PRODUCT SPECIFICATION

HM-WB01

Wi-Fi and Bluetooth Module

Version:V1.1

Customer: _____

Customer P/N:_____

Signature:_____

Date:_____

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

Factory: NO.8, Litong RD., Liuyang Economic & Technical Development Zone, Changsha, CHINA

TEL: +86-755-2955-8186

Website: www.fn-link.com

HM-WB01 Module Datasheet

	Part NO.	Description
Ordering Information	HM-WB01	ECR6600-TS2D5,802.11AX/B/G/N,18*20mm,UART/PWM/GPIO,1T1R+BLE5.1

CONTENTS

Revision History

Version	Date	Contents of Revision Change	Draft	Checked	Approved
V1.0	2024/01/02	New version	Lxp	Zzq	Qjp
V1.1	2024/02/26	Update Screen printing diagram	Lxp	Zzq	Qjp

1. General Description

1.1 Introduction

HM-WB01 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.

HM-WB01 module conforms to SRRC specification, can be used in a variety of different environment equipment, in line with RoHS specification.

1.2 Description

Model number of modules	HM-WB01
describe	Support WIFI/BLE functionalities
size	L x W x H: 20 x15x2.9mm
Wi-Fi interface	Support UART
BT interface	UART
Built-in Flash	4MB
External flash	16MB
Operating temperature	-40°C to 105°C
Storage temperature	-40°C to 125°C

2. features

General

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

bluetooth feature

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

3. Block diagram

None.

4. General Specification

4.1 2.4GHz RF Specification

features	describe	
WLAN 标准	IEEE 802.11 ax/b/g/n/ Wi-Fi compliant	
Range of frequency	2.400 GHz ~ 2.4835 GHz (2.4 GHz ISM Band)	
channels	2.4GHz：Ch1 ~ Ch14	
Test Items	**Typical Value**	**EVM**
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 ≤ -28dB
	802.11n40 /MCS7 : 14dBm ± 2 dB	EVM ≤ -28dB
	802.11ax /MCS7 : 13dBm ± 2 dB	EVM ≤ -28dB
Frequency spectrum template	Meet with IEEE standard	
Standard frequency	±20ppm	
Test Items	**TYP Test Value**	**Standard Value**
Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps @ -92 dBm	≤-83 dBm
	- 11Mbps @ -85 dBm	≤-76 dBm
Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps @ -89 dBm	≤-85 dBm
	- 54Mbps @ -70 dBm	≤-68 dBm
Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 @ -89 dBm	≤-85 dBm
	- MCS=7 @ -68 dBm	≤-67 dBm
Receive Sensitivity (11n,40MHz) @10% PER	- MCS=0 @ -85 dBm	≤-83 dBm
	- MCS=7 @ -66 dBm	≤-65 dBm
Receive Sensitivity (11ax,20MHz) @10% PER	- MCS=0 @ -83 dBm	≤-82 dBm
	- MCS=7 @ -64 dBm	≤-62dBm
Maximum receiving level	802.11b : -10 dBm	
	802.11ax/g/n : -20 dBm	

