



COMPAL

5G RMM-G4_Module Datasheet



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1. Foreword

1.1 Introduction

This document describes the hardware of the COMPAL® 5G RMM-G4 Module products. It helps you quickly retrieve interface specifications, electrical and mechanical details, and information on the requirements to be considered for integrating further components.

1.2 Safety Information

The following safety precautions must be observed during all phases of operation, such as usage, service or repair of any cellular terminal or mobile incorporating with 5G RMM-G4 module. Manufacturers of the cellular terminal should send the following safety information to users and operating personnel, and incorporate these guidelines into all manuals supplied with the product. If not so, Compal assumes no liability for customers' failure to comply with these precautions.



Full attention must be given to driving at all times in order to reduce the risk of an accident. Using a mobile while driving (even with a hands free kit) causes distraction and can lead to an accident. Please comply with laws and regulations restricting the use of wireless devices while driving.



Switch off the cellular terminal or mobile before boarding an aircraft. The operation of wireless appliances in an aircraft is forbidden to prevent interference with communication systems. If the device offers an Airplane Mode, then it should be enabled prior to boarding an aircraft. Please consult the airline staff for more restrictions on the use of wireless devices on boarding the aircraft.



Wireless devices may cause interference on sensitive medical equipment, so please be aware of the restrictions on the use of wireless devices when in hospitals, clinics or other healthcare facilities.



Cellular terminals or mobiles operating over radio signals and cellular network cannot be guaranteed to connect in all possible conditions (for example, with unpaid bills or with an invalid (U) SIM card). When emergent help is needed in such conditions, please remember using emergency call. In order to make or receive a call, the cellular terminal or mobile must be switched on in a service area with adequate cellular signal strength.



The cellular terminal or mobile contains a transmitter and receiver. When it is ON, it receives and transmits radio frequency signals. RF interference can occur if it is used close to TV set, radio, computer, or other electric equipment.



In locations with potentially explosive atmospheres, obey all posted signs to turn off wireless devices such as your phone or other cellular terminals. Areas with potentially explosive atmospheres include fueling areas, below decks on boats, fuel or chemical transfer or storage facilities, areas where the air contains chemicals or particles such as grain, dust or metal powders, etc.



2. Overview

2.1 Introduction

5G RMM-G4 MODULE is a highly integrated 5G NR wireless communication module that adopts standard PCIe RMM-G4 interface and backward supports with LTE/WCDMA system. It is applicable to most broadband communication networks of the mobile operator across the world.

2.2 Specification

Table 2-1 RMM-G4 module features

Specification		
Platform	MTK MT6986 ARM Cortex-A35 up to 1.5 GHz	
Memory	4Gb NAND Flash (ONFI) with 4Gb LPDDR4X (4.266 GHz) MCP	
Operating Band	5G Sub-6G: n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28, n29, n30, n38, n40, n41, n48, n66, n70, n71, n75, n76, n77, n78, n79	
	4G LTE: B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B43, B48, B66, B71,	
	UMTS: B1, B2, B4, B5, B8	
	GPS L1	
Network option	SA	TBD
	NSA	TBD
Downlink	LTE	LTE Cat20, 5CC, 2G bps, MIMO4x4 , 256QAM ,
	5G Sub-6G	4CC; Max aggregated BW 300MHz 7Gbps; MIMO4x4 ,256QAM
Uplink	LTE	LTE CAT18 2CC 211 Mbps
	5G Sub-6G	2CC; Max aggregated BW 200MHz 2.5Gbps; MIMO2x2 ,256QAM
HPUE (PC1.5)	n41, n77, n78, n79	
UL 2x2 MIMO	n41, n77, n78, n79	
DL 4x4 MIMO	5G Sub-6G: n1, n2, n3, n7, n20, n25, n30, n38, n40, n41, n48, n66, n70, n77, n78, n79 4G LTE: B1, B2, B3, B4, B7, B20, B25, B30, B34, B38, B40, B41, B42, B43, B48, B66	
Carrier aggregation	ULCA, DLCA and EN-DC	
SRS antenna switching	n41/n77/n78/n79: 2T4R(SA)	



Power Supply	DC 3.15V~4.4V, Typical 3.3V
Temperature	Operating temperature ^[1] : -30°C ~ +70°C
	Extended temperature ^[2] : -40°C ~ +85°C
	Storage temperature: -65°C ~ +100°C
Physical characteristics	Interface: PCIe M.2 Key B
	Dimension: 30x52 mm, Thickness=2.3 mm(max.)
	Weight: ~9.5g
Interface	
Antenna Connector	3/4G/Sub-6G Antenna x 4
	Support 4x4 DL MIMO
Function Interface	Single USIM 1.8/ 3V e-Sim design internally
	PCIe Gen4_1-lane
	USB2.0 (Reserved) /USB3.2 Gen2(Reserved)
	W_Disable#1/2
	RESET#/ FULL_CARD_POWER_OFF#
	DPR (Body SAR)
	COEX_TXD/RXD
	LED control pin
	Tunable antenna(1xMIPI)
	I2C(Reserved)
	Debug UART x1
Software	
Protocol Stack	IPV4/IPV6
AT commands	3GPP TS 27.007 and 27.005
Firmware update	Over PCIe
Others feature	Windows MBIM support
	Windows update
	Support 5G NR NSA and SA
	Multiple carrier aggregation
	GNSS/AGNSS



NOTE:

1. When temperature goes beyond normal operating temperature range of -10°C~+55°C, RF performance of module may be slightly off 3GPP specifications.
2. When the RMM-G4 module works at this temperature. NOT all its RF specifications comply with the 3GPP RF specifications.

