RMM-T1 mPCIE Module

User Manual

Version：AA

Update date：Aug. 6. 2024

Copyright

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.

Revision History

Version	Date	Name	Major Changes
AA	Aug. 6, 2024	**HW** V01	Draft version

Content

1. Foreword

1.1 Introduction

This document is a user manual of COMPAL® RMM-T1 NTN mPCIE Module product.
RMM-T1 mPCIE module dimension is 30x51 mm, which supports 3GPP R17 NB-IOT NTN.
RMM-T1 supports L-Band and S-Band including B23, B24, B255, and B256 by MediaTek chip.
RMM-T1 has a GNSS receiver to support multi-GNSS GPS, Glonass, Galileo, and Beidou satellite systems. The location accuracy is within 15m, 98%.

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 NTN mPCIE 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, we assume 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 handsfree 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 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.

Safety of Children

Do not allow children to use the wireless device without guidance. Small and sharp components of the wireless device may cause danger to children or cause suffocation if children swallow the components.

Environment Protection

Observe the local regulations regarding the disposal of your packaging materials, used wireless device and accessories, and promote their recycling.

WEEE Approval

The wireless device is in compliance with the essential requirements and other relevant provisions of the Waste Electrical and Electronic Equipment Directive 2012/19/EU (WEEE Directive).

RoHS Approval

The wireless device is in compliance with the restriction of the use of certain hazardous substances in electrical and electronic equipment Directive 2011/65/EU (RoHS Directive).

2. FCC Notice

2.1 Introduction

Model: RMM-T1
FCC ID: GKRRMMT1

RMM-T1 mPCIE Module is a highly integrated NTN wireless communication module that adopts mPCIE interface, and backward supports with NTN system. It is applicable to 3GPP R17 NTN narrow-band IOT communication networks of satellite operator across the world.

2.2 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 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).

2.3 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.

2.4 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.

2.5 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.

2.6 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.

2.7 Label requirements

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

“Contains FCC ID: GKRRMMT1”

3. Product Specification

3.1 Product specification list

Model name: RMM-T1

Power supply: DC 3V ~ 3.6V

Connectivity: NTN L-Band (B24 and B255), S-Band (B23 and B256), multi-GNSS Rx

Maximum output power: 23dBm +/- 2dBm

Operating temperature: 0℃ ~ 50℃

Extended temperature: -40℃ ~ 75℃

Maximum allowable antenna gain table as Table 3-1.

Band	Antenna Gain (dBi)	Max. Power (dBm)	Maximum EIRP (dBm
NTN Band 23	7.0	25.0	32.0
NTN Band 24	7.0	25.0	32.0
NTN Band 255	7.0	25.0	32.0

Table 3-1

Antenna connector ports location are showed in Figure 3-1, and which antenna connectors are 4th coaxial connector for external antenna connection.

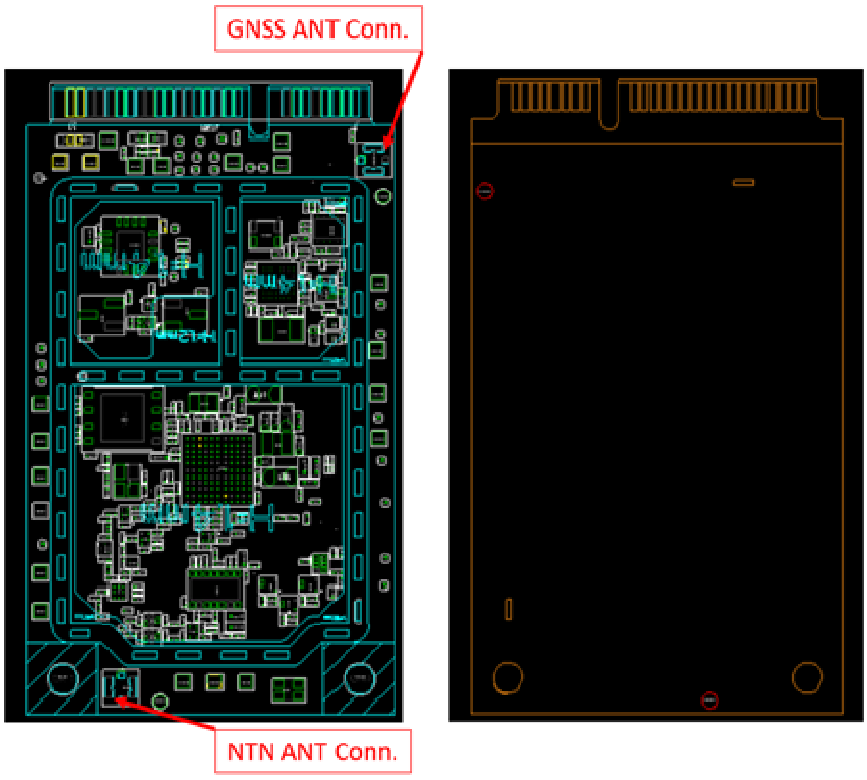

Figure 3-1 Antenna connectors location