4.2 Bluetooth Specifications

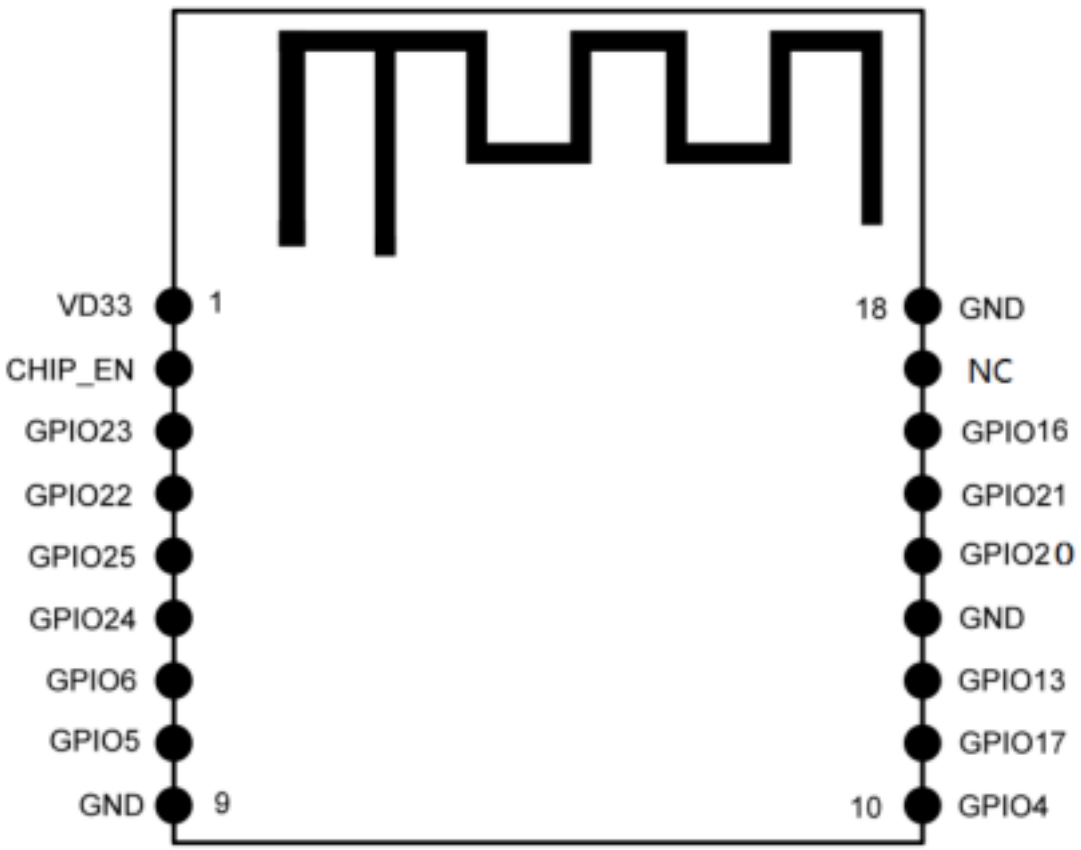
Feature	Description
General Specification	
Bluetooth Specification	Bluetooth V5.1
Host interface	UART

Range of frequency	2400 MHz ~ 2483.5 MHz		
channels	40 channels		
Radio frequency Specifications			
	Min(dBm)	**Typical**(dBm)	**Max**(dBm)
Power output	0	4	8
sensitivity @ BLE=30.8%			-70
Maximum input level	GFSK (1Mbps):-20dBm		

5. Pin definition

5.1 Pin Outline

< TOP VIEW >



5.2 Pin Definition details

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	GPIO20	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table	
15	GPIO21	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table	
16	GPIO16	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table	
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。

