

PRODUCT SPECIFICATION

Bluetooth 5.2 BLE IoT Module Model Number: YGB-T305B

Custom Approval Section		
Custom Name		
Department		
Approval		Date :
Version	V0.3	

DESIGN	CHECK	APPROVAL
KY	Kyle.Guo	Jimmy.Huang
2022.09.19	2022.09.19	2022.09.19

ESD CAUTION

This module is ESD (Electrostatic Discharge) sensitive device and may be damaged with ESD or spike voltage. Please handle with care to avoid the permanent malfunction or the performance degradation.



杭州雅观科技有限公司
HANGZHOU ARGRACE TECHNOLOGY CO.,LTD

中国杭州市余杭区欧美金融城 T4 美国中心 9 层 901-2 室
R901-2, 9F/T4 US CENTER EURO AMERICA FINACIAL CITY HANGZHOU CHINA

CONTENTS

1. Overview	3
2. Features	3
3. Electrical Parameters	4
3.1 Absolute electrical parameters	4
3.2 Normal Operation conditions	4
3.3 RF current consumption	4
4. RF features	5
4.1 Basic RF features	5
4.2 RF output power	5
4.3 RF sensitivity	5
5. Pin Definition and Reference Circuit	6
5.1 Pin Definition	6
5.2 Reference Circuit	7
6. Dimensions and Footprint	7
7. Antenna notices	8
8. Production instructions	9
8.1 Recommended Reflow Profile	9
8.2 Storage of module and Bake	9
9. Regulatory Module Integration Instructions	11
10. FCC Statement	11

1. Overview

YGB-T305B is a low power embedded Bluetooth module developed by ARGRACE. It consists of a highly integrated Bluetooth chip TG7120B and a several peripheral components. It has built-in Bluetooth network communication protocol stack and rich library functions. The YGB-T305B also includes a low-power 32-bit MCU that supports Bluetooth SIG MESH, BLE5.2/2.4G Radio, 3 reusable I/O ports, 512KB built-in FLASH, and OTA (over-the-air) support.

2. Features

- Built-in low power 32-bit MCU, which can also function as an application processor.
 - Operating voltage: 3.3±0.3V
 - Peripheral: 3xPWM, IIC, UART
 - BLE RF features - BLE5.2 TX transmit power: +8dBm, RX receive sensitivity: -93dBm
 - Operating temperature: -40°C to +105°C
 - RF output pad, please design an antenna in the end product.
- Application area
 - Smart LED lights
 - Smart households
 - **MSL Level: 3, Pay attention on the storage and re-bake condition.**

3. Electrical Parameters

3.1 Absolute electrical parameters

Parameter	Description	Minimum value	Maximum value	Unit
Ts	Storage temperature	-40	120	°C
VCC	Power supply voltage	-0.3	3.6	V
ESD_HBM	Tamb.=25°C		2000	V
ESD_MM	Tamb.=25°C		200	V

3.2 Normal Operation conditions

Parameter	Description	Minimum value	Typical value	Maximum value	Unit
Ta	Operation temperature	-40		105	°C
VCC	Power supply voltage	3.0	3.3	3.6	V
VIL	I/O low-level input	-0.3		VCC*0.25	V
VIH	I/O high-level input	VCC*0.75		VCC	V
VOL	I/O low-level output			VCC*0.1	V
VOH	I/O high-level output	VCC-0.3		VCC	V

3.3 RF current consumption

*Please supply the power for the module with 3.3VDC/50mA at least.