3.2 Power Supply

The power interface of 5G RMM-G4 Module as shown in the following table:

Table 3-2 power interface

Pin	Pin Name	I/O	Pin Description	DC Parameter (V)		
				Minimum Value	Typical Value	Maximum Value
2,4,70,72,74	P_5A_VSYS_3V3	PI	Power supply input	3.135	3.3	4.4
36	P_D2A_VSIM1_1V8	PO	USIM power supply	-	1.8V/3V	-
24	P_D6A_VIO18_1V82	PO	ANT turner power		1.8V	

Table 3-3 Power interface output capacitance requirement



3.2.3 Power Consumption

In the condition of 3.3V power supply, the 5G RMM-G4 MODULE power consumption as shown in the following table 3-7:

Table 3-7

Technology	Band	Typical Value (dBm)	Tolerance (dB)	*Power consumption (mA)
WCDMA	Band 1	24.5	+0.5, -0.2	TBD
	Band 2	24.5	+0.5, -0.2	TBD
	Band 4	24.5	+0.5, -0.2	TBD
	Band 5	24.5	+0.5, -0.2	TBD
	Band 8	24.5	+0.5, -0.2	TBD



LTE FDD	Band 1	24.5	+0.5, -0.2	843
	Band 2	24.5	+0.5, -0.2	761.8
	Band 3	24.5	+0.5, -0.2	933.8
	Band 4	24.5	+0.5, -0.2	765.5
	Band 5	24.5	+0.5, -0.2	723.2
	Band 7	24.5	+0.5, -0.2	962
	Band 8	24.5	+0.5, -0.2	787.1
	Band 12	24.5	+0.5, -0.2	647.9
	Band 13	24.5	+0.5, -0.2	698.5
	Band 14	24.5	+0.5, -0.2	692.5
	Band 17	24.5	+0.5, -0.2	650.7
	Band 18	24.5	+0.5, -0.2	718
	Band 19	24.5	+0.5, -0.2	738.4
	Band 20	24.5	+0.5, -0.2	749.3
	Band 25	24.5	+0.5, -0.2	755.8
	Band 26	24.5	+0.5, -0.2	729
	Band 28	24.5	+0, -0.2	655.6
	Band 30	23.0	+0, -0.2	1140
	Band 66	24.5	+0.5, -0.2	783.6
	Band 71	24.5	+0.5, -0.2	717.8
LTE TDD	Band 34	24.5	+0.5, -0.2	437.5
	Band 38	24.5	+0.5, -0.2	467.7
	Band 39	24.5	+0.5, -0.2	467.7
	Band 40	24.5	+0.5, -0.2	456.5
	Band 41	24.5	+0.5, -0.2	505.2
	Band 42	24.5	+0.5, -0.2	TBD
	Band 43	24.5	+0.5, -0.2	449.3
	Band 48	22	+0, -0.2	471.6
NR-FR1 FDD	n1	24.5	+0.5, -0.2	914.6
	n2	24.5	+0.5, -0.2	872.9
	n3	24.5	+0.5, -0.2	972.5
	n5	24.5	+0.5, -0.2	796.4
	n7	24.5	+0.5, -0.2	986
	n8	24.5	+0.5, -0.2	818.8
	n12	24.5	+0.5, -0.2	683.6
	n13	24.5	+0.5, -0.2	717.7
	n14	24.5	+0.5, -0.2	697.5
	n18	24.5	+0.5, -0.2	738.4
	n20	24.5	+0.5, -0.2	778.5



	n25	24.5	+0.5, -0.2	850.2
	n26	24.5	+0.5, -0.2	751.7
	n28	24.5	+0.5, -0.2	757.7
	n30	23	+0, -0.2	1300
	n66	24.5	+0.5, -0.2	922.4
	n70	24.5	+0.5, -0.2	929.3
	n71	24.5	+0.5, -0.2	773.2
	n40	24.5	+0.5, -0.2	456.5
NR-FR1 TDD	n38	24.5	+0.5, -0.2	337.6
	n41 (HPUE PC1.5)	29	+0, -0.2	486.9
	n41 (HPUE PC2)	27	+0.5, -0.2	486.9
	n41	24.5	+0.5, -0.2	TBD
	n48	22	+0, -0.2	309.7
	n77 (HPUE PC1.5)	29	+0, -0.2	482.4
	n77 (HPUE PC1.2)	26.5	+0.5, -0.2	TBD
	n77	24.5	+0.5, -0.2	488.9
	n78 (HPUE PC1.5)	29	+0, -0.2	TBD
	n78 (HPUE PC1.2)	26.5	+0.5, -0.2	471.3
	n78	24.5	+0.5, -0.2	TBD
	n79	24.5	+0.5, -0.2	TBD



NOTE :

*The measured data is the average value and test conditions at room temperature (25°C)



3.3

3.7.2 BODY SAR

The 5G RMM-G4 Module supports Body SAR function by detecting the DPR pin. The voltage level of DPR is high by default, and when the SAR sensor detects the closing human body, the DPR signal will be pulled down. As the result, the module then lowers down its emission power to its default threshold value, thus reducing the RF radiation on the human body. The threshold of emission power can be set by the AT Commands. The definition of DPR signals as shown in the following table 3-26:

3.7.3 SAR Trigger

Supports Body SAR and TA SAR function by detecting the DPR pin. The voltage level of DPR need to be pulled-up by external design. when the SAR sensor detects the closing human body, the DPR signal will be pulled down. As the result, the module then lowers down its emission power to its default threshold value, thus reducing the RF radiation on the human body.

