

PRODUCT SPECIFICATION

R110NB-IA

Bluetooth 5.0 Module Datasheet

Version:v1.2

Customer: _____

Customer P/N: _____

Signature: _____

Date: _____

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R110NB-IA Module Datasheet

Ordering Information	Part NO.	Description
	FGR110NBIA-02	LE5010AI,BLE5.0,1T1R,18.6*12.2mm,UART, 内置 512KBflash,板载天线, 明微电子:FCOMW001

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1. General Description

1.1 Introduction

R110NB-IA is a low-cost and low-power consumption BT5.0 module. It is highly integrated internally with a 32-bit MCU with 64kByte SRAM and 512kByte Flash, as well as bluetooth 5.0 BLE transceiver. The Bluetooth wireless module complies with the Bluetooth 5.0 BLE standard. Moderate module size, suitable for applications such as smart LEDs. It can efficiently solve emergency communication problems in complex environments such as high-rise, underground, tunnels and large complex environments.

1.2 Description

Model Name	R110NB-IA
Product Description	Support Bluetooth functionalities
Dimension	L x W x H: 18.6 x 12.2 x 2.84 mm
BT Interface	UART
Operating temperature	-40°C to 85°C
Storage temperature	-40°C to 105°C

2. Features

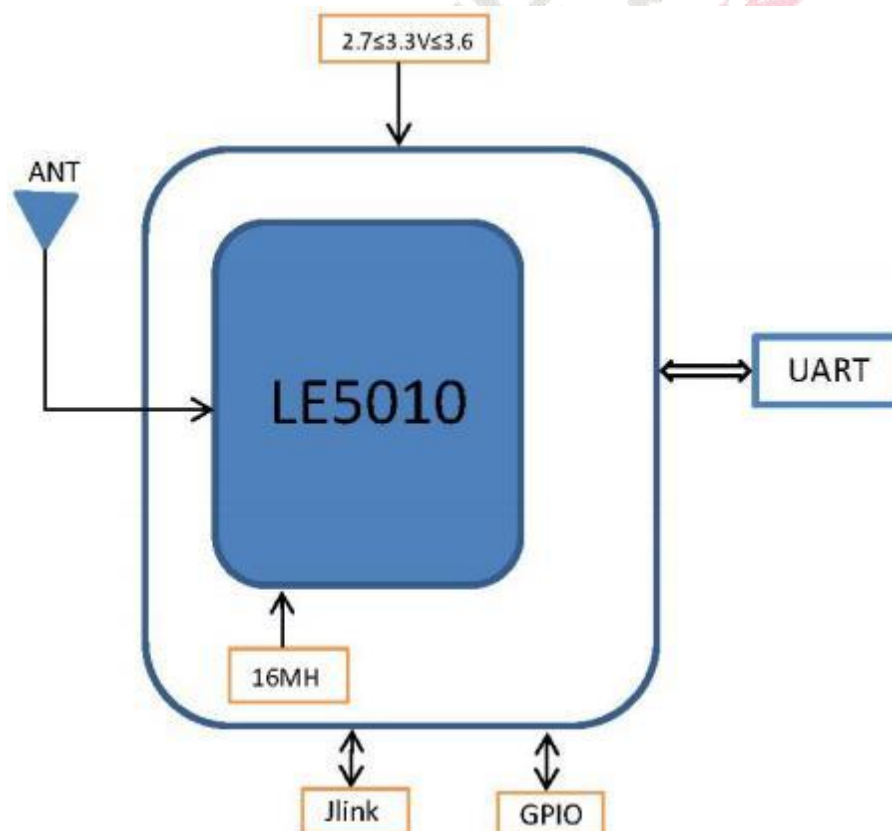
General Features

- Support for single-ended Antenna Output
- Support Bluetooth SIG Mesh
- Support 125Kbps/500Kbps/1Mbps/2Mbps
- Support BLE5.0