Symbol	Condition	Typical value	Unit
I _{tx}	Constant transmission, 0 dBm output power	12	mA
I _{tx}	Constant transmission, 8 dBm output power	25	mA
I _{rx}	Constant receiving	12	mA
I _{deepsleep}	Deep sleep mode (retention RAM)	4	uA

4. RF features

4.1 Basic RF features

Parameter	Description
Frequency band	2.4GHz ISM band
Wireless standard	BLE 5.2
Data transmission rate	1Mbps, 2Mbps
Antenna type	I/O RF output

4.2 RF output power

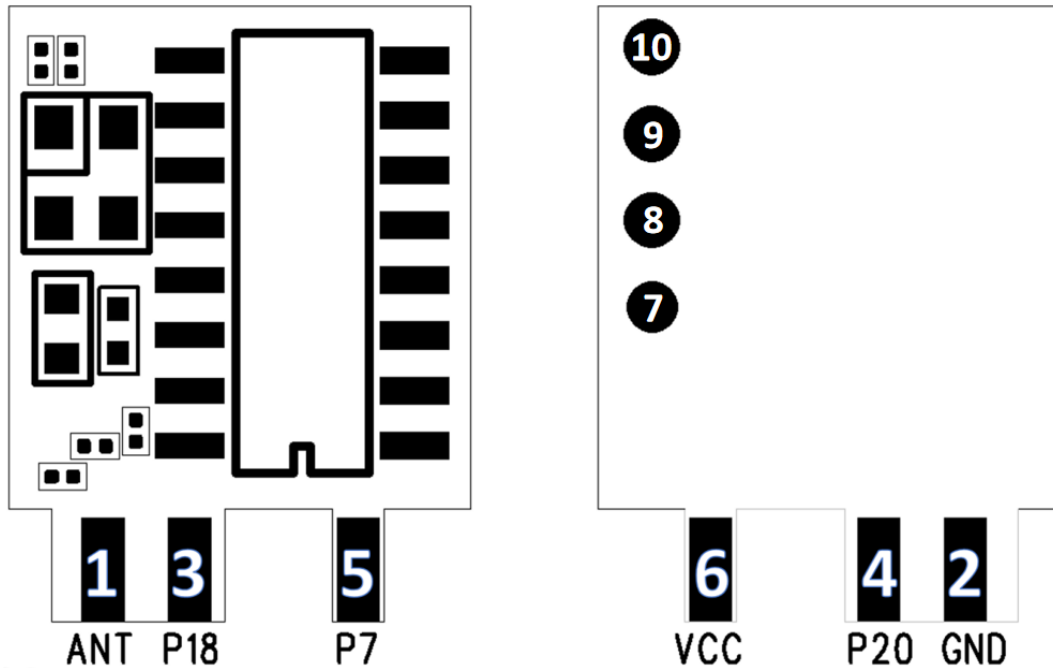
Parameter	Minimum value	Typical value	Maximum value	Unit
Average RF output power	-20	0	8	dBm

4.3 RF sensitivity

Parameter	Minimum value	Typical value	Maximum value	Unit
RX sensitivity (1Mbps)	-	-93	-	dBm
Co-channel interference suppression	-	-6	-	dB

