reboot the modem:

```
AT#REBOOT<cr>
```

Turn on the GNSS system by entering:

```
AT$GPSP=1<cr>
```

The GNSS antenna bias voltage will also be enabled.
NMEA data can be continuously streamed. For example, enter:

```
AT$GPSNMUN=1,1,1,1,1,1,1<cr>
```

Turn them off by entering:

```
AT$GPSNMUN=0,1,1,1,1,1,1<cr>
```

Antennas

The modem requires a separate antenna connection each for cellular and GNSS operation. Both antenna connections require a U.FL type antenna connector.
Cellular Antenna Requirements:

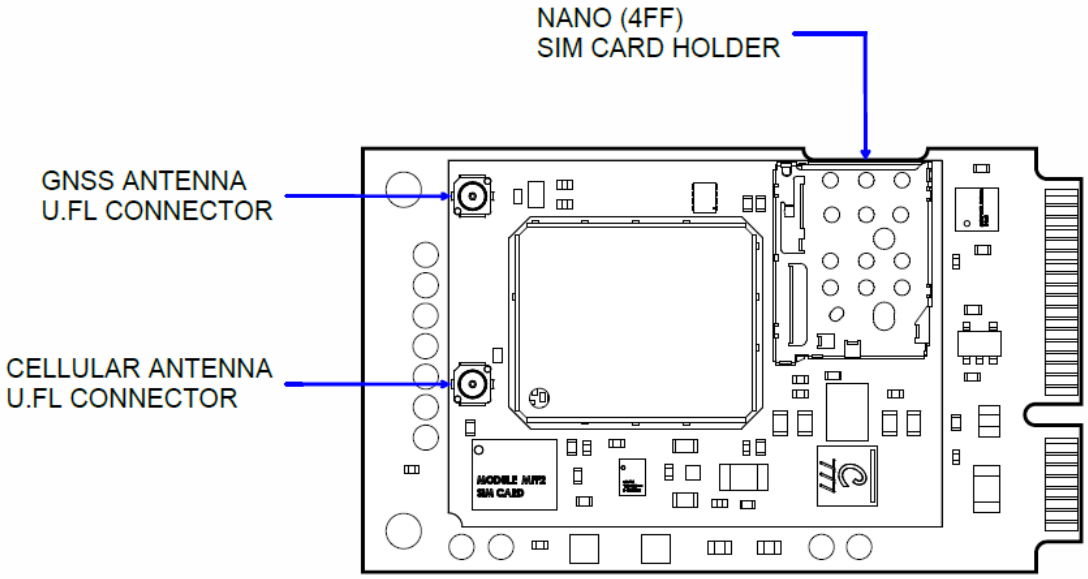
Cellular Antenna Requirements:

Parameter	Description
Frequency Range	Depending on frequency bands provided by the network operator, the customer should use the most suitable antenna for those frequencies.
Bandwidth	250 MHz in LTE Band 1 140 MHz in LTE Band 2, PCS1900 170 MHz in LTE Band 3, DCS1800 445 MHz in LTE Band 4 70 MHz in LTE Band 5, GSM850 80 MHz in LTE Band 8, GSM900 47 MHz in LTE Band 12 41 MHz in LTE Band 13 60 MHz in LTE Band 18 71 MHz in LTE Band 20 145 MHz in LTE Band 25 80 MHz in LTE Band 26 62 MHz in LTE Band 27 100 MHz in LTE Band 28 490 MHz in LTE Band 66
Impedance	50Ω
Input Power	33 dBm average
VSWR Absolute Max	≤ 10:1
VSWR Recommended	≤ 2:1

GNSS Antenna Requirements:

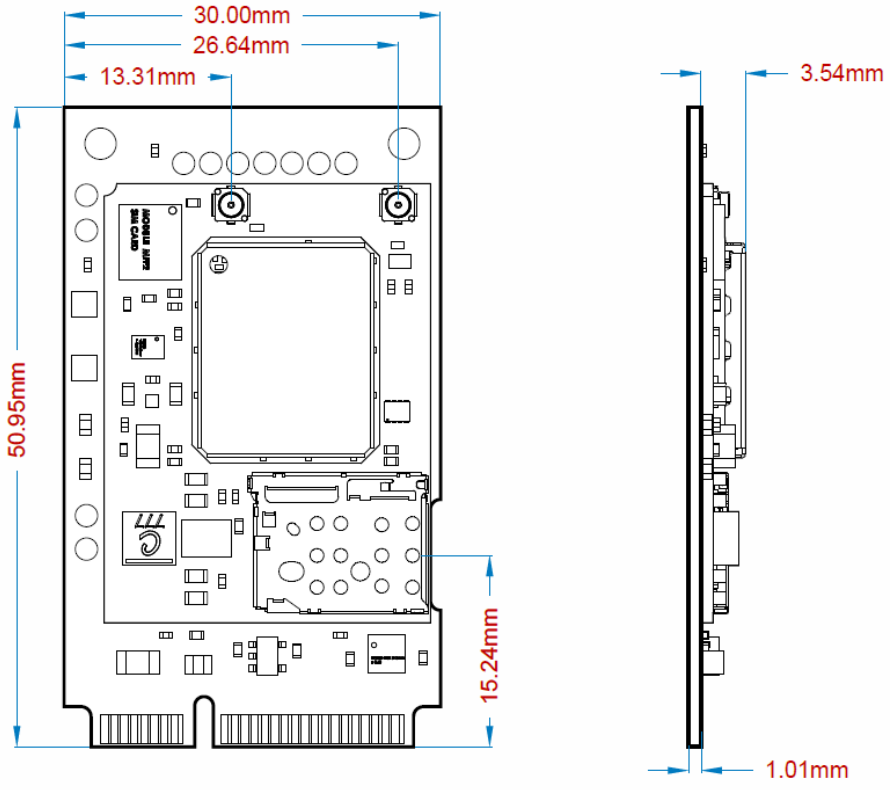
Parameter	Description
Input Voltage Range	3.3V
Frequency Range	1559.0 to 1610.0 MHz
Gain	15 to 30 dB
Impedance	50Ω
Input Power	33 dBm average
VSWR	≤ 3:1
Current Consumption	30mA Max, 20mA Typ.

Antenna Connectors and SIM Card Holder Location



Mechanical

Note: The LTE310SMT V1.00P has a mechanical height of 3.54mm above the top surface of the mPCIe circuit board. This exceeds the standard mPCIe card form factor height of 2.40mm by an additional 1.14mm.



Electrical Specifications

The following electrical signals are supported on the mPCIe card edge connector:

Signal Group	Signal Name	Direction	Pin number	Description
Power	3V3_AUX (5 pins) GND (14 pins)		2,24,39,41,52 4,9,15,18,21,26,27, 29,34,35,37,40,43,50	3.3V source return current path
USB	USB_D_N,USB_D_P	Input/Output	36,38	USB serial data interface compliant to the USB 2.0 specification
Auxiliary Signals (3.3V Compliant)	PERST# WAKE#	Input Output	22 1	Functional reset to the card Not implemented
Communication Signals	LED_WWAN#	Output	42	Open drain, active low signal specific used to allow the PCI Express Mini Card add-in card to pro- vide status indictors via LED devices that will be provided by the system.
	W_DISABLE#	Input	20	Not implemented

Note: The LED_WWAN# signal will follow the STAT_LED pin of the modem to indicate registration status.

Default operation is as follows:

Not registered: always ON

Registered in idle: blinking 1 s ON and 2 s OFF

See reference [2] for more information.

Additionally, the following signals are available at individual pads on the p.c. board:

Signal Name	Description
3.3V	3V3_AUX from host
1.8V	On board 1.8V supply
GND	Power & signal ground
BOOT0	Microcontroller test pin
SWCLK	Microcontroller test pin
SWDIO	Microcontroller test pin
PERST#	Functional reset to the card
USB_BOOT	Cellular module test pin
CTANK	Cellular module internal supply

Reference Documentation

[1] LTE310SMT User Guide

[2] Telit ME310G1/ME910G1/ML865G1 AT Commands Reference Guide

[3] Telit IP Easy User Guide

[4] Telit MEx10G1 GNSS Application Note

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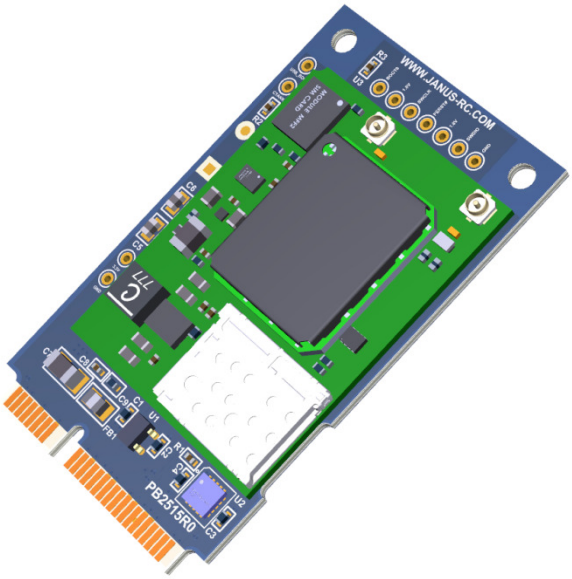

Ordering Information

Ordering Information	Description

Revision History

Revision	Revision Date	Note
00	07/13/21	LTE310SMT v1.00 mPCIe card User Manual release

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