Bluetooth Features

- Support UART Interface

3. Block Diagram



4. General Specification

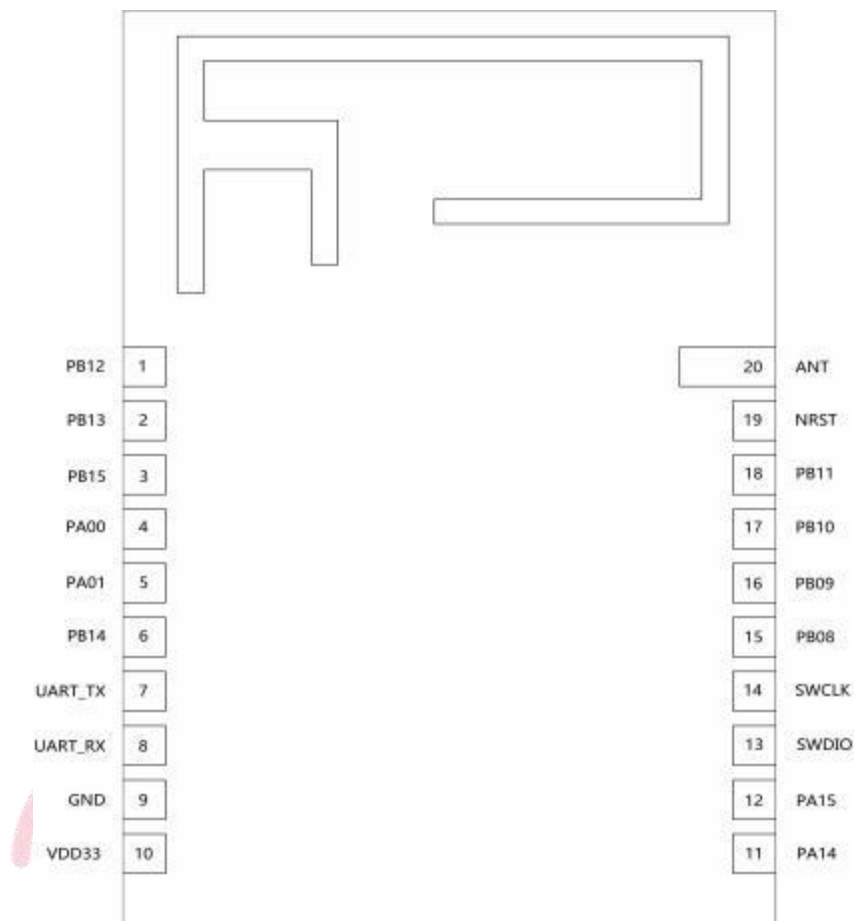
4.1 Bluetooth Specification

Feature	Description		
General Specification			
Bluetooth Standard	Bluetooth V5.0 BLE		
Host Interface	UART		
Antenna Reference	Small antennas with 0~2 dBi peak gain		
Frequency Band	2402 MHz ~ 2483.5 MHz		
Number of Channels	40（3 Advertising + 37 Data）		
Modulation	GFSK		
RF Specification			
	Min(dBm)	Typical(dBm)	Max(dBm)
Output Power	-3	0	3
Sensitivity @ PER<=30.8% for LE 1Mbps		-90	
Maximum Input Level	LE 1Mbps: -20dBm		
	LE 2Mbps: -20dBm		

5. Pin Definition

5.1 Pin Outline

< TOP VIEW >



5.2 Pin Definition details

NO.	Name	Type	Description	Voltage
1	PB12	I/O	GPIO Pin /ADC0	
2	PB13	I/O	GPIO Pin /ADC1	
3	PB15	I/O	GPIO Pin /WKUP	
4	PA00	I/O	GPIO Pin /ADC4 /WKUP	
5	PA01	I/O	GPIO Pin /ADC5	
6	PB14	I/O	GPIO Pin	
7	USRT_TX	I/O	PB00/ GPIO Pin /UART Download serial port TX	
8	USRT_RX	I/O	PB01/ GPIO Pin /UART Download serial port RX	
9	GND		Ground connections	

