

## Wireless Broadband LTE Solutions

### MitraStar **M4G-641** LTE FDD Module

### Band 13 & Band 4 supported

- **3GPP TS 36.521 Compliant (LTE FDD)**
- **R8. Software upgradable to R9**
- **FDD Dual Band Band 13 Band 4**
- **Standard mPCIe minicard Form Factor**
- **23dBm Transmission Power**

#### Field Proved LTE Technology

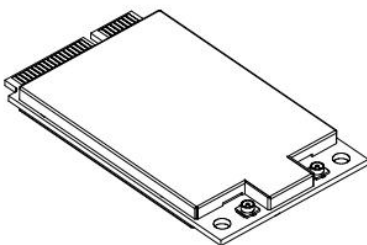
M4G-641 is based on Altair Semiconductor's high performance LTE chipsets of FourGee3100 baseband and FourGee6202 RFIC chip. It supports 3GPP R8 and R9 upgradable without hardware change. It supports LTE connection using single software and implements a high performance MIMO receiver. Altair FourGee 3100/6202 LTE chipset is Verizon Wireless pre-certified to run over Verizon's 4G LTE network.

#### Fast Hook Up Standard Minicard Interface

M4G-641 adapts the standard mini-PCIe minicard with 52 pin connector. The dimension is 51(L) x 30(W) x 5(H)mm. Both sides have components. Two antenna connectors are provided. The operation temperature ranged from -30°C to 60°C.

#### Easy Enable with Hostless Driver Support

M4G-641 supports hostless driver architecture on Linux and Windows. The advantage of this kind of driver requires a lower-end process to establish LTE connection and run traffic through LTE network. This will let most lower-end machine-to-machine applications to use 4G wireless broadband LTE high speed network in the first moment.



## Specifications

### LTE Air Interface

- 3GPP TS 36.521 Compliant R8 compliance  
Software upgradeable to R9.
- Duplex mode: FDD
- Band 13  
Uplink 777-787MHz  
Downlink 746-756MHz
- Band 4  
Uplink 1710-1755 MHz  
Downlink 2110-2155 MHz
- Channel Bandwidth:  
1.4MHz, 3MHz, 5MHz, 10MHz,  
15MHz and 20MHz.
- Modulation:  
Uplink QPSK, 16QAM  
Downlink QPSK, 16QAM, 64QAM
- Transmit Power : 23±1 dBm
- Receive Sensitivity:  
-97dBm @ QPSK 1/2. 10MHz  
channel bandwidth
- Antenna:  
Two antenna connectors  
Main RF for transmit & receive  
Auxiliary RF for receive diversity

### Hardware Specifications

- mini-PCIe minicard 52 connector  
(work in USB mode)
- LED : Power/ LTE connection  
status through minicard interface
- SIM card through mini-card  
interface

### Power Specification

- Input Voltage: 3.3V ± 9%
- Power consumption :  
Average power consumption 3 W

### Physical Specifications

- Dimension:  
51(L) x 30(W) x 5(H)mm
- Weight: 12g

### Environmental Specifications

- Operation Temperature: -30 oC ~  
60oC
- Operation Humidity : 10% ~ 90%
- Storage Temperature: -30oC ~  
70oC
- Storage Humidity: 10% ~ 95%