The definition of DPR signal is shown in Table 3-27:

Table 3-27

DPR signal	Function
High (Need external pull high)	The module keeps the default emission power
Low	Lower the maximum emission power to the threshold value of the module.

3.7.4 ODYSAR and Tunecode truth table (DPR). TBD

Table 3-28

4. Radio Frequency

4.1 RF Interface

The 5G RMM-G4 Module is equipped with four RF connectors as shown in Figure 4-1.

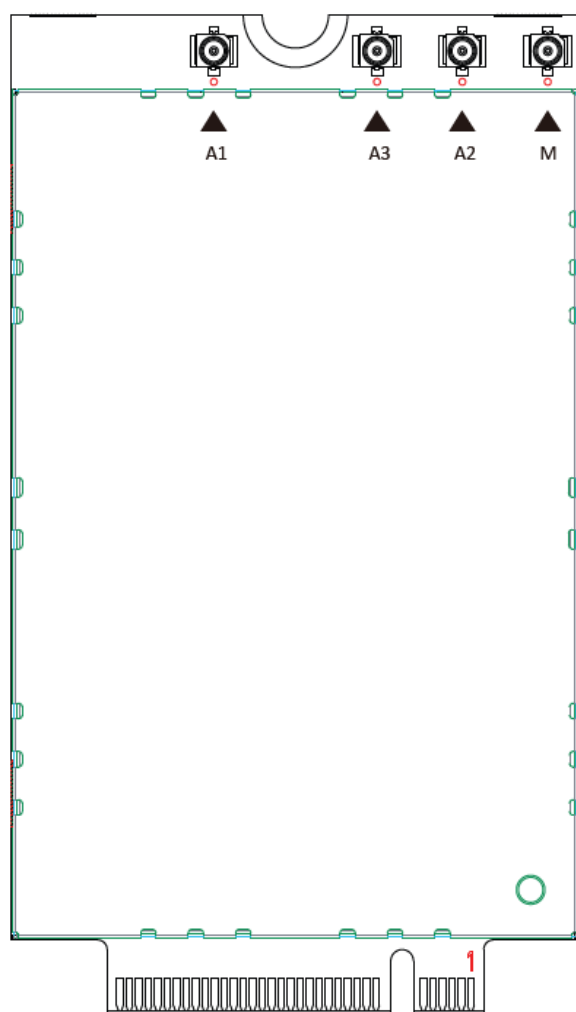


Figure 4-1 RF connectors

2.1.1 RF Interface Functionality

The available RF connectors are:

ANT0: Cellular TX0&PRX

ANT1: Cellular MIMO PRX

ANT2: Cellular TX1 & MIMO DRX



ANT3: Combined Cellular DRX and GPS L1/GLONASS/BeiDou/Galileo Rx path

Detailed functionalities supported and band groups for each of RF connectors are listed in the following table 4-1

Table 4-1

Band	Frequency	ANT_0	ANT_1	ANT_2	ANT_3
LB	617-960MHz	Tx0/PRX	PRX2 ²	DRX2 ²	DRX
MHB	1427-2690MHz	(Tx0/PRX) ¹	PRX2	(Tx1 ³ /DRX2) ¹	DRX
UHB	3300-5000Mhz	Tx0/PRX	PRX2	Tx1/DRX2	DRX
NTN	1525-2200Mhz	Tx0/PRX		DRX	
LB+UHB	3300-5000Mhz	PRX	PRX2	Tx/DRX	DRX2
GPS_L1	1559-1607MHz				RX

Note1: MHB TX0/PRX & DRX2 will swap when ENDC&UL-CA (LB+MHB & MHB+UHB)

Note2: Only B20/n20

Note3: Only n41

2.1.2 RF Connector Characteristic

Table 4-2

Rated Condition		Environment Condition
Frequency Range	DC to 6GHz	Temperature Range
Characteristic Impedance	50Ω	−40°C to 85°C

2.1.3 RF Connector Dimension

5G RMM-G4 Module adopts standard RMM-G4 module RF connectors, the model name is 20449-001E from IPEX company, and the connector size is 2*2*0.6mm. The connector dimension is shown as following picture:

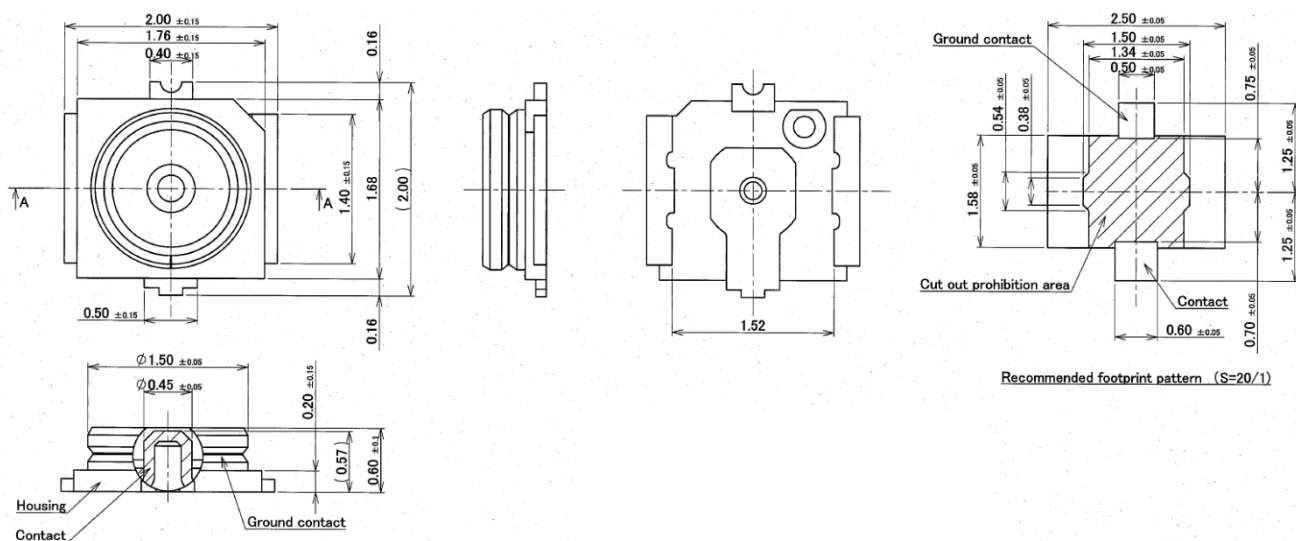


Figure 4-2 RF connector dimensions

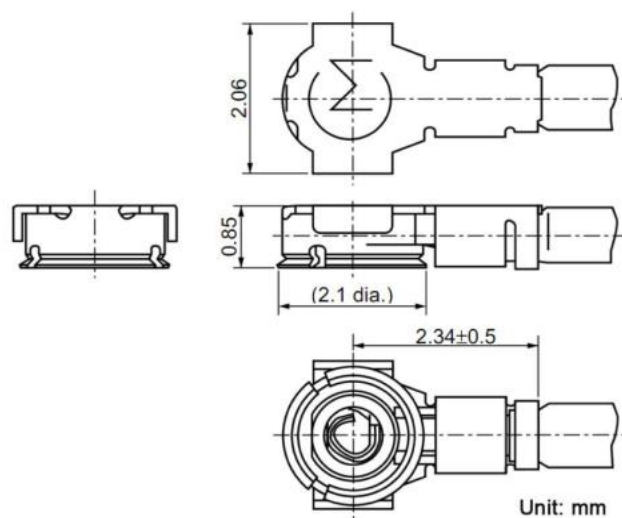


Figure 4-3 0.81mm coaxial antenna dimensions

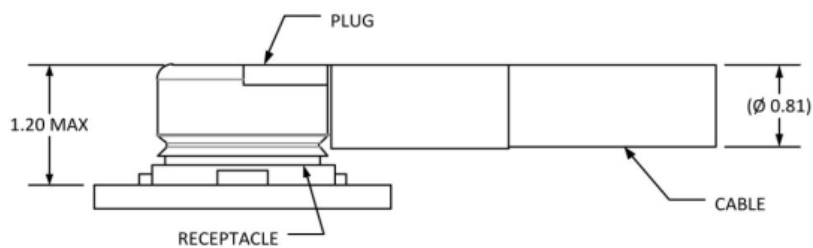


Figure 4-4 Schematic diagram of 0.81mm coaxial antenna connected to the RF connector



2.2 Transmitting Power

The transmitting power for each band of the RMM-G4 Module as shown in the following table:

Table 4-4 WCDMA

Mode	Band	Typical Value (dBm)	Tolerance (dB)	3GPP Requirement
WCDMA	Band 1	24.5	+0.5, -0.2	24+1.7/-3.7
	Band 2	24.5	+0.5, -0.2	24+1.7/-3.7
	Band 4	24.5	+0.5, -0.2	24+1.7/-3.7
	Band 5	24.5	+0.5, -0.2	24+1.7/-3.7
	Band 8	24.5	+0.5, -0.2	24+1.7/-3.7

Table 4-5 LTE FDD

Mode	Band (10MHz,12RB)	Typical Value (dBm)	Tolerance (dB)	3GPP Requirement (dBm)
LTE FDD	Band 1	24.5	+0.5, -0.2	23±2.7
	Band 2	24.5	+0.5, -0.2	23±2.7
	Band 3	24.5	+0.5, -0.2	23±2.7
	Band 4	24.5	+0.5, -0.2	23±2.7
	Band 5	24.5	+0.5, -0.2	23±2.7
	Band 7	24.5	+0.5, -0.2	23±2.7
	Band 8	24.5	+0.5, -0.2	23±2.7
	Band 12	24.5	+0.5, -0.2	23±2.7
	Band 13	24.5	+0.5, -0.2	23±2.7
	Band 14	24.5	+0.5, -0.2	23±2.7
	Band 17	24.5	+0.5, -0.2	23±2.7
	Band 18	24.5	+0.5, -0.2	23±2.7
	Band 19	24.5	+0.5, -0.2	23±2.7
	Band 20	24.5	+0.5, -0.2	23±2.7
	Band 25	24.5	+0.5, -0.2	23±2.7