10	VDD33	p	3.3V power input	
11	PA14	I/O	GPIO Pin	
12	PA15	I/O	GPIO Pin	
13	SWDIO	I/O	PB05/ GPIO Pin /Debugging port: SWDIO data cable	
14	SWCLK	I/O	PB06/ GPIO Pin /Debugging port : SWCLK clock line	
15	PB08	I/O	GPIO Pin	
16	PB09	I/O	GPIO Pin	
17	PB10	I/O	GPIO Pin	
18	PB11	I/O	GPIO Pin /WKUP	
19	NRST	I/O	Power enable of module ON: pull high ; OFF: pull low	
20	ANT		Floating (NC)	

P:POWER I:INPUT O:OUTPUT

1. When PB0 and PB1 are powered on, TX and Rx are burned by default
2. When burning through UART port, PB14 needs to be pulled up

6. Electrical Specifications

6.1 Power Supply DC Characteristics

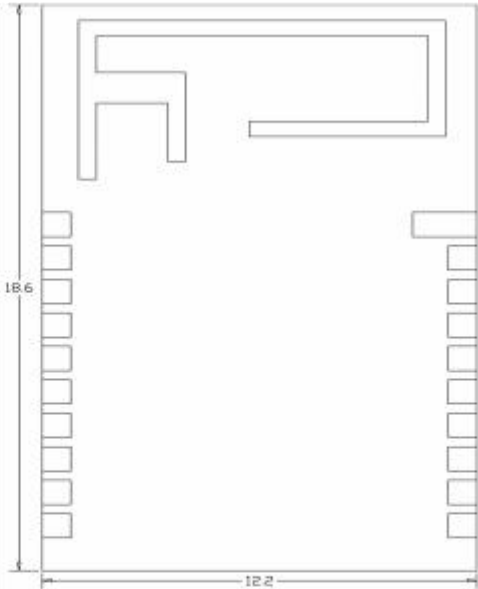
	MIN	TYP	MAX	Unit
Operating Temperature	-40	25	85	deg.C
Operating Voltage	2.7	3.3	3.6	V

6.2 Power Consumption

Power Consumption	TX LE@5dbm:12.5mA	RX LE@-95dbm:11.5mA
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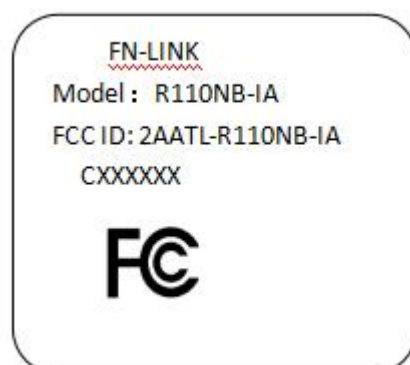
7. Size reference

7.1 Module Picture

L x W : 12.2 x 18.6 (± 0.25) mm	
H: 2.84 (± 0.2) mm	
Weight	0.81g

7.2 Marking Description

Since the labels are relatively small, they are placed inside the user manual and packaging.



< TOP VIEW >



备注:

二维码内容: 112233445566;FGR110NBIA-02

1. Fn-Link 商标 logo

2. 机型: R110NB-IA

3. 二维码: 编码规则为“BT mac 地址;成品料号”

