



RNGBTCM001 Bluetooth communication Module

User Manual

16 Jun. 2023
Version: V1.0

Applicability

The User Manual applies to the following product:

- Bluetooth communication Module RRGBTCM001

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Date and Revision

June 2023, Revision V1.0

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1. Introduction

The RRGBTCM001 contains a Bluetooth low energy single mode module and an antenna. It could be used for wireless communication.

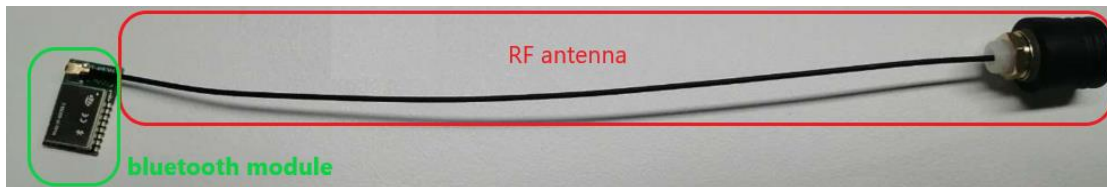
The RRGBTCM001 provides flexible interface that could be powered with 3.3V power rail. It consumes only 0.15uA in lowest power shutdown and will wake up in few microseconds.

The transmission distance is 100 meter.(at face to face, free space, 1.2 meter high from ground for testing).

2. Production description

Part number	Material type	
RRGBTCM001	Bluetooth module	RRGBTCM001
	antenna	1.01.21.11.0028.00

The Bluetooth communication contains two parts, as below figure.



The RRGBTCM001 figure

The antenna should be assembly to the external of unit's shell when RRGBTCM001 is used to transmit data for a unit. The Bluetooth should be welding to PCB of unit.

2.1 Bluetooth module

Part number	vender	description
HY-40R204IC	SHENGRUN	External antenna with IPEX interface, with shielding case

The HY-40R204IC is fulfilled: Bluetooth V4.2 single mode compliant.

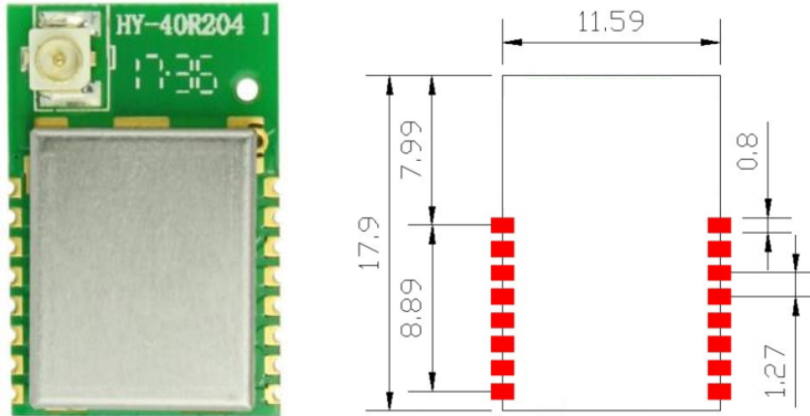
Transmit power :+5 dBm typical

Receiver sensitivity: -97dBm typical

Ultra low current consumption :Shutdown. No clocks running, no retention: 150 nA(Typical)

Programmable ARM Cortex-M3 processor for embedding full applications.