	Band 26	24.5	+0.5, -0.2	23±2.7
	Band 28	24.5	+0.5, -0.2	23+2.7/-3.2
	Band 30	23	+0, -0.5	23±2.7
	Band 66	24.5	+0.5, -0.2	23±2.7
	Band 71	24.5	+0.5, -0.2	23+2.7/-3.2

Table 4-6 LTE TDD

Mode	Band	Typical Value (dBm)	Tolerance (dB)	3GPP Requirement
LTE TDD	Band 34	24.5	+0.5, -0.2	23±2.7
	Band 38	24.5	+0.5, -0.2	23±2.7
	Band 39	24.5	+0.5, -0.2	23±2.7
	Band 40	23.5	+1, -0.2	23±2.7
	Band 41	24.5	+0.5, -0.2	23±2.7
	Band 42	24.5	+0.5, -0.2	23+3/-4
	Band 43	24.5	+0.5, -0.2	23+3/-4
	Band 48	22	+0, -0.2	23+3/-4

Table 4-7 NR-FR1 FDD

Mode	Band	Typical Value (dBm)	Tolerance (dB)	3GPP Requirement
NR-FR1 FDD	n1	24.5	+0.5, -0.2	23±2.7
	n2	24.5	+0.5, -0.2	23±2.7
	n3	24.5	+0.5, -0.2	23±2.7
	n5	24.5	+0.5, -0.2	23±2.7
	n7	24.5	+0.5, -0.2	23±2.7
	n8	24.5	+0.5, -0.2	23±2.7
	n12	24.5	+0.5, -0.2	23±2.7
	n13	24.5	+0.5, -0.2	23±2.7
	n14	24.5	+0.5, -0.2	23±2.7
	n18	24.5	+0.5, -0.2	23±2.7
	n20	24.5	+0.5, -0.2	23±2.7
	n25	24.5	+0.5, -0.2	23±2.7



	n26	24.5	+0.5, -0.2	23±2.7
	n28	24.5	+0.5, -0.2	23+2.7/-3.2
	n30	23	+0, -0.2	23±2.7
	n66	24.5	+0.5, -0.2	23±2.7
	n70	24.5	+0.5, -0.2	23±2.7
	n71	24.5	+0.5, -0.2	23+2.7/-3.2

Table 4-8 NR-FR1 TDD

Mode	Band	Typical Value (dBm)	Tolerance (dB)	3GPP Requirement
NR-FR1 TDD	n38	24.5	+0.5, -0.2	23±2.7
	n40	23.5	+1, -0.2	23±2.7
	n41 (HPUE)	PC2 27.5 PC1.5 29	+0, -0.2	26+3/-4
	n41	24.5	+0.5, -0.2	23+3/-3
	n48	22	+0, -0.2	23+3/-4
	n77 (HPUE)	PC2 27 PC1.5 29	+0, -0.2	26+3/-4
	n77	24.5	+0.5, -0.2	23+3/-4
	n78 (HPUE)	PC2 27 PC1.5 29	+0, -0.2	26+3/-4
	n78	24.5	+0.5, -0.2	23+3/-4
	n79 (HPUE)	PC2 27 PC1.5 29	+0, -0.2	26+3/-4
	n79	24.5	+0.5, -0.2	23+3/-4



NOTE: The max TX power is in primary RF path at ambient temperature 25°C.

2.3

2.4 GNSS Receiver -**TBD**

RMM-G4 module integrates Global Navigation Satellite System (GNSS) solution that supports simultaneously receiving GPS L1, GLONASS, BeiDou and Galileo signals. The GNSS could be worked in standalone mode and assisted mode, according to the different



configurations. In addition, with Integrated LNAs and pre-SAW filters which allows the RMM-G4 module to work well with passive GNSS antennas.

The following table shows the GNSS performance of RMM-G4 module.

Table 4-12 GNSS performance

Condition			Condition	Test Result
GNSS	TTFF	GPS	Cold start	35s@-130dBm
			Warm Start	32s@-130dBm
			Hot Start	1s@-130dBm
		GPS+ BDS+ GLONASS+ Galileo+ QZSS	Cold start	36s@-130dBm
			Warm Start	34s@-130dBm
			Hot Start	1s@-130dBm
	Receive Sensitivity	GPS	Tracking	-162 dBm
			Acquisition	-146 dBm
		GPS+ BDS+ GLONASS+ Galileo+ QZSS	Tracking	-158 dBm
			Acquisition	-146 dBm



NOTE:

1. Performance will vary depending on the environment, antenna type and signal conditions and so on.
2. Assuming 300 sec time out for cold start sensitivity measurement.