5.Pin Definition and Reference Circuit

5.1 Pin Definition



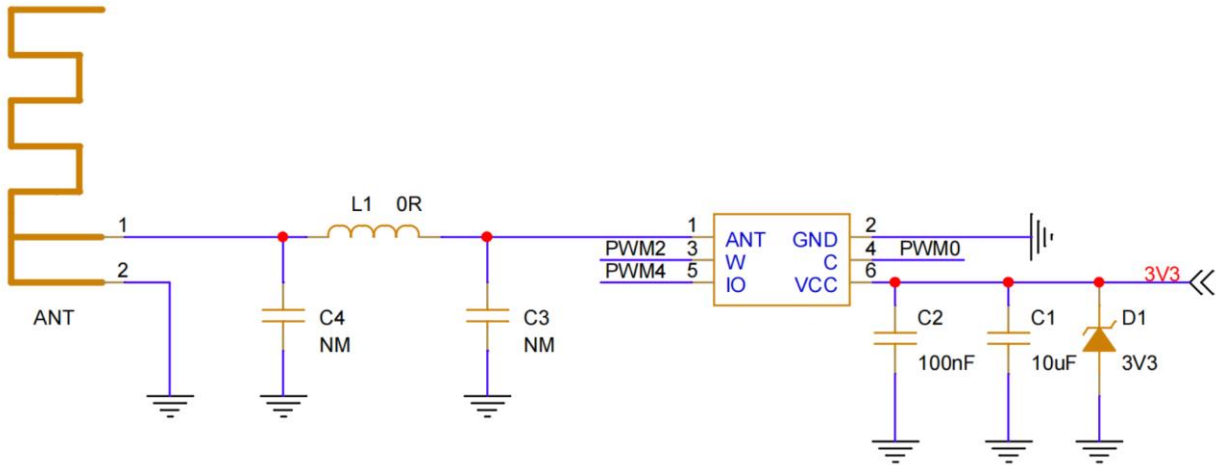
Pin	Symbol	IO Type	Description
1	ANT	-	Antenna port
2	GND	P	Power supply reference ground pin
3	P18	I/O	GPIO Port, which can be used as a PWM output of the LED drive and is connected to pin P18 on the IC
4	P20	I/O	GPIO Port, which can be used as a PWM output of the LED drive and is connected to pin P20 on the IC
5	P7	I/O	GPIO Port, which can be used as a PWM output of the LED drive and is connected to pin P7 on the IC
6	VCC	P	Power Supply 3.3V, please reserve a 10uF(or more), a 100nF and a 3.3V Zener Diode near this pad on customer's mother board.
Test point 7	VCC	P	Power supply pin (3.3 V)
Test point 8	TX	I/O	UART TX, which is connected to pin P9 on the IC
Test point 9	RX	I/O	UART RX, which is connected to pin P10 on the IC
Test point 10	GND	P	Power supply reference ground

NOTE:

*1: I-INPUT; O-OUTPUT; PU-Internal weak resistance pulled high; PD - Internal weak resistance pulled low.