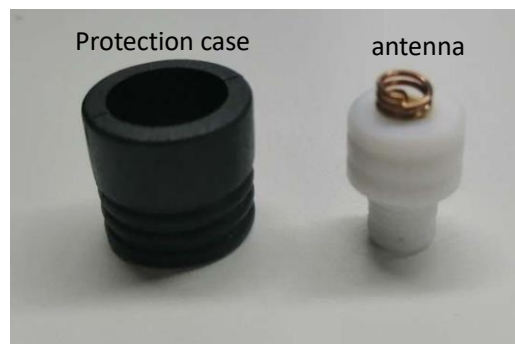
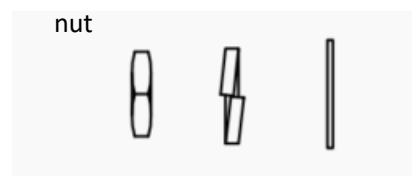
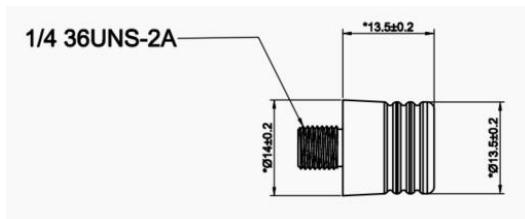
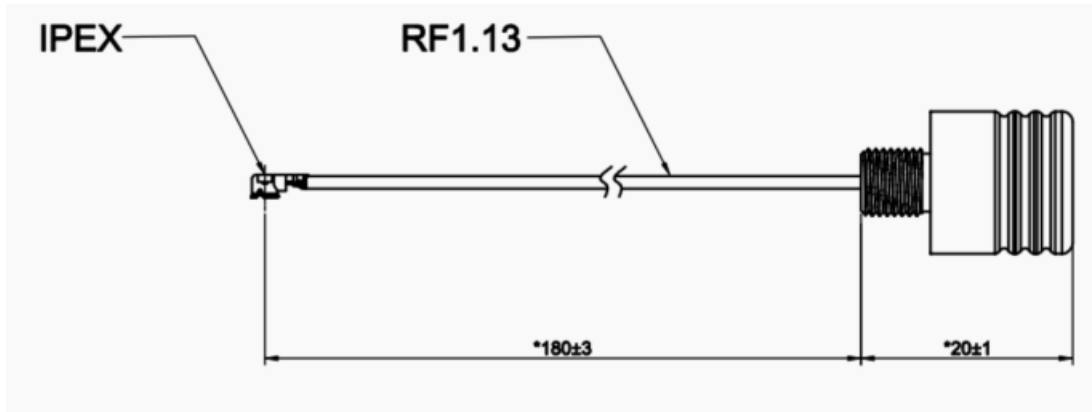
PCBA dimension size and figure



The detailed interface definition see HY-40R204IC specifications.

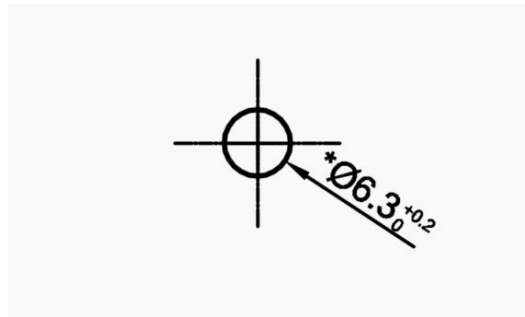
2.2 RF antenna

The antenna contains connection wire, antenna, protection case, nut. As below.



The RF antenna figure

The antenna is assembly that should open hole on shell of unit, the hole size is 6.3mm as below.



Assembly hole size

2.3 Application note

- The around antenna placement that is assembled on unit's case should be near metal and prevent material existence of electromagnetic radiation, this will affect the transfer distance. Recommendation as below.



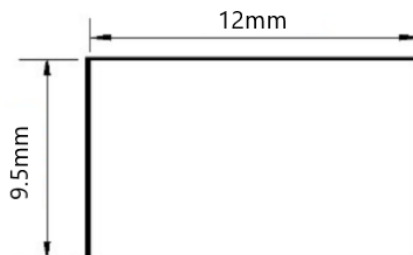
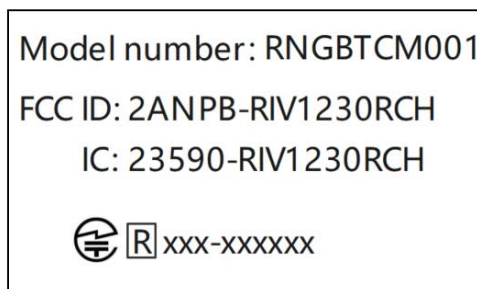
- The fixed antenna nut should be fulfilled requirement of torque, the excessive torque will lead to damage the teeth of antenna, the small torque will cause that the antenna is loose. Recommendation torque is $0.3 \pm 0.05\text{N}\cdot\text{m}$.
- Attention to the electrostatic protection, prevent the soldering iron and the equipment grounding bad; And the workbench, working environment, packaging materials and from the human body Touch with static electricity, etc., destroy IC ; Manual welding module solder iron temperature, should pay attention to avoid the PCB copper stripping off; Soldering iron strictly Grounding requirements, eliminating solder iron leak voltage and avoid supply power V_{cc} switch instant turn on/ turn off state ,generate high voltage, May be let the module to damaged; Recommended operating voltage $2.4\text{V}\sim 3.3\text{V}$, operation temperature range $-40^{\circ}\text{C}\sim 85^{\circ}\text{C}$. ESD ratings as below table.

