

**PRODUCT SPECIFICATION**

**B200H-RR5**

**Wi-Fi Single-band 1x1 802.11ax/b/g/n + BLE5.1**

**Combo Module**

**Version:V2.0**



## B200H-RR5 Module Datasheet

Ordering Information	Part NO.	Description
	FGB200HRR5-K0	ECR6600-TS2D5,802.11AX/B/G/N,18*20mm,UART/PWM/GPIO,1T1R+BLE5.1

Customer: \_\_\_\_\_

Customer P/N: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Office: 14th floor, Block B, phoenix zhigu, Xixiang Street, Baoan District, Shenzhen

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### Revision History

Version	Date	Contents of Revision Change	Draft	Checked	Approved
V1.0	2022/08/31	New version	Fc	Zzq	Qjp
V2.0	2022/11/02	Modify the pin pin definition	Fc	Zzq	Qjp

## 1. General Description

### 1.1 General Description

B200H-RR5 is a wifi+ble module for smart home IoT terminal devices. It supports Wi-Fi 802.11b/g/n/ax and Wi-Fi

BLE 5.1 protocol, developed based on the ECR660 platform of Weiswell, has excellent RF performance, extremely low power consumption, high security, powerful processor and rich on-chip resources, making it easy for users to integrate.

B200H-RR5 module conforms to SRRC specification, can be used in a variety of different environment equipment, in line with RoHS specification.

### 1.2 Basic parameters

Model number of modules	B200H-RR5
describe	Support WIFI/BLE functionalities
size	L x W x H: 18 x20mm
Wi-Fi interface	Support UART
BT interface	UART
Built-in Flash	2MB
External flash	4MB
Operating temperature	-40 °C to 105 °C
Storage temperature	-40 °C to 125 °C

## 2. features

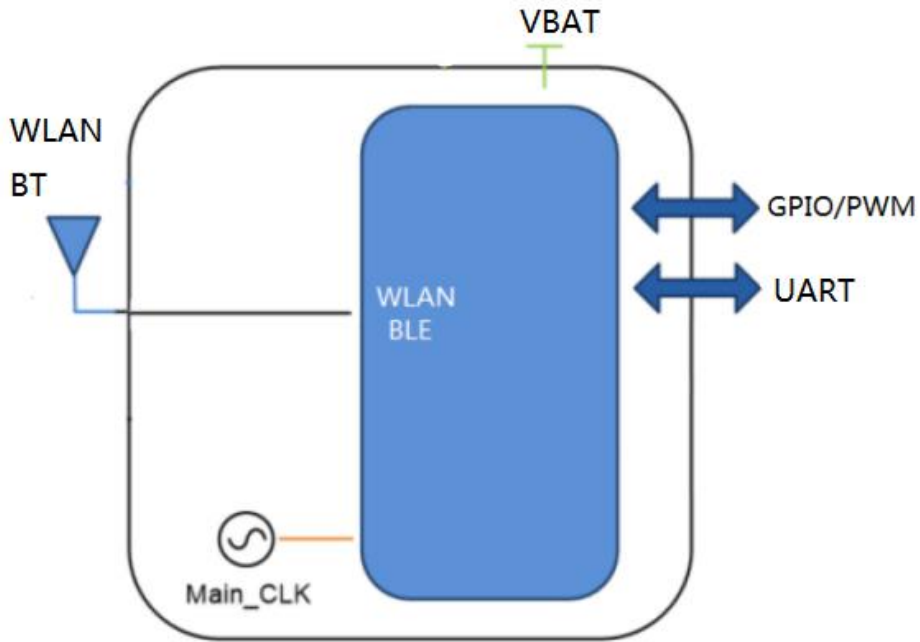
### General characteristics

- v supports IEEE 802.11 ax/b/g/n
- v 2.4 GHz band 1 t1r mode, support 400 MHz, data rate is as high as 150 megabits per second
- v wi-fi security WPS/WEP, WPA/connected Personal/WPA2Enterprise/WPA3
- v support Station + BLE, SoftAP Station + + BLE
- v wi-fi and BLE coexist

### The bluetooth feature

- v Bluetooth 5.1 low energy consumption
- v support BLE single device to connect
- v support synchronous broadcasting and scanning
- v support enhanced power consumption control
- v support adaptive frequency hopping (AFH)
- v support asynchronous data sending and receiving
- v support update connection parameters
- v support scalable packet length