***2: Please reserve a 3.3KOhm pull down resistor on each PWM path for lighting application.**

5.2 Reference Circuit

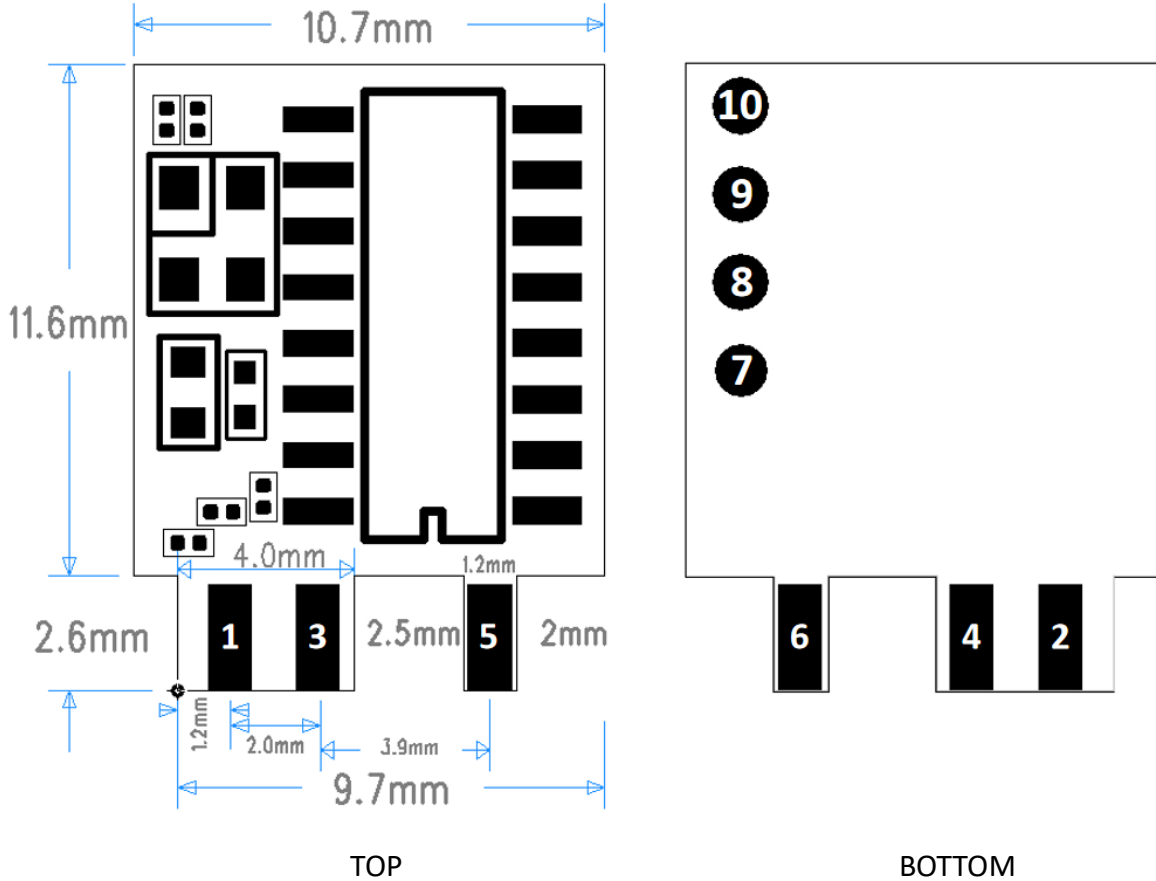


Please reserve a π type matching network for the external antenna, L1, C3, C4 parameter depends on the antenna matching result.

6. Dimensions and Footprint

YGB-T305B has 6 pins and 4 test points.

YGB-T305B size: $10.7\pm 0.3\text{mm(W)} \times 14.2\pm 0.3\text{mm(L)} \times 2.55\pm 0.3\text{mm(H)}$, wherein PCB thickness $1.0\text{mm} \pm 0.1\text{mm}$, package as shown as below:



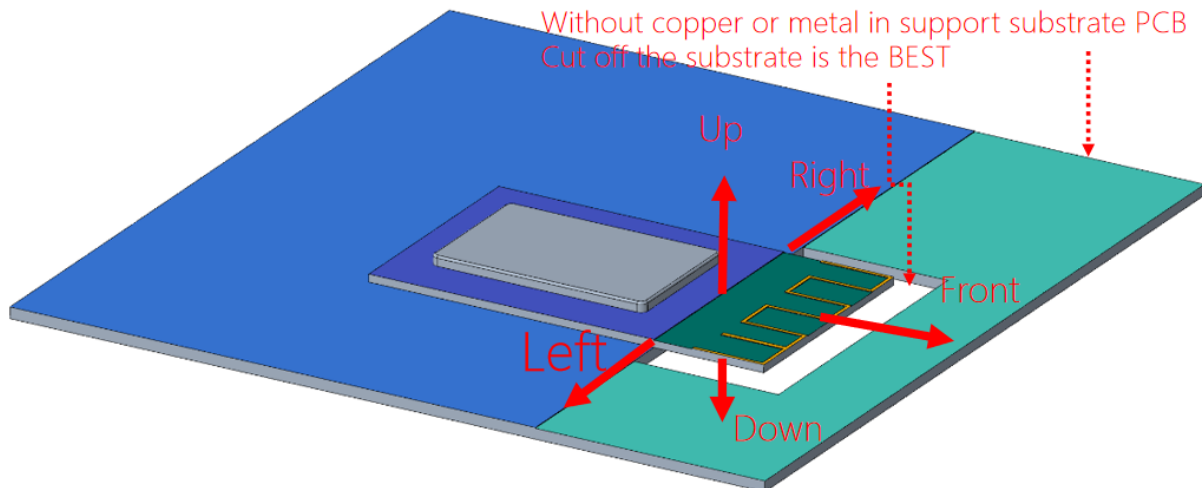
7. Antenna notices

To ensure optimal Wi-Fi/BLE/ZIGBEE performance when the module uses an onboard PCB antenna, it is recommended that the antenna be at least 15mm away from other metal parts.

- Place the antenna outside the PCB frame.
- Place the antenna along with the PCB frame without copper nearby.
- Place the antenna in a carved area on the PCB.

The preceding solutions ensure that there are no substrate media above or below the antenna and that copper is at a certain distance away from the antenna to maximize the antenna radiation performance.