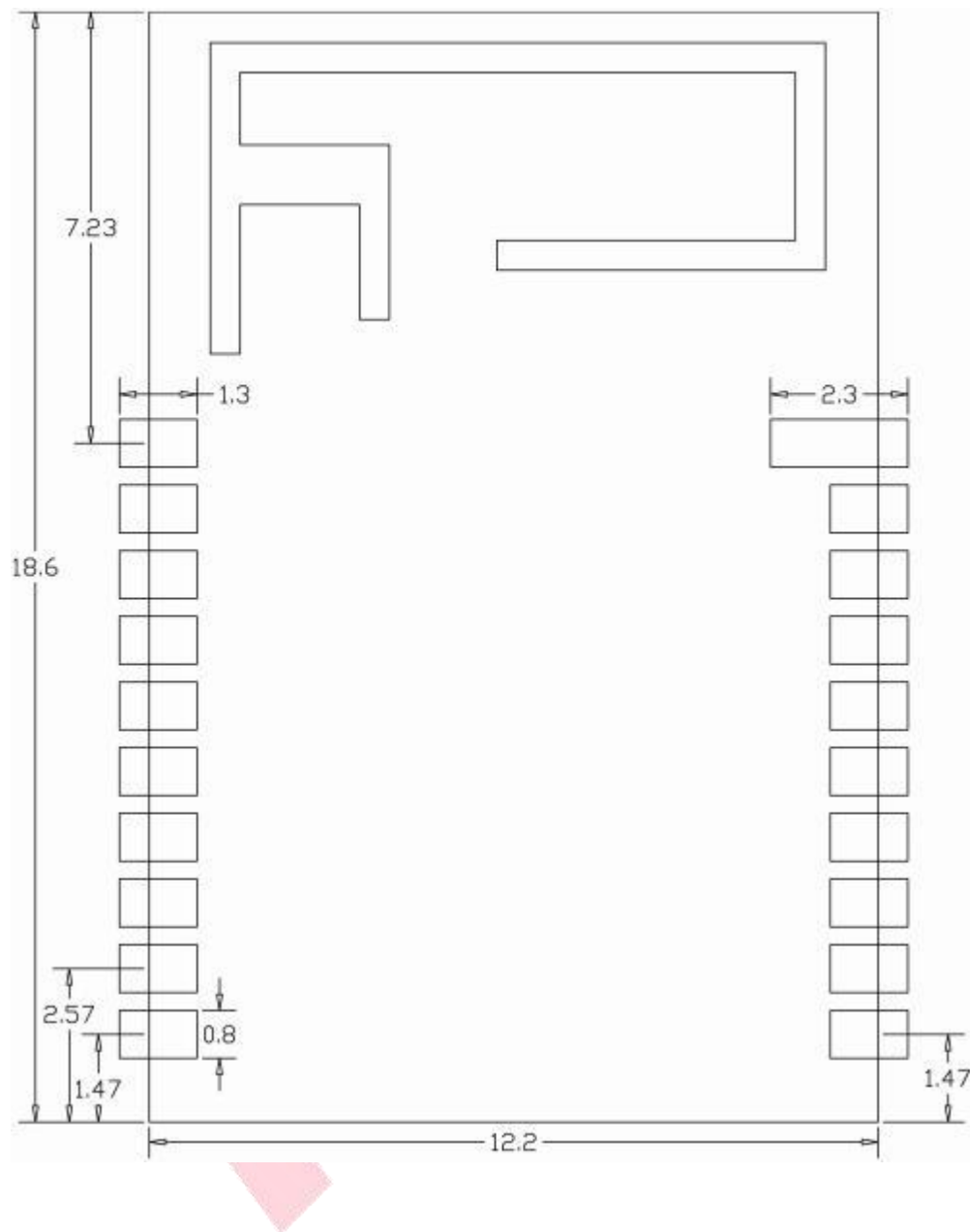
例如: 112233445566;FGR110NBIA-02 (MAC 地址以实际为准)

4. V/N 02(V/N 到 02 之间是两个空格, 02 为成品料号后缀, 与二维码右对齐)。

7.3 List of certified information

Certification project	Certificate number
SRRC	2022DP12921
FCC	TBD
CE	TBD
IC	TBD
NCC	TBD
KCC	TBD
TELEC	TBD
Brazil	TBD
Argentina	TBD
Japan	TBD