### 3. Block diagram



### 4. Specification parameters

#### 4.1 2.4G Range of frequency

features	describe		
WLAN	IEEE 802.11 ax/b/g/n/ Wi-Fi compliant		
Range of frequency	2.400 GHz ~ 2.497 GHz (2.4 GHz ISM Band)		
channels	2.4GHz: Ch1 ~ Ch14		
project	Typical value		Typical value
Power output	802.11b /11Mbps	: 18dBm ± 2 dB	EVM ≤ -9dB
	802.11g /54Mbps	: 15dBm ± 2 dB	EVM ≤ -25dB
	802.11n20 /MCS7	: 14dBm ± 2 dB	EVM ≤ -29dB
	802.11n40 /MCS7	: 14dBm ± 2 dB	EVM ≤ -29dB
	802.11ax /MCS7	: 13dBm ± 2 dB	EVM ≤ -30dB
Frequency spectrum template	Meet with IEEE standard		
Standard frequency	± 20ppm		
sensitivity (11b,20MHz) @8% PER	- 1Mbps	@ -92 dBm	≤-83 dBm
	- 11Mbps	@ -85 dBm	≤-76 dBm
sensitivity (11g,20MHz) @10% PER	- 6Mbps	@ -89 dBm	≤-85 dBm
	- 54Mbps	@ -70 dBm	≤-68 dBm
sensitivity (11n,20MHz)	- MCS=0	@ -89 dBm	≤-85 dBm

@ 10% PER	- MCS=7	@ -68 dBm	≤-67 dBm
sensitivity (11n,40MHz)	- MCS=0	@ -85 dBm	≤-83 dBm
@ 10% PER	- MCS=7	@ -66 dBm	≤-65 dBm
sensitivity (11ax,20MHz)	- MCS=0	@ -83 dBm	≤-82 dBm
@ 10% PER	- MCS=7	@ -64 dBm	≤-62dBm
Maximum receiving level	802.11b : -10 dBm		
	802.11ax/g/n : -20 dBm		

## 4.2 Bluetooth Specifications

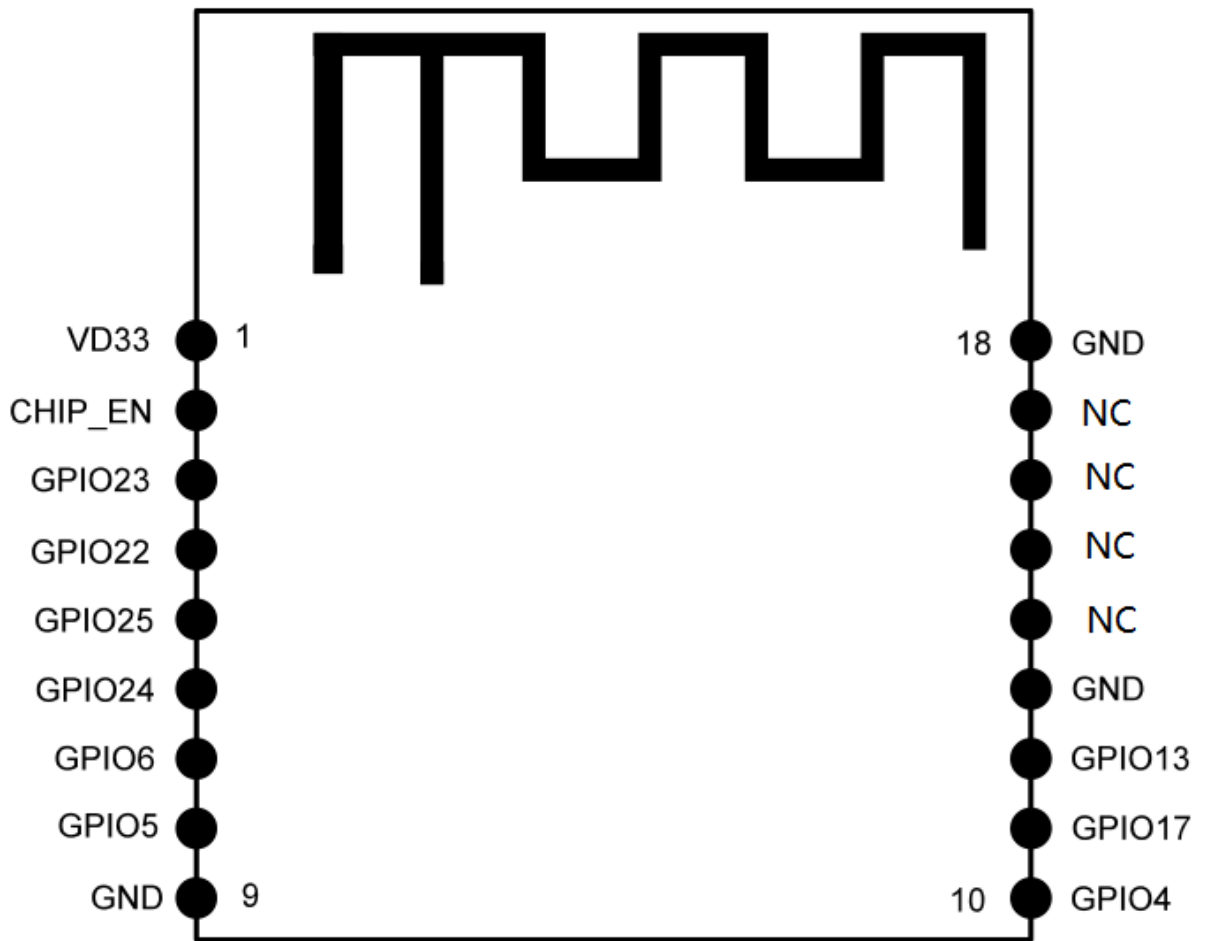
features	describe		
General Specifications			
Bluetooth Specification	Bluetooth V5.1		
Host interface	UART		
Range of frequency	2402 MHz ~ 2480 MHz		
channels	40 channels		
Radio frequency Specifications			
	<b>Min</b> (dBm)	<b>Typical</b> (dBm)	<b>Max</b> (dBm)
Power output	0	4	8
sensitivity @ BLE=30.8%			-70
Maximum input level	GFSK (1Mbps):-20dBm		