Antenna Keeout Up/Down/Left/Right and Front without Metal , at least 15mm away from other metal parts



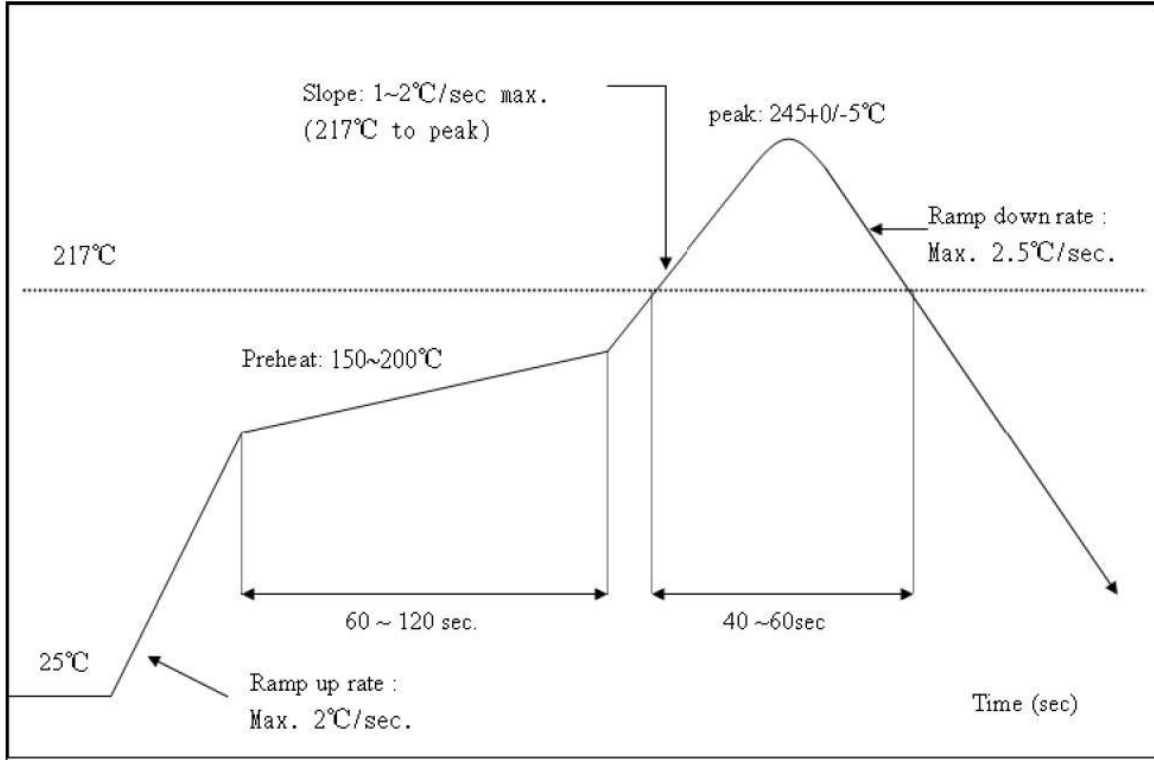
8. Production instructions

8.1 Recommended Reflow Profile

Referred to IPC/JEDEC J-STD-020, J-STD-033 standard

Peak Temperature: <250°C

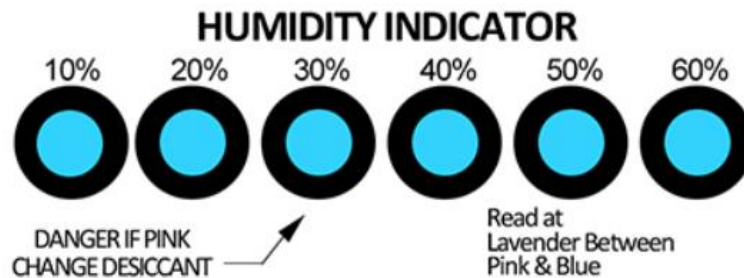
Number of Reflow Times : ≤2 times



8.2 Storage of module and Bake

8.2.1 Modules are Moisture Sensitivity Levels (MSL) 3 and Electrostatic Discharge (ESD) sensitivity devices, please follow the IPC/JEDEC J-STD-020, J-STD-033 handle the SMT process and do the ESD protection in all process.

