

R11e-LTE-US User Manual

OEM/Integrators Installation Manual

Important Notice to OEM integrators

1. This module is limited to OEM installation ONLY.
2. This module is limited to installation in mobile or fixed applications, according to Part 2.1091(b).
3. The separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations

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.

CAN ICES-3(B)/ NMB-3(B)**Innovation, Science and Economic Development Canada**

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

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'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement."

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.

For class B digital device

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.

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/IC RF 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.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

End Product Labeling

The host system using this module must display a visible label indicating the following text:

Contains FCC ID: TV7R11ELTE

The host system using this module must display a visible label indicating the following text:

Contains IC: 7442A-R11ELTE

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/IC 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:

- -3.5 dBi in 700 MHz Band
- -3.5 dBi in 850 MHz Band
- 0.6 dBi in 1700 MHz Band
- 0.6 dBi in 1900 MHz Band.

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC/IC authorization is no longer considered valid and the FCC/IC 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/IC authorization

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1. Introduction

The R11e-LTE-US mini-PCIe module is a Cat. 4 LTE modem which integrates an application CPU subsystem, peripheral interfaces and functions designed to address the power/performance/cost requirements of IoT and M2M applications. The CPU is based on Qualcomm's MDM architecture which offers OFDMA-related software based signal processing capabilities that significantly exceed traditional communications ARM cores. R11e-LTE-US module provides a variety of interfaces including USB 2.0, PCM, UART, USIM .

1.1. Features

- LTE Cat. 4 with 150/50 Mbps for DL/UL
- Supports LTE B2/4/5/12, 3GPP release 10 without Carrier Aggregation
- Supports WCDMA 2/5, 3GPP release 8
- Ultra-high-performance Cortex A7 microprocessor
- Modem subsystem (MSS)
- Resource and power management (RPM) subsystem
- Optimized for M2M and IoT markets
- Interfaces
 - Host USB 2.0 with integrated PHY
 - USIM interface
 - PCM
 - UART

2. Electrical Specification

2.1. Power supply

LTE module power input is 3V3.

Power	Pin Name	Pads	Description	Voltage Level (V)		
				Min.	Typ.	Max.
3V3	3V3		Main Power Supply	3.2	3.3	3.6

3. RF Specifications

3.1. RF Specification

3.2.1 Band support

Table 1. Band support

Band	Uplink (MHz)	Downlink (MHz)
LTE Band 2	1,850–1,910	1,930–1,990
LTE Band 4	1,710–1,755	2,110–2,155
LTE Band 5	824–849	869–894
LTE Band 12	699–716	729–746
Band	Uplink (MHz)	Downlink (MHz)
WCDMA Band 2	1,850–1910	1,930–1,990
WCDMA Band 5	824–849	869–894

3.2.2 Bandwidth support

Table 2. Bandwidth support

Band	Bandwidth					
	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
LTE Band 2	✓	✓	✓	✓	✓	✓
LTE Band 4	✓	✓	✓	✓	✓	✓
LTE Band 5	✓	✓	✓	✓	-	-
LTE Band 12	✓	✓	✓	✓	-	-

3.2.3 RF Transmit Specification

Table 3. Conductive TX output power

Band	Items	Parameter	Unit	Min.	Typ.	Max.
LTE Band 2	Max. TX Power	10 MHz 12 RBs/QPSK	dBm	20.3	23	25.7
LTE Band 4	Max. TX Power	10 MHz 12 RBs/QPSK	dBm	20.3	23	25.7
LTE Band 5	Max. TX Power	10 MHz 12 RBs/QPSK	dBm	20.3	23	25.7
LTE Band 12	Max. TX Power	10 MHz 12 RBs/QPSK	dBm	20.3	23	25.7
Band	Items	Parameter	Unit	Min.	Typ.	Max.

WCDMA Band 2	Max. TX power	-	dBm	20.3	23.5	25.7
WCDMA Band 5	Max. TX power	-	dBm	20.3	23.5	25.7

3.2.4 RF Receiver Specification

Table 4. Conductive Rx sensitivity-3GPP

Band	Items	Parameter	Unit	Min.	Typ.	Max.
LTE Band 2	RX Sensitivity	10 MHz with 50 RBs	dBm		-101	-94.3
LTE Band 4	RX Sensitivity	10 MHz with 50 RBs	dBm		-102	-96.3
LTE Band 5	RX Sensitivity	10 MHz with 50 RBs	dBm		-102	-94.3
LTE Band 12	RX Sensitivity	10 MHz with 50 RBs	dBm		-102	-93.3
Band	Items	Parameter	Unit	Min.	Typ.	Max.
WCDMA Band 2	RX Sensitivity	-	dBm		-110	-104.7
WCDMA Band 5	RX Sensitivity	-	dBm		-110	-104.7