			Value	Unit
V _{ESD} Electrostatic discharge	Human body model (HBM), per ANSI/ESDA/JEDECJS001	All pins	±2500	V
	Charged device model (CDM), per JESD22-C101	RF pins	±750	
		Non-RFpins	±750	

- Attention to avoid the overall motherboard power supply circuit of bad welding connected to short circuit or open circuit, causing the Bluetooth chip, abnormal voltage, The software will fly and problems of IC was damaged.
- Use the module in the production and the transport process, please insure module's component protection, prevent the precision parts on the module damaged.
- The module is humidity sensitive components (MSD level 3), if used in SMT reflow soldering operations, please strictly follow the IPC/JEDECJ-STD-020 regulation, completes the drying dehumidifying, and for this module has second processing work after placed in the functional test environment, the humidity of the chip is no guarantee that in a certain ratio, The attention note show in below figure.



3. Label and FCC ID & IC



Label should contain model number and FCC ID and IC number.
 The model number of Bluetooth communication module is RNGBTCM001.
 FCC ID is 2ANPB-RIV1230RCH.
 IC is 23590-RIV1230RCH.
 MIC is TBD until MIC report finished.
 The label size is 12mm*9.5mm, it should be pasted to shield case.

4. Antenna size, gain and test data information

For antenna size as section 2.2 antenna figure.

Individually tested antenna, tested data:

return loss is -10.2dB at 2.4GHz

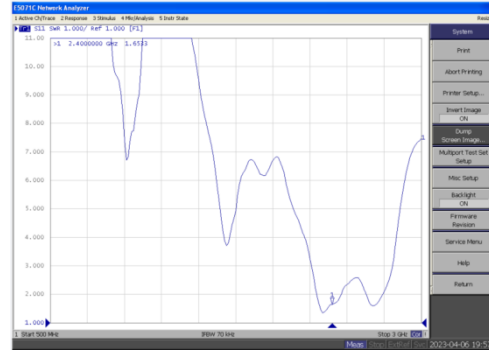
VSWR is 1.65

Gain is 3.56dBi

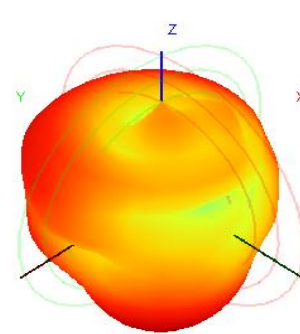
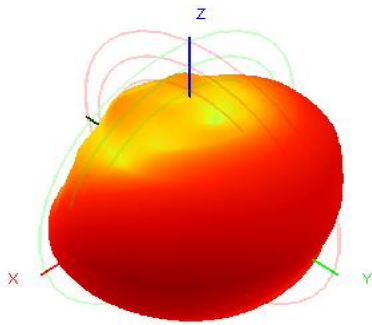
Tested wave as below figures, measuring frequency 2.4GHz~2.5GHz.



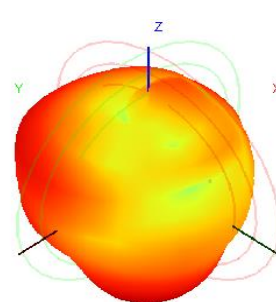
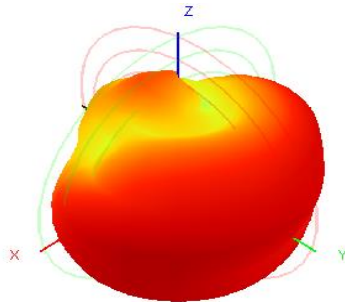
Return loss



VSWR



2.4GHz measured data



2.5GHz measured data

5. Statements

FCC/Industry Canada Statement (to be placed on End Products)
Federal Communications Commission (FCC) Statement

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

Note: 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.