6. Timing of circuit

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

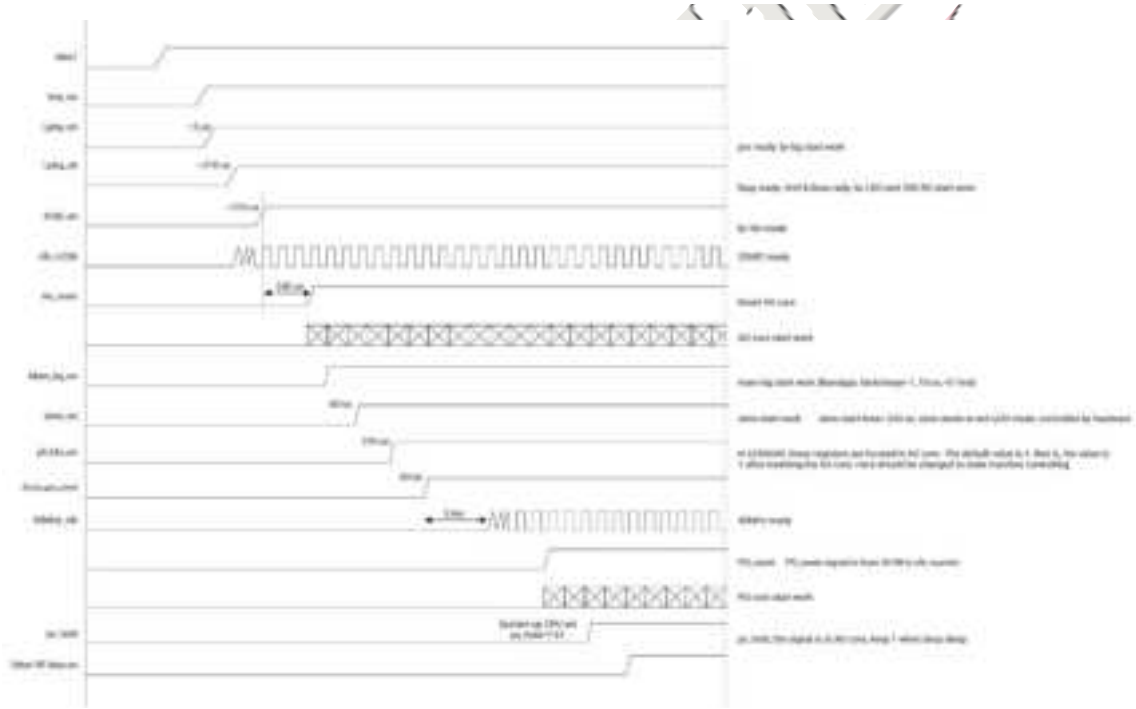
1. When Keyon detects high power level, POR module starts to work and generates por signal; The por signal is the enable signal of LP BandGap. When the por signal is elevated, LPBG starts to be enabled.

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.

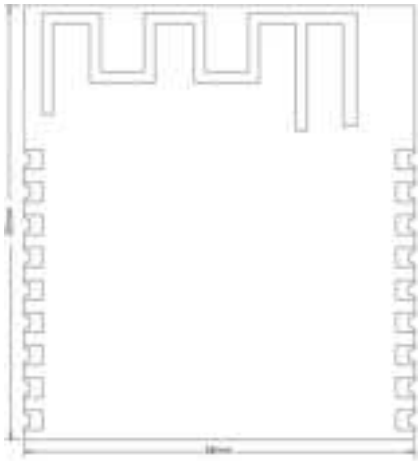
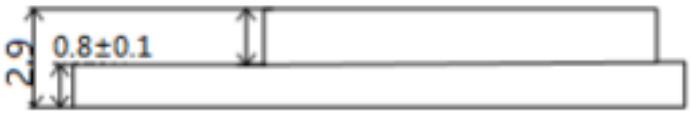
4. After the DC-DC is powered on, PLL-LDO and DCXO in the AO area are enabled in turn. PLL-LDO converts 1V output from DC-DC to 0.85V for DCXO to use.