4. Mechanical and Environmental Certifications

4.1. PCBA Form Factor

R11e-LTE-US module has the dimensions as below:

50.85 mm (typ.) × 29.9 mm (typ.) × 3.3 mm (typ.), tolerance: ± 0.15 mm

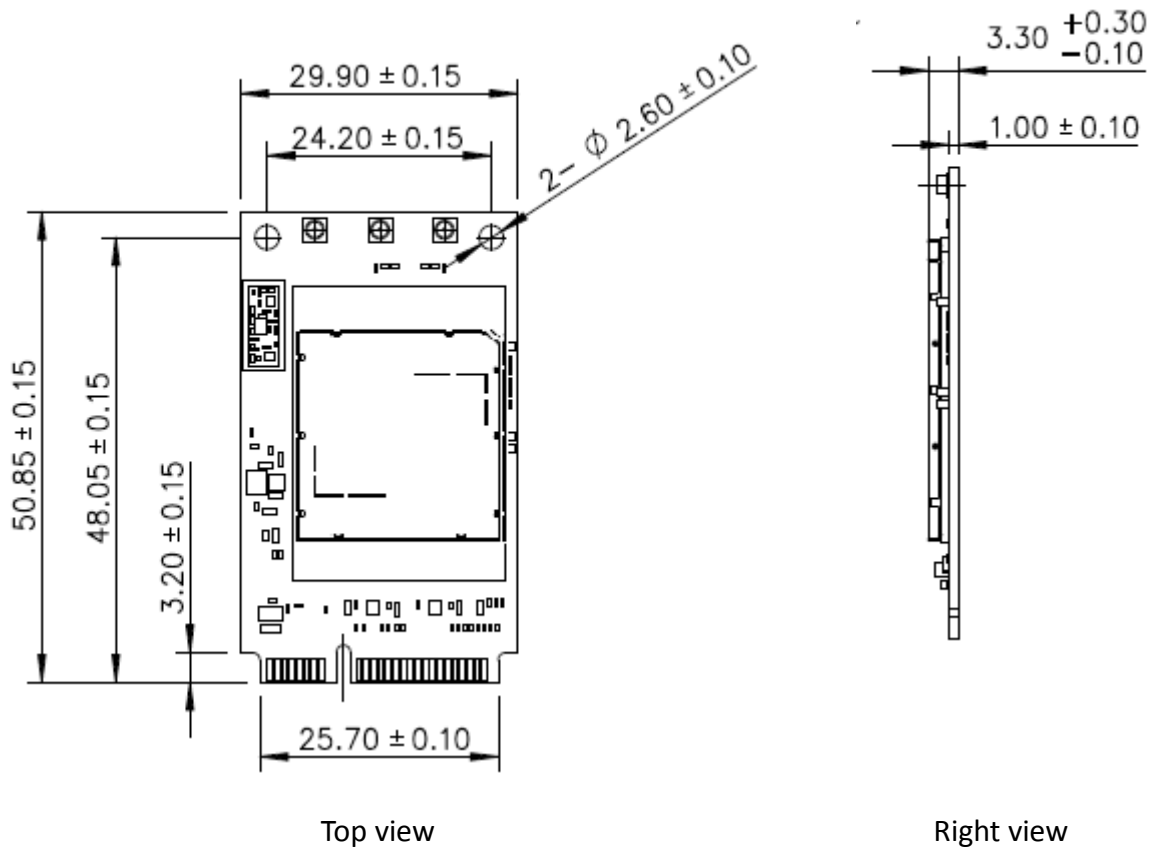


Figure 1. PCBA dimension

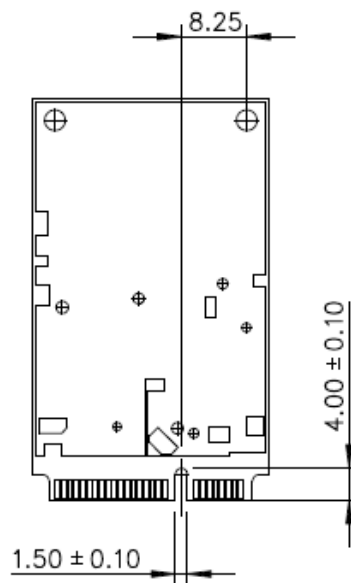


Figure 2. PCB dimension(Bottom view)

4.2. Thermal considerations

Ambient operating temperature: $-25\text{ }^{\circ}\text{C}$ to $+75\text{ }^{\circ}\text{C}$

($-20\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$ fully compliant with 3GPP; $-25\text{ }^{\circ}\text{C}$ to $+75\text{ }^{\circ}\text{C}$ functional work)

Ambient storage temperature: $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$

The case temperature of module shielding cover must be $< 85\text{ }^{\circ}\text{C}$ when integrated to prevent damage.