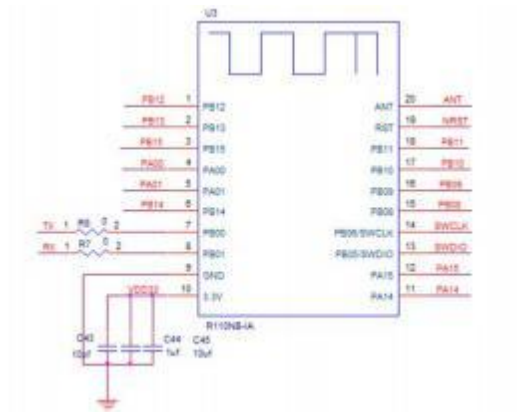
7.4 Layout Recommendation



8. The Key Material List

Item	Part Name	Description	Manufacturer
1	PCB	R110NB-IA,FR4,2L, 18.6*12.2*0.8mm	XY-PCB, GDKX, Sunlord, SLPCB
2	Crystal	3225 16MHz 9PF ± 8 ppm	ECEC, Hosonic, TKD, JWT
3	Chipset	LE5010AI,QFN32	Linkedsemi
4	Shielding	R110NB-IA Shielding	信太, 精力通

9. Reference Design



Note: 1. PB0 and PB1 are TX and Rx by default when powered on.

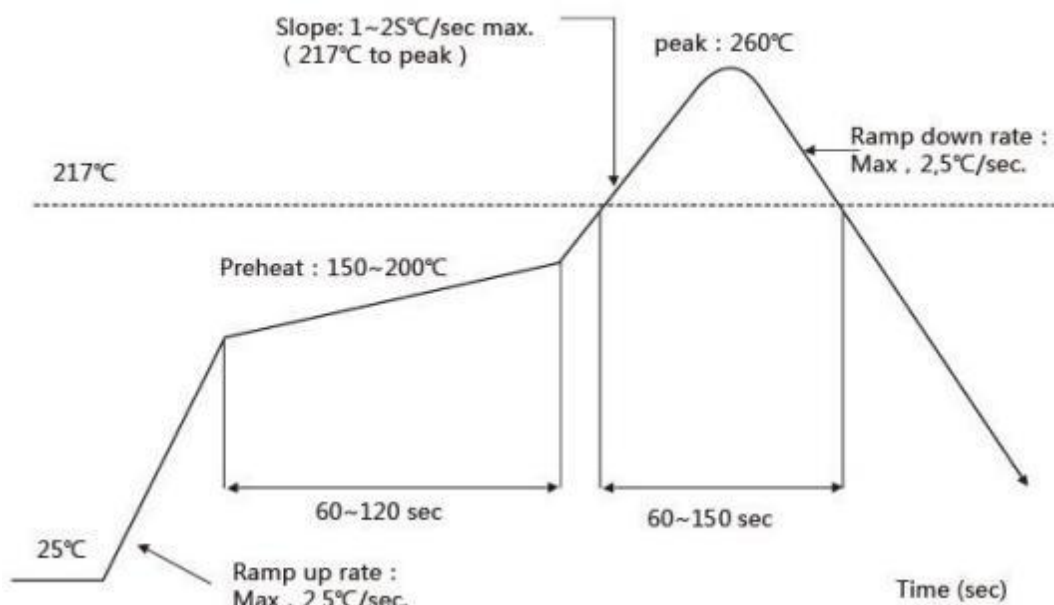
2. When burning through UART port, PB14 needs to be pulled up.

10. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <260°C

Number of Times : ≤2 times



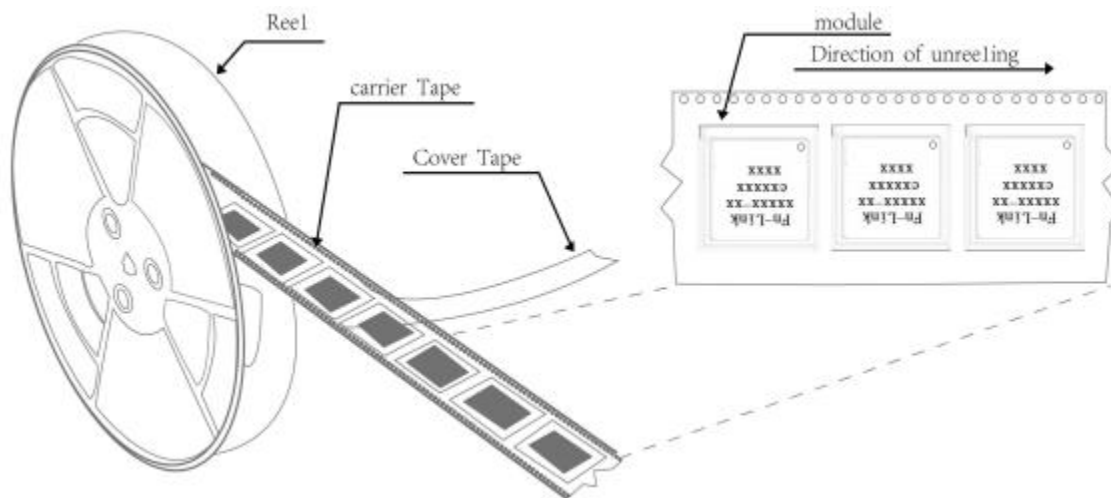
11. RoHS compliance

All hardware components are fully compliant with EU RoHS directive

12. Package

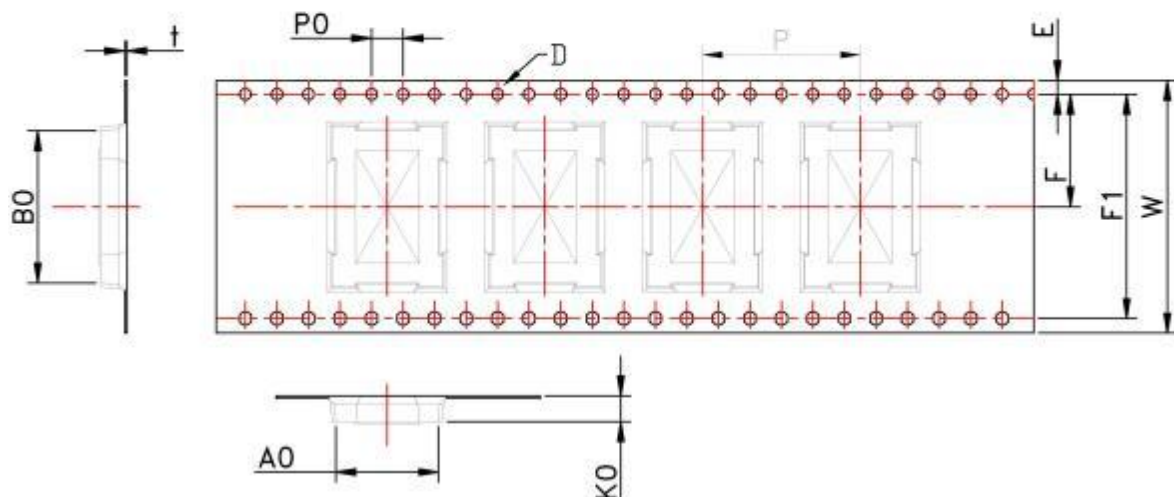
12.1 Reel

A roll of 1000pcs



12.2 Carrier Tape Detail

ITEM	W	A0	B0	D	E	F	F1	K0	P0	P2	P	T
DIM	32	12.65	18.90	1.5	1.75	14.20	28.4	3.30	4.0	2.4	20.0	0.30
TOLE	+0.3 -0.3	±0.10	±0.10	+0.1 -0.0	±0.1	±0.15	±0.10	±0.10	±0.1	±0.15	±0.1	±0.05



12.3 Packaging Detail

the take-up package



Using self-adhesive tape

Size of black tape: 32mm*20.8m the cover tape :25.5mm*32.6m

Color of plastic disc: blue



NY bag size:450X415mm



size : 350*350*35mm



The packing case size:360*210*370mm

13. Moisture sensitivity

The Modules is a Moisture Sensitive Device level 3, in according with standard IPC/JEDEC J-STD-020, take care

all the relatives requirements for using this kind of components.