## 5. Pin definition

### 5.1 Shape of pin

< **TOP VIEW** >





5.2 Pin function

NO.	Name	Type	Description	Voltage
1	VD33	P	3.3V power	
2	CHIP_EN	I	Power enable of module ON: pull high ; OFF: pull low Pin Function Table	
3	GPIO23	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table	
4	GPIO22	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table	
5	GPIO25	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table	
6	GPIO24	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table	
7	GPIO6	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table	

8	GPIO5	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table
9	GND	P	Ground connections
10	GPIO4	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table
11	GPIO17	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table
12	GPIO13	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table
13	GND	P	Ground connections
14	NC	-	NC
15	NC	-	NC
16	NC	-	NC
17	NC	-	NC
18	GND	P	Ground connections

P:POWER I:INPUT O:OUTPUT

download: 3.3V, GPIO5,GPIO16,GND,CHIP\_EN 接串口的 RTS。

RF test: 3.3V, GPIO5,GPIO6,GND。

### 5.3 Pin reuse function

引脚编号	引脚名称	驱动能力	控制电源	Pull-up/pull-down (Reset 模式下)	IO 类型	Function0		Function1		Function2		Function3		Function4		Function5		Function6	
						复用功能名称	类型	复用功能名称	类型	复用功能名称	类型	复用功能名称	类型	复用功能名称	类型	复用功能名称	类型	复用功能名称	类型
1	VDD_BAT		Domain	P	Vdd_bat 和 Vdd bat2, 可用于 RF BG, LP BG/LDO 等。														
2	VDD_1p0RF		VDDIO_33	P	SUCK feedback														
3	GPIO23	4mA	VDDIO_33	wpd		SD_H_DATA1	I/O	GPIO23	I/O	UART1_RTS	O	PWM_CTRL1	O	I2S_TXSCK	I/O				
4	GPIO22	4mA	VDDIO_33	wpd		SD_H_DATA0	I/O	GPIO22	I/O	UART0_TXD	O	PWM_CTRL0	O	I2S_TXWS	I/O				
5	GPIO13	4mA	VDDIO_33	wpd		SD_H_CLK	O	GPIO13	I/O	UART2_TXD	O	I2C_SCL	TRI	I2S_RXD	I	dpLL_80M_o	O		
6	GPIO21	4mA	VDDIO_33	wpd		SD_H_CMD	I/O	GPIO21	I/O	UART0_RXD	I	I2C_SDA	TRI	I2S_TXD	O				
7	GPIO25	4mA	VDDIO_33	wpd		SD_H_DATA3	I/O	GPIO25	I/O	phy_entrx	O	PWM_CTRL3	O	lphy_entrx	I/O	I2C_SDA	TRI		
8	GPIO24			wpd		SD_H_DATA2	I/O	GPIO24	I/O	UART1_CTS	I	PWM_CTRL2	O	I2S_MCLK	I				
9	GPIO17			A		WAKEUP	I	GPIO17	I/O	UART2_RXD	I	SPI1_WP	I/O	PWM_CTRL5	O	I2S_TXWS	I/O	bledebug2	

引脚编号	引脚名称	驱动能力	控制信号	Pull-up/pull-down (Reset 模式下)	IO 类型	Function0		Function1		Function2		Function3		Function4		Function5		Function6	
						复用功能名称	类型	复用功能名称	类型	复用功能名称	类型	复用功能名称	类型	复用功能名称	类型	复用功能名称	类型	复用功能名称	类型
10	GPIO16			A		NC		GPIO16	I/O	UART1_CTS	I	ir_out	O	PWM_CTRL2	O				
11	XTAL_O			P															
12	XTAL_I			P															
13	VDD_OP8			P	数字电源														
14	VDD_1P0			P	VDD_1p0 优先考虑不加载珠。EVK 版本需要留个磁珠位置。														
15	LX2		VDDIO_33	A	DCDC 模式下作为输入电感。LDO 模式下作为稳压电路输入。	POWER_ON/OFF													
16	LX1			P	DCDC 模式下作为输入电感。LDO 模式下悬空。														
17	VDDIO/VDD_BUCK/PWR_KEY		Domain	P	IO 电源 1.8V~3.3V/VDD_BUCK/PWR_KEY														
18	VDD_EFUSE		Typical 1.8V	P	eFuse 编程电压 1.8V														
19	UART0_TXD		VDDIO_33	wpu	数模复用	UART0_TXD	O	GPIO6	I/O	COLD_RESET	O	32K_CLK_OUT		I2S_RX_SCK	I/O	XTAL_O_32K			
20	UART0_RXD		VDDIO_33	wpu	数模复用	UART0_RXD	I	GPIO5	I/O	40M_CLK_OUT	O	ir_out	O	I2S_RXWS	I/O	XTAL_I_32K	A		