### OS Support

- Linux
- Microsoft Windows

### Certification

- FCC
- RoHS

## Pin Assignment

Pin Number	Minicard Standard Pin Define	I/O	MitraStar LTE module Pin Definition	I/O	Description
1	WAKE_N	O	NC	-	No Connect
2	3V3_Vaux	I	3V3_Vaux	I	Main Board for Module +3V3 System
3	COEX1/NC	I/O	BUZZER_CTL	O	USB Mode: no used OP Mode: RSSI Signal Monitor by Voice
4	GND	I	GND	I	Ground
5	COEX2/NC	I/O	RSSI_LED_0	O	USB Mode: no used OP Mode: RSSI Signal Monitor by LED
6	1.5V	I	NC	-	No Connect
7	CLKREQ_N	O	LAN_RESET	O	OP Mode: Rest PHY IC USB Mode: no used
8	UIM_PWR	O	UIM_PWR	O	For SIM Slot (Card) Power +1.8V/+3.0V
9	GND	I	GND	I	Ground
10	UIM_DATA	I/O	UIM_DATA	I/O	SIM Data Signal
11	REF_CLK-	I	NC	-	No Connect
12	UIM_CLK	O	UIM_CLK	O	SIM Clock Signal
13	REF_CLK+	I	NC	-	No Connect
14	UIM_RST	O	UIM_RST	O	SIM Reset Signal
15	GND	I	GND	I	Ground
16	UIM_VPP	O	NC	-	No Connect
17	UIM_C8	NA	NC	-	No Connect
18	GND	I	GND	I	Ground
19	UIM_C4	NA	NC	-	No Connect
20	W_DISABLE_N	I	W_DISABLE_N	I	USB Mode: Active Low Signal. System Can Be Use This Signal to Disable Radio Operation. Pull-up Resistor on The Card. (Feature Support) Low: Idle/Sleep Mode High: Operation Mode OP Mode: no used
21	GND	I	GND	I	Ground
22	PERST_N	I	PERST_N	I	USB Mode: Reset Module OP Mode: no used
23	PERn0	I/O	RMII_RXCTL	I	OP Mode: RMII Interface USB Mode: no used
24	3V3_Vaux	I	3V3_Vaux	I	Main Board for Module +3V3 System
25	PERp0	I/O	RMII_TXCTL	O	OP Mode: RMII Interface USB Mode: no used
26	GND	I	GND	I	Ground

Pin Number	Minicard Standard Pin Define	I/O	MitraStar LTE module Pin Definition	I/O	Description
27	GND	I	GND	I	Ground
28	1.5V	I	NC	-	No Connect
29	GND	I	GND	I	Ground
30	SMB_CLK	I	RMII_MDIO	I/O	OP Mode: RMII Interface USB Mode: no used
31	PETn0	I/O	RMII_RXD0	I	OP Mode: RMII Interface USB Mode: no used
32	SMB_DATA	I/O	RMII_MDC	O	OP Mode: RMII Interface USB Mode: no used
33	PETp0	I/O	RMII_RXD1	I	OP Mode: RMII Interface USB Mode: no used
34	GND	I	GND	I	Ground
35	GND	I	GND	I	Ground
36	USB_D-	I/O	USB_D-	I/O	OP Mode: no used USB Mode: Data Interface
37	GND	I	GND	I	Ground
38	USB_D+	I/O	USB_D+	I/O	OP Mode: no used USB Mode: Data Interface
39	3V3_Vaux	I	3V3_Vaux-PA	I	Main Board for PA Power +3V3 (+23dBm) or +4V2 (+26dBm)
40	GND	I	GND	I	Ground
41	3V3_Vaux	I	3V3_Vaux-PA	I	Main Board for PA Power +3V3 (+23dBm) or +4V2 (+26dBm)
42	LED_WWAN_N	O	RSSI_LED_1	X	USB Mode: no used OP Mode: RSSI Signal Monitor by LED
43	GND	I	GND	I	Ground
44	LED_WLAN_N	O	RSSI_LED_2	O	USB Mode: no used OP Mode: RSSI Signal Monitor by LED
45	NC	X	RMII_CLK	O	OP Mode: RMII Interface USB Mode: no used
46	LED_WPAN_N	O	NC	-	No Connect
47	NC	X	RMII_TXD0	O	OP Mode: RMII Interface USB Mode: no used
48	1.5V	I	NC	-	No Connect
49	NC	X	RMII_TXD1	O	OP Mode: RMII Interface USB Mode: no used
50	GND	I	GND	I	Ground
51	NC	X	NC	-	No Connect
52	3V3_Vaux	I	3V3_Vaux-PA	I	Main Board for PA Power +3V3 (+23dBm) or +4V2 (+26dBm)