3. Structure Specification



3.1Product Appearance

The product appearance for RMM-G4 module is shown in Figure 5-1

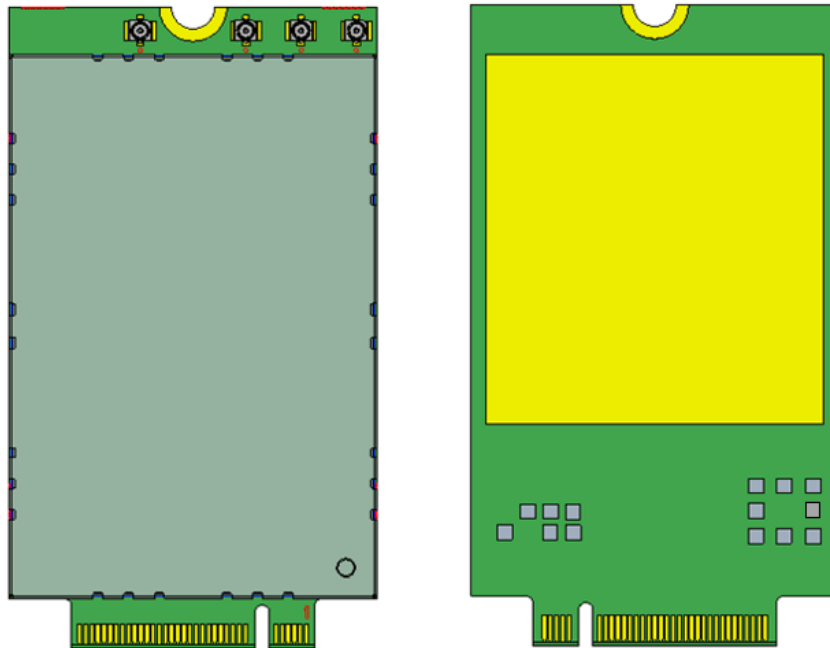


Figure 5-1 Module appearance

3.2Dimension of Structure

The structural dimension of the RMM-G4 module is shown in Figure 5-2:

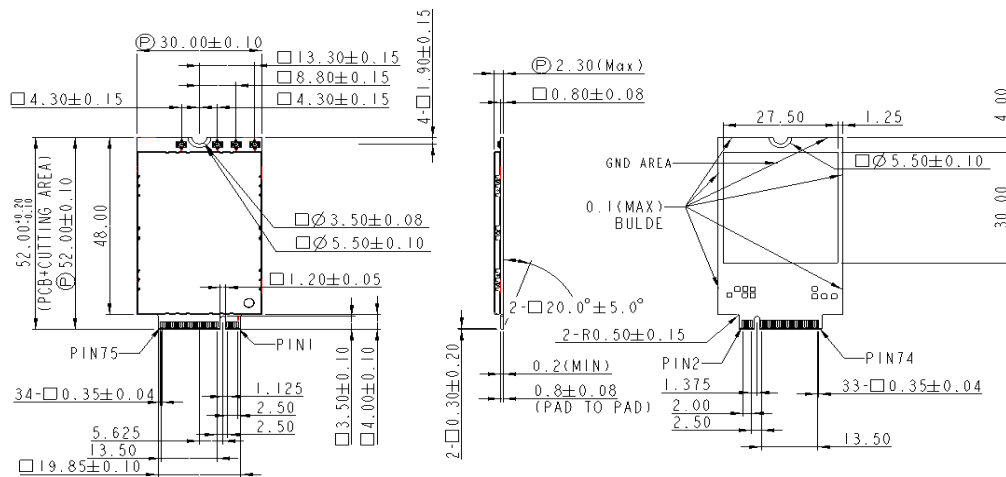


Figure 5-2 Dimension of structure

3.3 M.2 Card Assembly -

3.3.1 Card Insertion

Angled insertion is allowable and preferred; intent is to minimize the insertion and extraction force.

The minimum angle of insertion is 5° and the maximum angle of insertion is 20°.

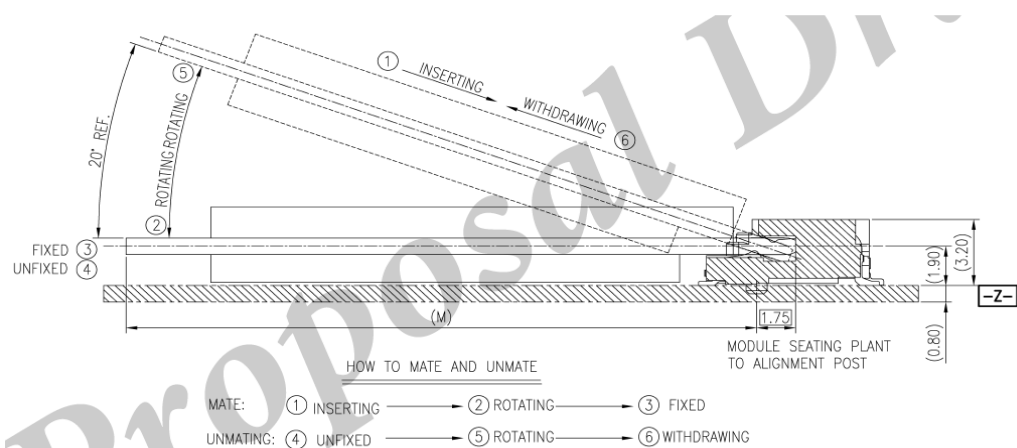


Figure 5-3 Maximum angle of insertion for M.2 Connector

3.3.2 Top-mount Connection with Single-Sided Module

Stack-up top-mount single-sided module is shown in Figure 5-4. The maximum height of components is 1.35mm.