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

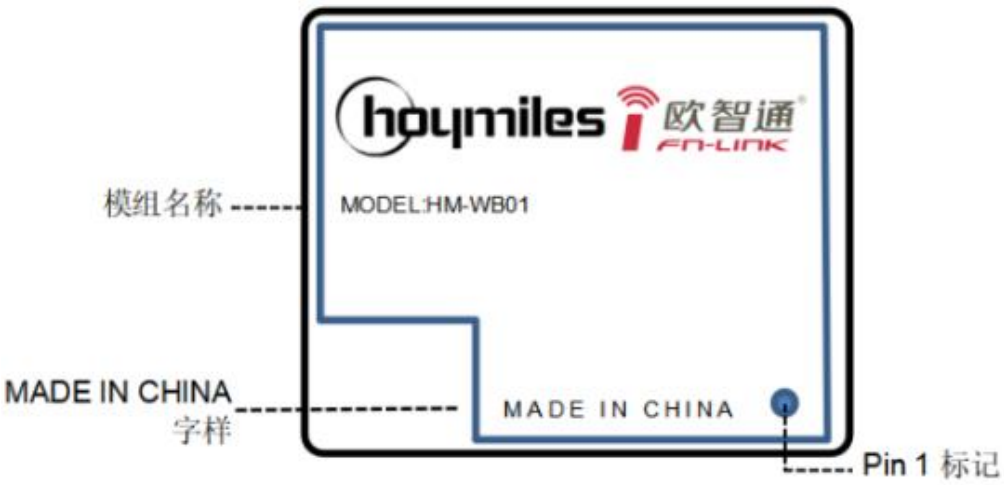


7. Size reference

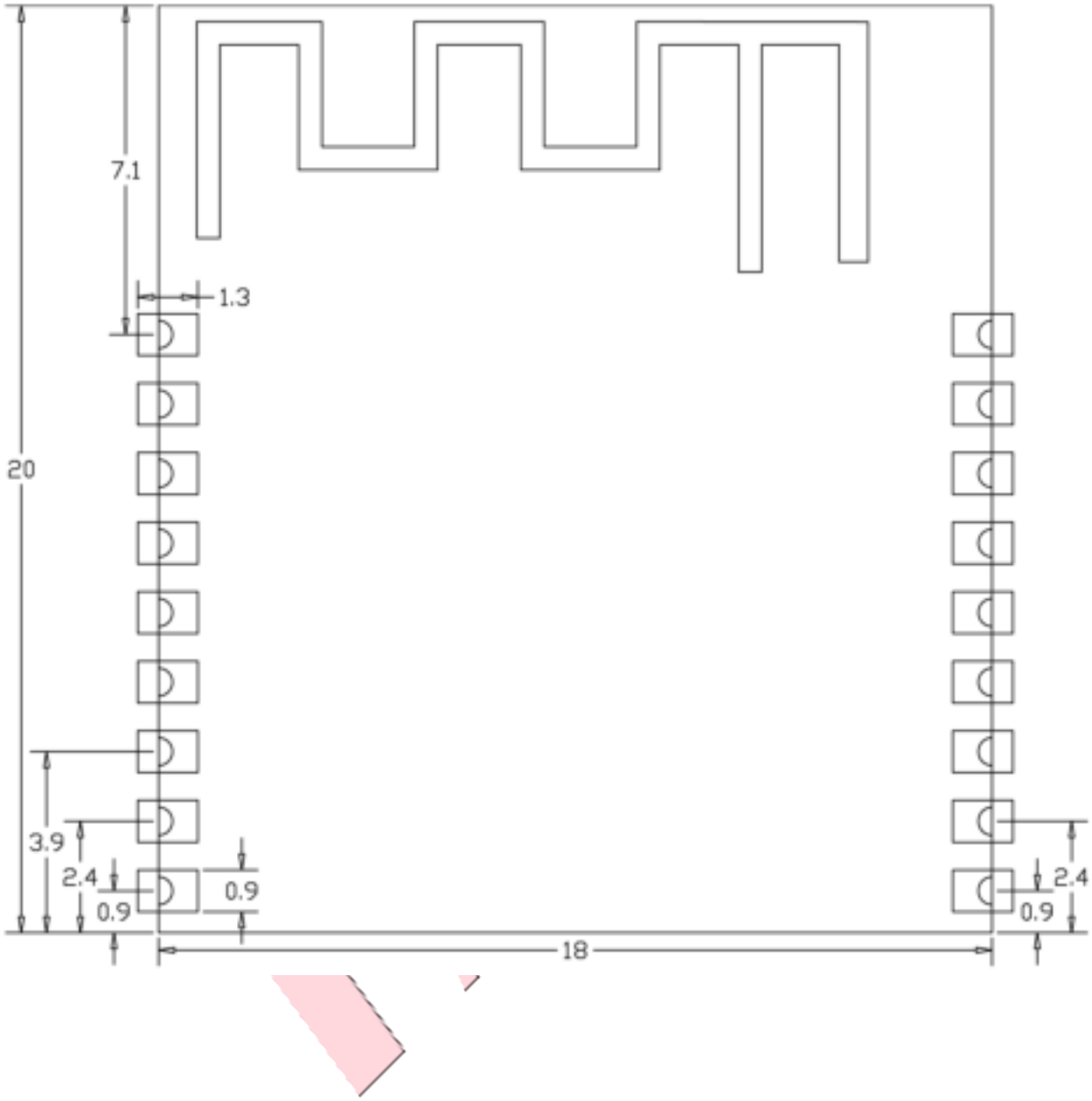
7.1 Module diagram