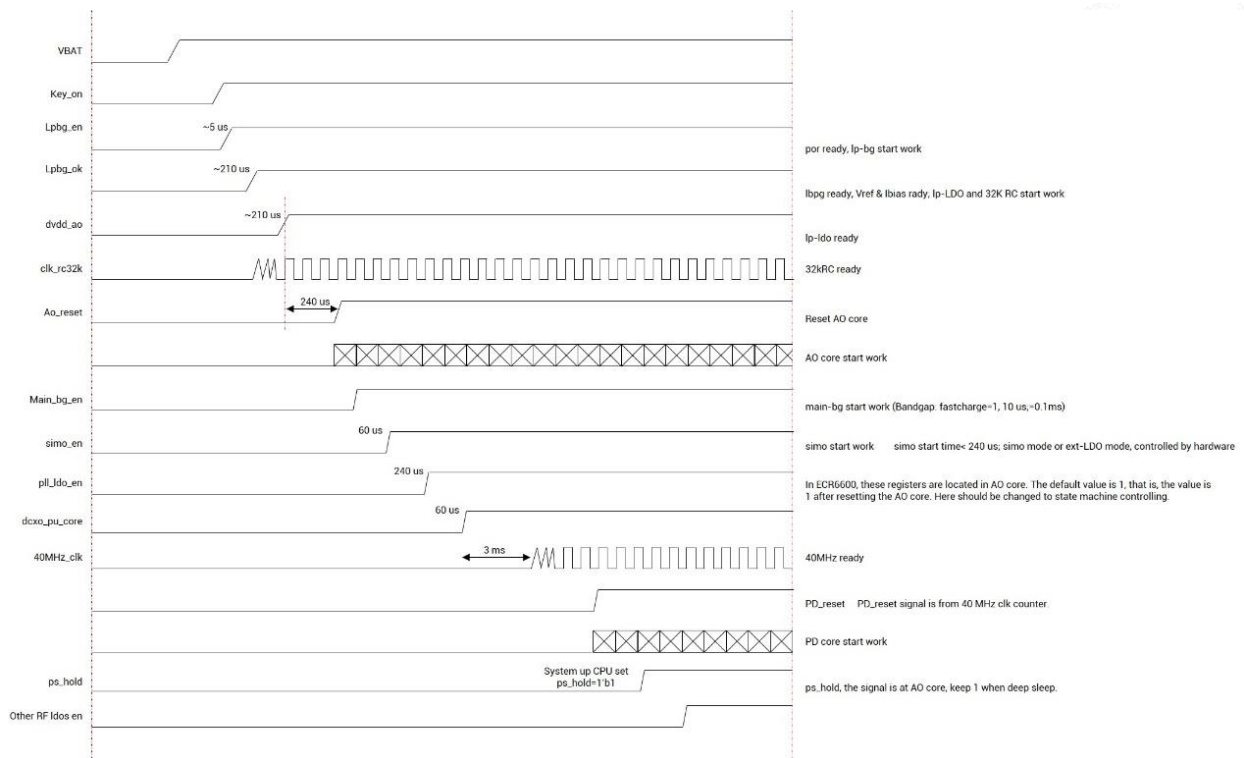
引脚编号	引脚名称	驱动能力	控制信号	Pull-up/pull-down (Reset 模式下)	IO 类型	Function0		Function1		Function2		Function3		Function4		Function5		Function6	
						复用功能名称	类型	复用功能名称	类型	复用功能名称	类型	复用功能名称	类型	复用功能名称	类型	复用功能名称	类型	复用功能名称	类型
21	TRST	4mA	VDDIO_33	wpd		TRST		GPIO4	I/O	UART0_RTS	O	SPI1_CS2	I/O	PWM_CTRL0	O	PSRAM_CS	O	bledebug7	
22	TDI	4mA	VDDIO_33	wpd		TDI	I	GPIO3	I/O	UART0_CTS	I	SPI1_MISO	I/O	PWM_CTRL3	O	I2C_SDA	TRI	bledebug6	
23	TDO	4mA	VDDIO_33	wpd		TDO	O	GPIO2	I/O	UART1_TXD	O	SPI1_MOSI	I/O	PWM_CTRL2	O	I2C_SCL	TRI	bledebug5	
24	TMS	4mA	VDDIO_33	wpd		TMS	I	GPIO1	I/O	UART1_RXD	I	SPI1_CS0	I/O	PWM_CTRL1	O	I2S_RXD	I	bledebug4	
25	TCK	4mA	VDDIO_33	wpd		TCK	I	GPIO0	I/O	UART2_TXD	O	SPI1_CLK	I/O	PWM_CTRL0	O	I2S_TXSCK	I/O	bledebug3	
26	ResetB/TestMode	4mA	VDDIO_33	wpu	数模复用	TestMode	I	ResetB	I										
27	GPIO20		VDDIO_33	wpd	数模复用	PWM_CTRL3	O	GPIO20	I/O	aux_2/vout_lp	A	I2S_MCLK	I/O						
28	GPIO15		VDDIO_33	wpu	数模复用	BOOTMODE1	I	GPIO15	I/O	ATST_B/aux_1/vout_lp	A			PWM_CTRL5	O	I2S_TXWS	I/O		
29	GPIO14		VDDIO_33	wpu	数模复用	BOOTMODE0	I	GPIO14	I/O	ATST_A/aux_0/vout_lp	A			PWM_CTRL4	O	I2S_TXD	O		
30	VDD_DA			P	DA 电源														
31	VDD_PA			P	PA 电源														
32	LNA			A															