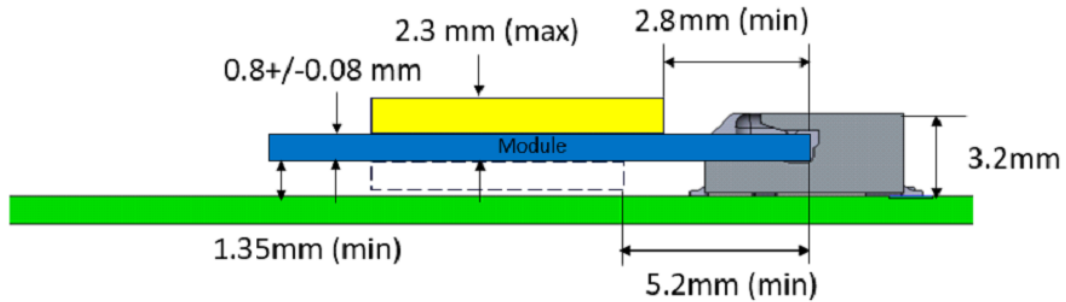


Figure 5-4. Stack-up top-mount single-sided module

- 1) Full keep out area 30×52mm below module, which means don't place any components and routings below M.2 module.
- 2) Add thermal pad between M.2 module and mother board for thermal dissipation.
- 3) If there is a need for double-sided component, the space between PCB and M.2 module is only 1.35mm and additional consideration is required for heat dissipation.
- 4) Special attention is required at the distance of 2.8mm and 5.2mm from the M.2 module edge to the component area.

3.4 RMM-G4 Interface Model

The 5G RMM-G4 module adopts 75-pin gold finger as external interface, where 67 pins are signal pins and 8 pins are notch pins.
(30x52mm, height is 2.3mm max. and KEY ID is B).

3.5 RMM-G4 Connector (standard M.2 connector)

The 5G RMM-G4 Module connects to AP via standard M.2 connector, it is recommended to use a connector that meets the M.2 specification in Table 1-5.

The connector example is shown in Figure 5-5.

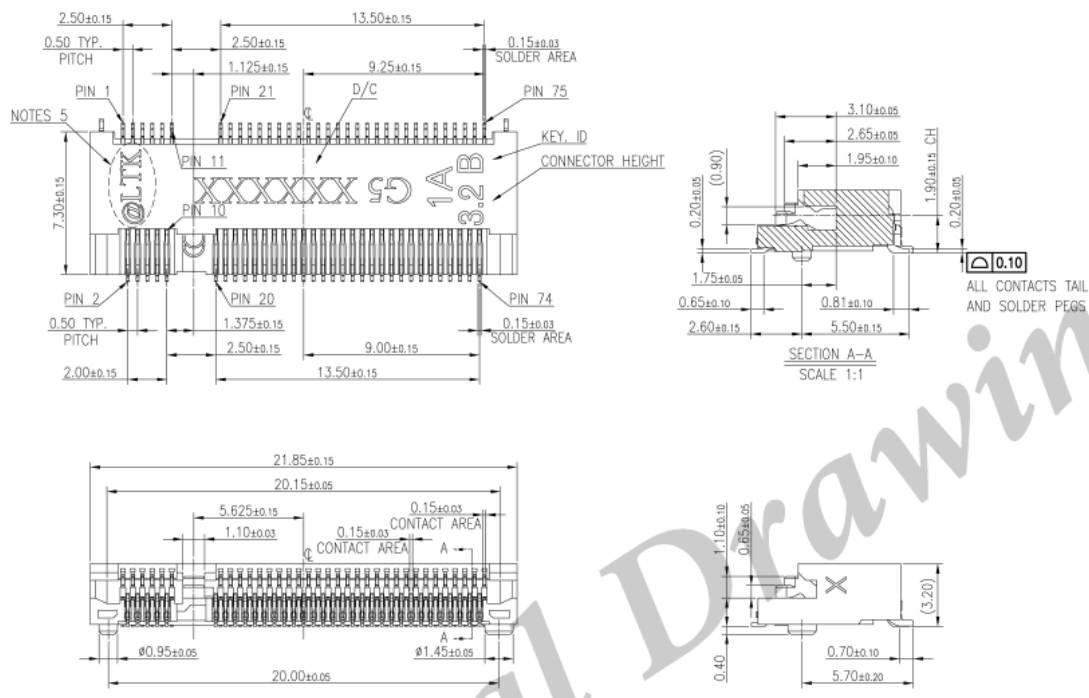


Figure 5-5 M.2 connector example & Dimension of Structure

4. Certifications

The RMM-G4 module is designed to meet, and upon commercial release, will meet the requirements of the following regulatory bodies and regulations, where applicable:

- Federal Communications Commission (FCC) of the United States
- The Certification and Engineering Bureau of Industry Canada (IC)
- The CE Certification of European Union (CE)
- The National Communications Commission (NCC) of Taiwan, Republic of China
- Telecom Engineering Center (TELEC) of Japan.

Upon commercial release, the following industry certifications will have been obtained, where applicable:

- GCF
- PTCRB

Additional certifications and details on specific country and carrier approvals may be obtained upon customer request.



Additional testing and certification may be required for the end product with an embedded RMM-G4 module and are the responsibility of the OEM.