8.2.2 The modules must storage in the Moisture-Proof bags, and stored in an environment under temperature < 30°C and relative humidity < 85% RH. A humidity indicator card inside in the sealed package.



8.2.3 Bake

After unpacking the Moisture-Proof bags and

- (a) find without humidity indicator card inside or
- (b) the humidity indicator card 10% and above shows pink or
- (c) total exposure time has lasted for over 168 hours since unpacking or
- (d) more than 12 months have passed since the sealing of the bag.

The module needs to be baked again before reflow or wave soldering.

The baking parameters:

1. Temperature/Time: 60°C and ≤ 5% RH for reel package for 48 hours and 125°C and ≤5% RH for tray package for 8 hours (please use the heat-resistant tray rather than plastic container)
2. Alarm temperature: 65°C for reel package and 130°C for tray package
3. SMT-ready temperature after cooling down below 36°C in room temperature.
4. Re-baking: If modules still not finish the oven reflow for over 168 hours after baked, it needs to be baked again.
5. If modules expose without sealed, storage under 10% RH or without baked over 168 hours, DO NOT use the reflow soldering or wave soldering to solder them.

If the Moisture-Proof bag has been unpacked over 3 months, DO NOT reflow soldering or wave soldering these modules, the module's solder pad could be oxidized and cause the solder joint failure, ARGRACE does not assume the corresponding responsibility.

9. Regulatory Module Integration Instructions

Common specific operation conditions:

This module can be used in household electrical appliances as well as lighting products. The input voltage to the module should be nominally 3.0~3.6VDC, typical value 3.3VDC and the ambient temperature of the module should not exceed 105°C.

This module using only one kind of antennas with maximum gain is 2.14dBi. Other antenna arrangement is not covered by this certification.

The antenna is not field replaceable. If the antenna needs to be changed, the certification should be re-applied.

It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).

10. FCC Statement

Warning: 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.

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 or 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

The device must not be co-located or operating in conjunction with any other antenna or transmitter. 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 minimum separation generally be used is at least 20cm.

The DUT are produced with a standard PVC enclosure that does not affect wireless transmission and reception characteristics.

This device is intended only for OEM integrators under the following conditions:

The antenna must be installed such that 20cm is maintained between the antenna and user’s body, and the maximum antenna gain allowed for use with this device is 2.14dBi.

The module doesn’t integrate antenna on it, required an external monopole antenna with a length $30 \pm 0.1\text{mm}$ and with gain smaller than 2.14dBi for the FCC rules. Antenna shown as below.



The RF module is considered as a limited modular transmitter according to FCC rules. Even though the RF module get FCC ID, the host product manufacturer can’t use the FCC ID on the final product directly. In these circumstances, the host product manufacturer integrator will be responsible for re-evaluating the end products (including the transmitter) and obtaining the FCC authorization by a Class II permissive change application or a new application.

The transmitter module may not be co-located with any other transmitter or antenna. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

IMPORTANT NOTE:

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 products (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling:

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end products must be labeled in a visible area with the following: “Contains FCC ID: 2AYYQ-YGB-T305B”. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

Manual Information to the End User:

The OEM integrator must 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 products which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

We, Hangzhou Yaguan Technology Co., LTD, declared that our module YGB-T305B(FCC ID :2AYYQ-YGB-T305B) is only FCC authorized for the FCC rule parts 15B/15C .The host product manufacturer is responsible for compliance to other rules that our module not cover. Please be noticed that the final host product still requires Part 15 Subpart B compliance testing with our module installed.

Document revision history

Rev.	Date	Author	Remarks
Version 0.1	2022.02.21		Draft
Version 0.2	2022.09.16		IC: TG7120B,
Version 0.3	2022.09.19		3.0V~3.6V, RF output pad, FCC, CE Statement