### 6. Timing of circuit

To ensure normal power-on and startup, the power supply, reset, and Bootstrap pins must meet the corresponding timing requirements.

1. When Keyon detects high power level, POR module starts to work and generates por signal; The por signal is the enable signal of LP BandGap. When the por signal is elevated, LPBG starts to be enabled.

2. After LPBG is started, an lpbg\_ok signal will be output; This signal enables LP\_LDO and 32K RTC. At this point, the AO area begins to work.
3. Then, the status opportunity in AO area enables Main\_BG and Buck DC-DC in turn, where Main\_BG generates reference voltage and bias current required by each module, DC-DC generates two volttimes of 1V and 0.8V, 1V supplies power to RF module and 0.8V supplies power to PD area.
4. After the DC-DC is powered on, PLL-LDO and DCXO in the AO area are enabled in turn. PLL-LDO converts 1V output from DC-DC to 0.85V for DCXO to use.
5. Then, BootRom starts to work and raises the ps\_hold to complete the startup. After the startup is complete, the RF power supply can be configured to control each RF module

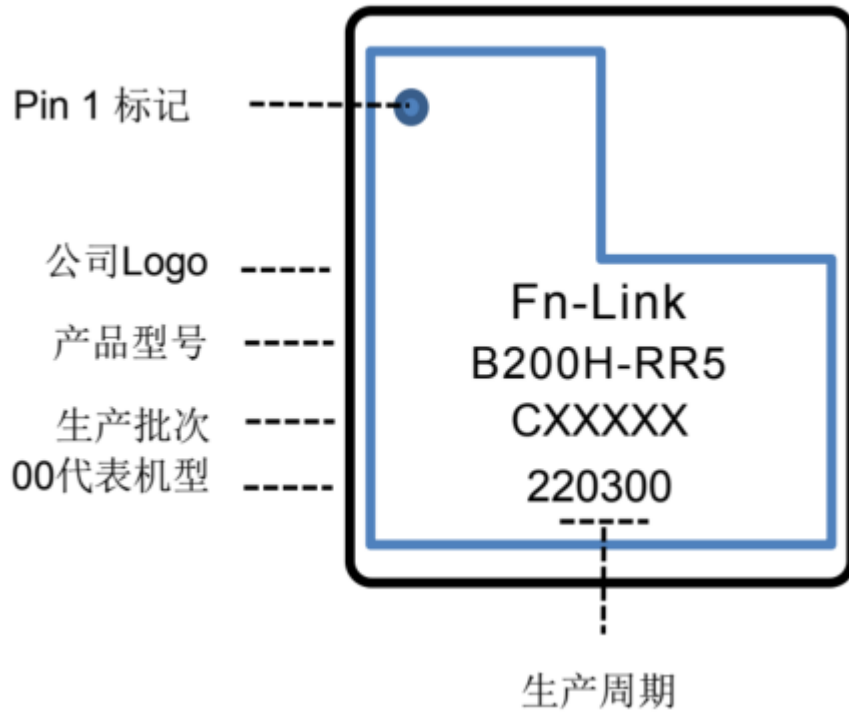


## 7. Size reference

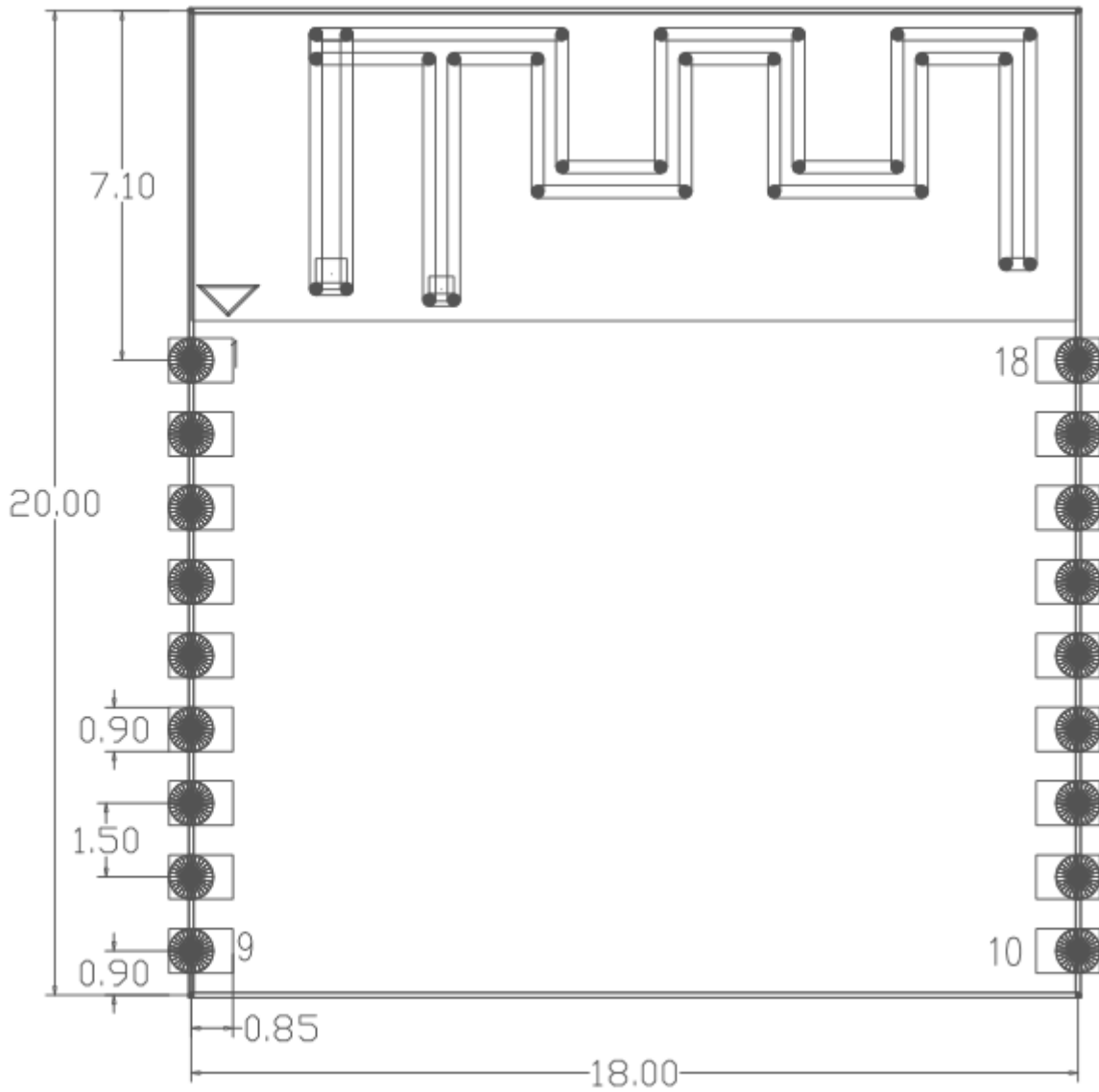
### 7.1 Module diagram

<p>L x W : 18 x 20(+0.3/-0.1) mm</p>	
<p>H:</p>	<p>TBD</p>
<p>Weight</p>	<p>TBD</p>