Moreover, the customer has to take care of the following conditions:

- a) Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH)
- b) Environmental condition during the production: 30°C / 60% RH according to IPC/JEDEC J-STD-033A paragraph 5
- c) The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition
- d) "IPC/JEDEC J-STD-033A paragraph 5.2" is respected
- e) Baking is required if conditions b) or c) are not respected
- f) Baking is required if the humidity indicator inside the bag indicates 10% RH or more

The Module is designed to comply with the FCC statement. FCC ID is 2AATL-R110NB-IA. The host system using Module, should have label indicated it contain modular's FCC ID: 2AATL-R110NB-IA. This radio module must not installed to collocate and operating simultaneously with other radios in host system additional testing and equipment authorization may be required to operating simultaneously with other radio.

The Module and its antenna must not be co-located or operating in conjunction with any other transmitter or antenna within a host device.

The modular must be installed in the host that assign by Company name: FN-LINK TECHNOLOGY LIMITED, Model no.: R110NB-IA if other host types used would need further evaluation and possible C2PC if they are not significantly similar to the one tested The WIFI Module is designed for a compact PCB design. It should be installed and operated with host or other minimum distance of 20 centimeters between the radiator and your body." 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-only exposure condition must not exceed 1.14 dBi in the 2.4G band. The module uses PCB Antenna, the antenna is sold with the module.

Notice to OEM integrator

The end user manual shall include all required regulatory information/warning as show in this manual. The OEM integrator is responsible for testing their end-product for any additional compliance requirements required with this module installed. If the final product contains circuits of other FCC PART 15 Subparts, the final host product still requires Part 15 Subpart B compliance testing with the

modular transmitter installed. The intended use is generally not for the general public. It is generally for industry/commercial use. The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not normally required, the user has no access to the connector. Installation must be controlled. Installation requires special training.

This device complies with Part 15 of the FCC Rules.

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

2.2

This module has been assessed against the following FCC rule parts: CFR 47 FCC Part 15 C (15.247. DTS). It is applicable to the modular transmitter.

2.3

This radio transmitter Module has been approved by Federal Communications Commission 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 concrete contents to check are the following three points.

- 1) Maximum antenna gains are shown in item 2.7 below.
- 2) Should be installed so that the end user cannot modify the antenna
- 3) Feed line should be designed in 50ohm

Fine-tuning of return loss etc. can be performed using a matching network.

The antenna shall not be accessible for modification or change by the end user.

2.4

The module complies with FCC Part 15.247 and apply for Single module approval.

2.5

Trace antenna designs: applicable.

Any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed

by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

The device must be professionally installed.

The intended use is generally not for the general public.

It is generally for industry/commercial use.

The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not normally required.

The user has no access to the connector.

Installation must be controlled.

Installation requires special training.

2.6

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

2.7

The following antennas have been certified for use with this module.

Only antennas of the same type with equal or lower gain may also be used with this module.

Other types of antennas and/or higher gain antennas may require the additional authorization for operation. The installer should use unique antenna connector and 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 manufacturer of module will inform installer to meet with the FCC part 15.203 in the warning part.

Antenna Specification list below:

2.4G:

Antenna type: PCB Antenna

The max antenna gain (in dBi): 1.14 dBi

2.8

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as "Contains FCC ID: 2AATL-R110NB-IA "; any similar wording that expresses the same meaning may be used.

2.9

Testing of the host product with all the transmitters installed - referred to as the composite investigation test- is recommended, to verify that the host product meets all the applicable FCC rules. The radio spectrum is to be investigated with all the transmitters in the final host product functioning

to determine that no emissions exceed the highest limit permitted for any one individual transmitter as required by Section 2.947(f). The host manufacturer is responsible to ensure that when their product operates as intended it does not have any emissions present that are out of compliance that were not present when the transmitters were tested individually.

If the modular transmitter has been fully tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. 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).

The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration.

2.10

Any company of the host device which install this modular should perform the test of radiated & conducted emission and spurious emission etc. according to FCC Part 15C: 15.247 requirement, only if the test result comply with FCC part 15C: 15.247 requirement. Then the host can be sold legally. 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, If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

FCC Statement

1. 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.

2. Changes or modifications 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 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.

The device has been evaluated to meet general RF exposure requirement. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.