## Connector

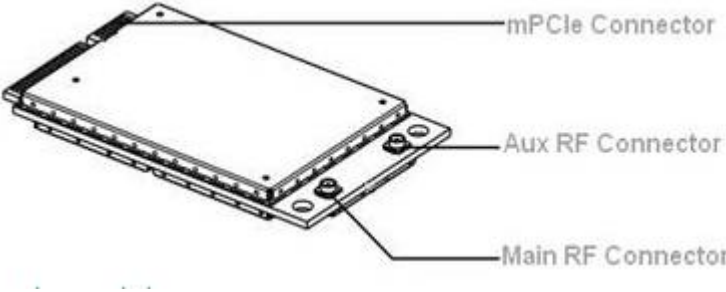


Figure 1 Module Connectors

## Physical Dimension

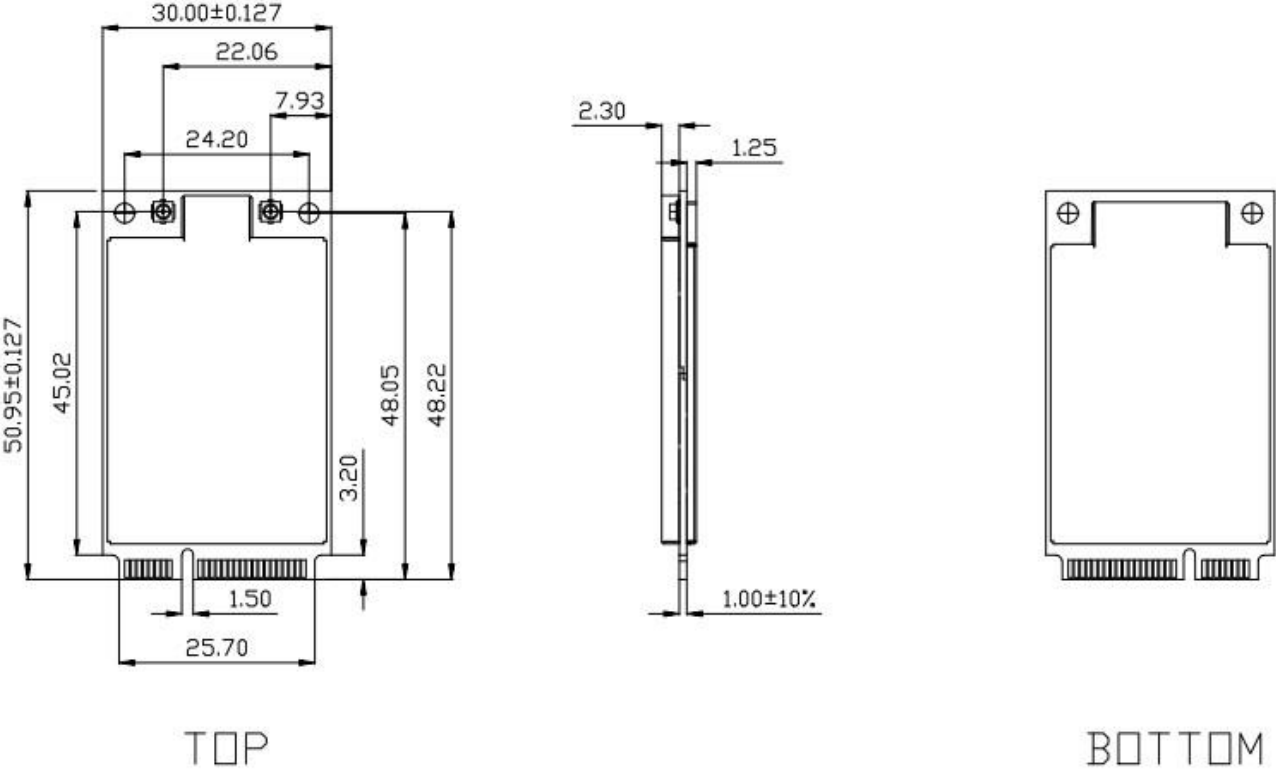


Figure 2 Mechanical Drawing (unit: mm)

## Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

## Federal Communication Commission Interference Statement

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.

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 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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

## Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

## End Product Labeling

When the module is installed in the host device, the FCC ID label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily re-moved. If not, a second label must be placed on the outside of the final device that contains the following text: "Contains FCC ID: **ZMYM4G-641**"

The grantee's FCC ID can be used only when all FCC compliance requirements are met.

**This device is intended only for OEM integrators under the following conditions:**

- (1) The antenna must be installed such that 20 cm is maintained between the antenna and users,
- (2) The transmitter module may not be co-located with any other transmitter or antenna.
- (3) To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile exposure condition must not exceed:
  - 5.5dBi in LTE Band 4
  - 10dBi in LTE Band 13

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.