### 7.2 Screen printing diagram



### 7.3 Physical Dimensions

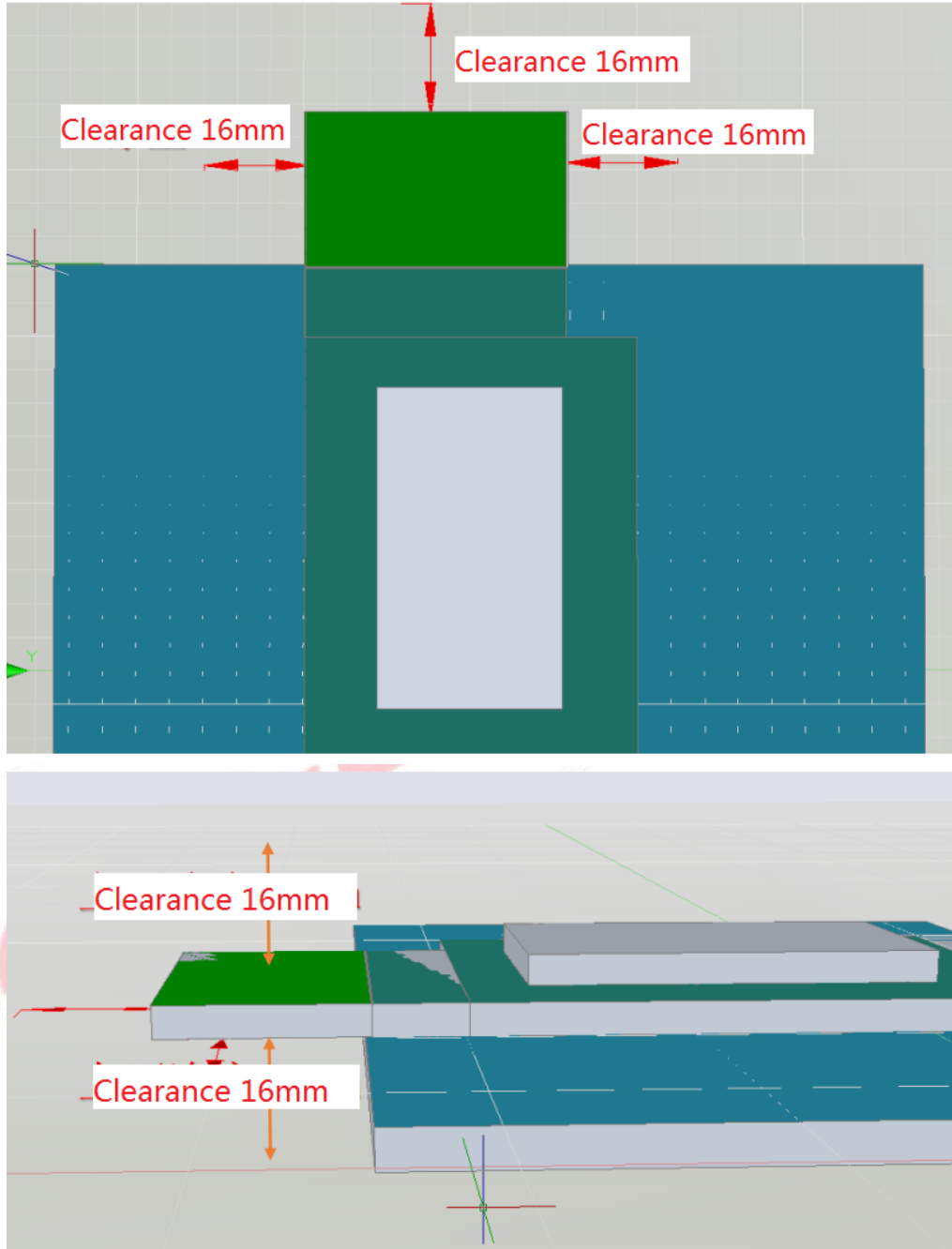


### 8. The Key Material List

Item	Part Name	Description	Manufacturer
1	Crystal	3225 26Mhz $\pm 10$ ppm,9pF,	ECEC, TKD, Hosonic, JWT, TXC
2	Chipset	ECR6600-TS2D5	ESWIN
3	PCB	B200H-RR5 18X20X0.8mm	XY-PCB,GDKX,Sunlord, SL-PCB
4	Shielding	Shielding	SINTAVE

## 9.2 Antenna layout Requirement

When using the PCB antenna on the Wi-Fi module, keep the PCB on the mainboard at least 16mm away from other metal devices. The shaded area below should be kept away from metal devices, sensors, interference sources, and other materials that may interfere with the signal.





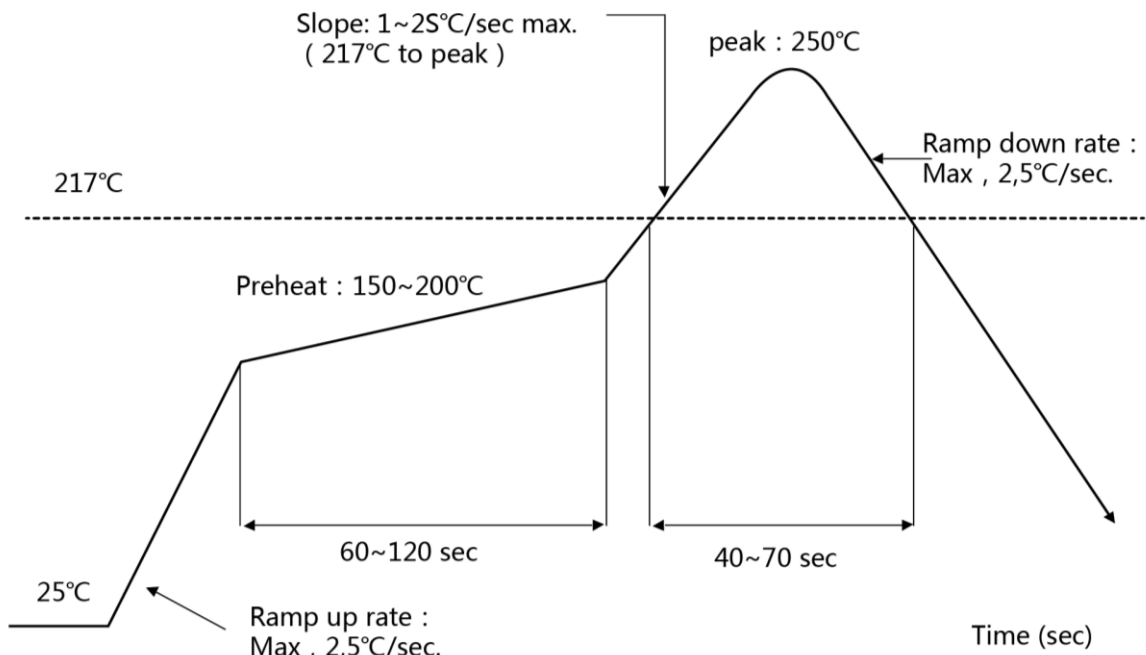
### 10. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature: 250±5 °C