FCC Notice

Model: RMM-G4

Important Notice to OEM integrators

1. This module is limited to OEM installation ONLY.
2. List of applicable FCC rules: 47 CFR Part 22/24/27/90/96
3. 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 4. For FCC Part 15.31 (h) and (k): The host manufacturer is responsible for additional testing to verify compliance as a composite system. When testing the host device for compliance with Part 15 Subpart B, the host manufacturer is required to show compliance with Part 15 Subpart B while the transmitter module(s) are installed and operating. The modules should be transmitting and the evaluation should confirm that the module's intentional emissions are compliant (i.e. fundamental and out of band emissions). The host manufacturer must verify that there are no additional unintentional emissions other than what is permitted in Part 15 Subpart B or emissions are complaint with the transmitter(s) rule(s).
4. Note EMI Consideration: KDB 996369 D04 Module Integration Guide has been considered as “best practice” for RF design engineering testing and evaluation of non-linear interactions which can generate additional noncompliant limits due to module placement to host components or properties.

How to make changes: Only Grantees are permitted to make permissive changes. Please contact us if the host integrator expects the module to be used differently than as granted:

Compal Electronics Inc

Miranda Wu

Miranda_wu@compal.com



Antenna Installation

- (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:

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.



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.

Module Warning statements

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
- (2) This device must accept any interference received, including interference that may cause undesired operation.

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

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.

RF Exposure

This device has been tested and meets applicable limits for Radio Frequency (RF) exposure. The antenna(s) used for this transmitter should be installed and operated with minimum distance 20 cm between the radiator & your body.



Label requirements

Any device incorporating this module must include an external, visible, permanent marking or label which states:

“Contains FCC ID: GKRRMMG4”



Industry Canada Statement

CAN ICES-3(B)/ NMB-3(B)

Radiation Exposure Statement

This equipment complies with FCC/IC 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.

Cet équipement est conforme aux limites d'exposition aux rayonnements FCC/IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.

To ensure RF exposure compliance under portable exposure conditions, the antenna(s) used with this module must be installed in host platforms to provide a 25 mm minimum separation distance from all persons, in all operating modes and orientations of the host platform. The antenna separation distance applies to both horizontal and vertical orientation of the antenna when installed in the host system. Any separation distances less than 25 mm will require additional evaluation and ISSED authorization.

OEM integrators must identify all possible combinations of simultaneous transmission configuration for all transmitters and antennas installed in the host platform. When there are multiple transmitting devices installed in a host platform, an RF exposure evaluation for the simultaneous transmission condition must be performed.

End Product Labeling

When the module is installed in the host device, the IC 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 IC: 2533B-RMMG4"



Hereby, Compal Electronics, Inc., declares that this device is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: www.compal.com



Hereby, Compal Electronics, Inc., declares that this device is in compliance with Radio Equipment Regulations 2017. The full text of the UK declaration of conformity is available at the following internet address: www.compal.com

This device has been tested and meets applicable limits for Radio Frequency (RF) exposure. This equipment should be installed and operated to ensure a minimum of 20 cm spacing to any person at all times.



Waste Electrical and Electronic Equipment (WEEE)

This symbol means that according to local laws and regulations your product and/or its battery shall be disposed of separately from household waste. When this product reaches its end of life, take it to a collection point designated by local authorities. Proper recycling of your product will protect human health and the environment.

電磁波警語

減少電磁波影響，請妥適使用。

WCDMA 頻段宣告

RMM-G4支援WCDMA B1/8

LTE 頻段宣告

RMM-G4支援B1/3/7/8/28/38/41.

5GNR 頻段宣告

RMM-G4支援n1/n3/n7/n8/n38/n41/n78(3300~3570MHz)/n79

電波功率密度 MPE 標準值為：1 mW/cm²，送測產品實測值為：0.462 mW/cm²，
建議使用時設備天線至少距離人體 20 公分。



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Antennas (Maximum allowable gain)

Table 2-4 Maximum allowable gain

Modulation	Frequency (MHz)	Max. Allowable Antenna Gain (dBi)
WCDMA B2/ LTE Band 2/FR1 Band n2	1850 ~ 1910	8
WCDMA B4/ LTE Band 4	1710 ~ 1755	5
WCDMA B5/ LTE Band 5/ FR1 Band n5	824 ~ 849	6.1
LTE Band 7/ FR1 Band n7	2500 ~ 2570	8
LTE Band 12/ FR1 Band 12	699 ~ 716	5.6
LTE Band 13/ FR1 Band 13	777 ~ 787	5.9
LTE Band 14/ FR1 Band 14	788 ~ 798	5.9
LTE Band 17	704 ~ 716	5.6
LTE Band 25/ FR1 Band n25	1850 ~ 1915	8
LTE Band 26/ FR1 Band n26	814 ~ 849	6.1
LTE Band 30/ FR1 Band n30	2305~2315	0.98
LTE Band 38/ FR1 Band n38	2570 ~ 2620	8
LTE Band 41/ FR1 Band n41	2496 ~ 2690	8
FR1 Band n41 PC2	2496 ~ 2690	5.5
FR1 Band n41 PC1.5	2496 ~ 2690	4
LTE Band 48/ FR1 Band n48 For FCC	3550~3700	1
LTE Band 48/ FR1 Band n48 For ISSED	3550~3700	5
LTE Band 66/ FR1 Band n66	1710~ 1780	5
LTE Band 71/ FR1 Band n71	663 ~ 698	5.4



FR1 Band n77 PC3	3300~3980	5
FR1 Band n77 PC2	3300~3980	3
FR1 Band n77 PC1.5	3300~3980	1
FR1 Band n78 PC3	3550~3700	5
FR1 Band n78 PC2	3300~3450	3
FR1 Band n78 PC1.5	3300~3450	1