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

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.

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 20cm between the radiator & your body.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01

2.2 LIST OF APPLICABLE FCC RULES:

Compliance with § 15.247 regulation

2.3 SPECIFIC OPERATIONAL USE CONDITIONS:

The module is typically use in industrial, household and general office / ITE and audio & video, EV charging system end-products. The product must not be co-located or operating in conjunction with any other antenna or transmitters.

2.4 LIMIT MODULE PROCEDURES:

Not applicable as this radio module meets the Single-Modular transmitter requirements.

2.5 TRACE ANTENNA DESIGNS:

The module was designed with the fixed PCB print antenna and the maximum gain is about 3.56dBi between 2400-2500MHz, any changes or modifications

by the OEM integrator will require additional testing and evaluation.

2.6 RF EXPOSURE CONSIDERATIONS:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This product must be installed and operated with a minimum distance of 20 cm between the radiator and user body. OEM integrator shall equipped the antenna to compliance with antenna requirement part 15.203& 15.204 and must not be co-located or operating in conjunction with any other antenna or transmitters, otherwise, a Class II Permissive Change (C2PC) must be filed with the FCC and/or a new FCC authorization must be applied.

2.7 ANTENNAS:

The antenna of the module was deisgned as PCB printed on the PCBA board and the best gain is about 3.56dBi between 2400-2500MHz. Modification the antenna design may need additional testing and evaluation.

2.8 LABEL AND COMPLIANCE INFORMATION:

The final end product into which this RF Module is integrated has to be labeled with an visible area and stating the FCC ID of the RF Module, such as "Contains FCC ID: 2ANPB-RIV1230RCH". If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users' manual: 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.

The User's Manual for The finished product should include the following statements:

Any changes or modifications to this equipment not expressly approved by the OEM/Integrator may cause harmful interference and void the user's authority to operate this equipment.

Integrator is reminded to assure that these installation instructions will not be made available to the end-user of the final host device.

2.9 INFORMATION ON TEST MODES AND ADDITIONAL TESTING REQUIREMENTS:

Data transfer module demo board can control the EUT work in RF test mode at specified conditions. This radio module must not be installed to co-locate and operating simultaneously with other radios in the host system except in accordance with FCC multi-transmitter product procedures. Additional testing and equipment authorization may be required operate simultaneously with other radio. This device is intended only for OEM integrators under the following conditions: 1) The antenna must be installed such that 20cm is maintained between the antenna and users, and 2) The transmitter module may not be co-located with any other transmitter or antenna. As long as the 2 conditions above are met, further transmitter tests will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

2.10 ADDITIONAL TESTING, PART 15 SUBPART B DISCLAIMER:

The host product manufacturer is responsible for compliance with 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.

General Statements

The module is intended only for OEM integrators.

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

The OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

OEM integrator shall not modify and change the fixed designed PCB print antenna, and must not be co-located or operating in conjunction with any other antenna or transmitters, otherwise, a Class II Permissive Change (C2PC) must be filed with the FCC and/or a new FCC authorization must be applied.

The product is typically use in industrial, household and general office / ITE and audio & video, EV charging system end-products.

Industry Canada (IC) Statement:

This device complies with Industry Canada licence - exempt RSS standard(s). 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.

Radiation Exposure Statement:

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm 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.

This radio transmitter 23590-RIV1230RCH has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

The Industry Canada certification label of a module shall be clearly visible at all times when installed in the host device, otherwise the host device must be labeled to display the Industry Canada certification number of the module, preceded by the words "Contains transmitter module", or the word "Contains", or similar wording expressing the same meaning, as follows:

Contains IC: 23590-RIV1230RCH

or Contains transmitter module IC: 23590-RIV1230RCH

6. Manufacturer information

Manufacturer:

RENOGY New Energy Co., Ltd

Address:

Room 624-625, Taicang German Overseas Students Pioneer Park, No.66
Ningbo East Road, Taicang Economic Development Zone, Taicang, Jiangsu,
215000 China