5G M.2 Module

User Manual

FCC-ID: GKRRXMG1
Module name: RXM-G1

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Notice

The document is subject to update from time to time owing to the product version upgrade or other reasons. Unless otherwise specified, the document only serves as the user guide. All the statements, information and suggestions contained in the document do not constitute any explicit or implicit guarantee.

Content

1. Foreword

1.1 Introduction

This document describes the hardware of the COMPAL® 5G RXM-G1 M.2 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 RXM-G1 M.2 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 RXM-G1 M.2 MODULE is a highly integrated 5G NR wireless communication module that adopts standard PCIe RXM-G1M.2 interface and backward supports with LTE/WCDMA system. It is applicable to most broadband communication networks of the mobile operator across the world.

RXM-G1 has capability on 5G NR Sub6 and mmWave on HW design and using SW to inactive on 5G NR mmWave function.

2.2 Specification

Table 2-1 RXM-G1 5G M.2 module features

Specification		
Platform	QCT SDX55 Cortex-A7 up to 1.5 GHz	
Memory	4Gb NAND Flash (ONFI) with 4Gb LPDDR4X(1.8GHz) MCP	
Operating Band	5G NR_ Sub6 : n2, n5, n41, n66, n71	
	5G NR_mmWave: n258, n260, n261 (Using SW to inactive 5G mmWave fuction)	
	LTE FDD: B2, B4, B5, B7, B12, B13, B14, B25, B26, B30, B66, B71 LTE FCC Downlink only: B29	
	LTE TDD: B41, B48 LTE TDD Downlink only: B46	
	WCDMA/HSPA+: B1, B2, B4, B5, B8	
	Simultaneous GPS L1, GLONASS(GLO), Galileo(GAL) and BeiDou(BDS)	
Network option	SA	Option 2
	NSA	Option 3x/3a
Downlink	LTE	LTE CAT20
	5G sub-6	1CC; Max BW 100MHz; MIMO 4x4
	5G mmWave	8CC; Max BW 800MHz;MIMO 2x2
	LTE	LTE CAT13

Uplink	5G sub-6	1CC; Max BW 100MHz;
	5G mmWave	8CC; Max BW 800MHz;MIMO 2x2
HPUE (Class 2)	B41	
DL 4x4 MIMO	B2, B4, B7, B25, B30, B41, B48, B66 n2, n41, n66	
Carrier aggregation	ULCA, DLCA and EN-DC	
SRS antenna switching	n41 : 1T2R(NSA)	
Power Supply	DC 3.135V～3.465V, Typical 3.3V	
Temperature	Operating temperature[1]:-10℃ ～+55℃	
	Extended temperature[2] : -25℃ ～+75℃	
	Storage temperature: -40℃ ～+85℃	
Physical characteristics	Interface: PCIe M.2 Key B	
	Dimension: 30x52 mm, Thickness=2.25 mm(typ.)	
	Weight: 9.3g	
Interface		
Antenna Connector	3/4G/Sun6G Antenna x 4	
	mmWave Antenna x 3	
	Support 4x4 MIMO	
Function Interface	Single USIM 2.95V/1.8V	
	PCIe Gen3_1xlane	
	USB2.0 HS /USB3.1 SS	
	W_Disable#	
	Body Sar	
	LED control pin	
	Tunable antenna(1xMIPI)	
	I2S(Reserved)	
Software		
Driver	Windows 19H1 and later, Linux kernel v4.4 [3]	

Protocol Stack	IPV4/IPV6
AT commands	3GPP TS 27.007 and 27.005
Firmware update	FOTA
Others feature	Windows MBIM support
	Windows update
	Support 5G NR NSA
	Multiple carrier aggregation
	AGNSS

2.3 Operating Band

The 5G RXM-G1 M.2 Module operating bands of the antennas are as follows:

Table 4-5

Band name	Tx (MHz)	Rx (MHz)	LTE	UMTS	5G NR
PCS (1900)	**1850 - 1910**	**1930 - 1990**	**B2**	**B2**	**n2**
AWS	**1710 - 1755**	**2110 - 2155**	**B4**	**B4**	**–**
Cell (850)	**824 - 849**	**869 - 894**	**B5**	**B5**	**n5**
IMT-E (2600)	**2500 - 2570**	**2620 - 2690**	**B7**		
700 lower A–C	**699 - 716**	**729 - 746**	**B12**		
700 upper C	**777 - 787**	**746 - 756**	**B13**		
700 D	**788 - 798**	**758 - 768**	**B14**		
PCS + G	**1850 - 1915**	**1930 - 1995**	**B25**		
B26	**814 - 849**	**859 - 894**	**B26**		
FLO	***N/A***	**716 - 728**	**B29**		
WCS	**2305 - 2315**	**2350 - 2360**	**B30**		
B41/B41-XGP	**2496 - 2690**		**B41**		**n41**
B46	**5150 – 5925**		**B46**		
B48	**3550 - 3700**		**B48**		
B66	**1710 - 1780**	**2110 - 2200**	**B66**		**n66**
B71	**663 - 698**	**617 - 652**	**B71**		**n71**

2.4 Transmitting Power

The transmitting power for each band of the RXM-G1 XX Module as shown in the following table:

Table 4-6 WCDMA

Mode	Band	Typical Value (dBm)	Note
WCDMA	Band 1	23.5	±2
	Band 2	23.5	±2
	Band 4	23.5	±2
	Band 5	23.5	±2
	Band 8	23.5	±2

Table 4-7 LTE FDD

Mode	Band	Typical Value (dBm)	Note
LTE FDD	Band 2	23	±2
	Band 4	23	±2
	Band 5	23	±2
	Band 7	23	±2
	Band 12	23	±2
	Band 13	23	±2
	Band 14	23	±2
	Band 25	23	±2
	Band 26	23	±2
	Band 30	23	±2
	Band 66	23	±2
	Band 71	23	±2

Table 4-8 LTE TDD

Mode	Band	Typical Value (dBm)	Note
LTE TDD	Band 41	26	±2
	Band 48	23	±2

Table 4-9 NR-FR1 FDD

Mode	Band	Typical Value (dBm)	Note
NR-FR1 FDD	n2	23	±2
	n5	23	±2
	n66	23	±2
	n71	23	±2

Table 4-10 NR-FR1 TDD

Mode	Band	Typical Value (dBm)	Note
NR-FR1 TDD	n41	23 (LTE+NR)	±2

2.5 Antennas (Maximum allowable gain)

Vendor	Modulation	Frequency (MHz)	Max. Allowable Antenna Gain (dBi)
Pulse	WCDMA / HSPA Band II	1852.4 ~ 1907.6	10.07
	WCDMA / HSPA Band IV	1712.4 ~ 1752.6	6.20
	WCDMA / HSPA Band V	826.4 ~ 846.6	9.42
	LTE Band 2 / NR n2	1850 ~ 1910	7.50
	LTE Band 4	1710 ~ 1755	6.14
	LTE Band 5 / NR n5	824 ~ 849	7.00
	LTE Band 7	2500 ~ 2570	8.00
	LTE Band 12	699 ~ 716	6.40
	LTE Band 13	777 ~ 787	7.00
	LTE Band 14	788 ~ 798	9.21
	LTE Band 25	1850 ~ 1915	8.39
	LTE Band 26	824 ~ 849	7.40
	LTE Band 26 (Part 90S)	814 ~ 824	7.40
	LTE Band 30	2305 ~ 2315	1.22
	LTE Band 41 / NR n41	2496 ~ 2690	7.68
	LTE Band 48	3550 ~ 3700	-1.92
	LTE Band 66 / NR n66	1710 ~ 1780	7.50
	LTE Band 71 / NR n71	663 ~ 698	6.50

3. Legal Information

FCC Statement:
Any device incorporating this module must include an external, visible, permanent marking or label which states: “Contains FCC ID: GKRRXMG1”

The RXM-G1 modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification.

The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

15.21
You are cautioned that changes or modifications not expressly approved by the part responsible for compliance could void the user’s authority to operate the equipment.

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 of the device.

This module has been tested and found to comply with the following requirements for Modular Approval.

Part 2.1046 – Measurements required: RF power output
Part 22H – Cellular radiotelephone service
Part 24E – Broadband PCS
Part 27C – Technical standards
Part 90S – Regulations governing licensing and use of frequencies in the 806-824, 851-869, 896-901, and 935-940 MHz Bands, 851-869, 896-901, and 935-940 MHz Bands
PART 96—CITIZENS BROADBAND RADIO SERVICE

FCC RF Exposure:
This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled

environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.