5Time within 5° C of peak temperature: ≥10s

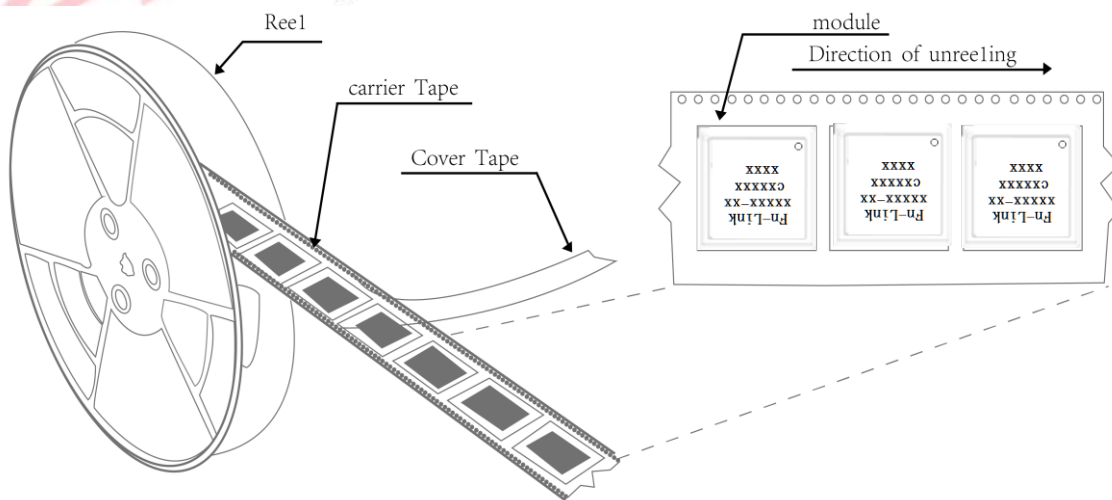
Number of Times: 2 times



### 11. Package

#### 11.1 package

A roll of xxpcs



### 11.2 Details of packing

The take-up package:



Using self-adhesive tape

Size of black tape: 44mm\*20.2m

the cover tape : 37.5mm\*20.2m

Color of plastic disc: blue



NY bag size: 415mm\*450mm



size : 350X350X35mm



Carton size: 360X210X370mm

## 12. Sensitivity to humidity

This module is a level 3 moisture sensitive device, according to IPC/JEDEC J-STD-020, pay attention to all relevant requirements for the use of such devices.

In addition, customers need to be aware of the following conditions:

a) Calculate shelf life in sealed bag: in <math>40^{\circ}\text{C}</math> and <math>90\%</math> relative humidity (RH) for the next 12 months

b) Environmental conditions during production:  $30^{\circ}\text{C}/60\%</math>RH according to IPC/JEDEC J-STD-033A paragraph 5.$

c) If conditions permit, the maximum time between the opening of the sealed bag and the reflux process must be 168 hours

b) Compliance with Paragraph 5.2 of IPC/JEDEC J-STD-033A

d) Baking is required if conditions b) or c) are not observed

e) If the humidity indicator in the bag indicates relative humidity greater than or equal to 10%, it needs to be baked

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

### **2.2 List of applicable FCC rules**

FCC Part 15.247

### **2.3 Specific operational use conditions**

This transmitter/module and its antenna(s) must not be co-located or operating in conjunction with any transmitter. This information also extends to the host manufacturer's instruction manual.

### **2.4 Limited module procedures**

not applicable

### **2.5 Trace antenna designs**

not applicable

### **2.6 RF exposure considerations**

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This compliance to FCC radiation exposure limits for an uncontrolled environment, and minimum of 20cm separation between antenna and body.

The host product manufacturer would provide the above information to end users in their end-product manuals.

### **2.7 Antennas**

External Antenna; 1.75dBi; 2.402 GHz~2.480GHz

### **2.8 Label and compliance information**

The end product must carry a physical label or shall use e-labeling followed KDB784748D01 and KDB 784748 stating "Contains Transmitter Module FCC ID: 2AATLB200H-RR5".

### **2.9 Information on test modes and additional testing requirements**

For more information on testing, please contact the manufacturer.

### **2.10 Additional testing, Part 15 Subpart B disclaimer**

The modular transmitter is only FCC authorized for the specific rule parts (FCC Part 15.247) 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 when contains digital circuitry.

## FCC Statements

(OEM) Integrator has to assure compliance of the entire end-product incl. the integrated RF Module. For 15 B (§15.107 and if applicable §15.109) compliance, the host manufacturer is required to show compliance with 15 while the module is installed and operating.

Furthermore the module should be transmitting and the evaluation should confirm that the module's intentional emissions (15C) are compliant (fundamental / out-of-band). Finally the integrator has to apply the appropriate equipment authorization (e.g. Verification) for the new host device per definition in §15.101.

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

The final host device, into which this RF Module is integrated" has to be labeled with an auxiliary label stating the FCC ID of the RF Module, such as "Contains  
FCC ID: 2AATLB200H-RR5

"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."

"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."

the Integrator will be responsible to satisfy SAR/ RF Exposure requirements, when the module integrated into the host device.