L x W : 20 x 18(±**0.2) mm**  	
H: 2.9(+0.2/-0.2)mm	
重量	1.28g

7.2 Screen printing diagram



7.3 Physical Dimensions



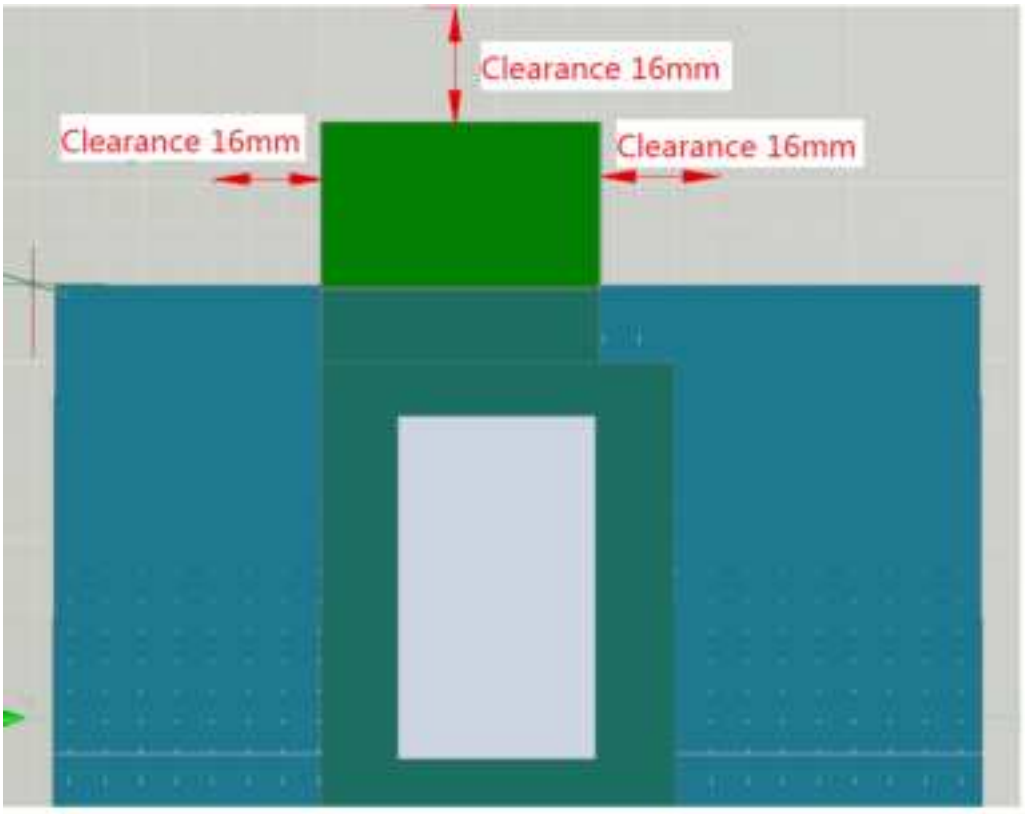
8. The Key Material List

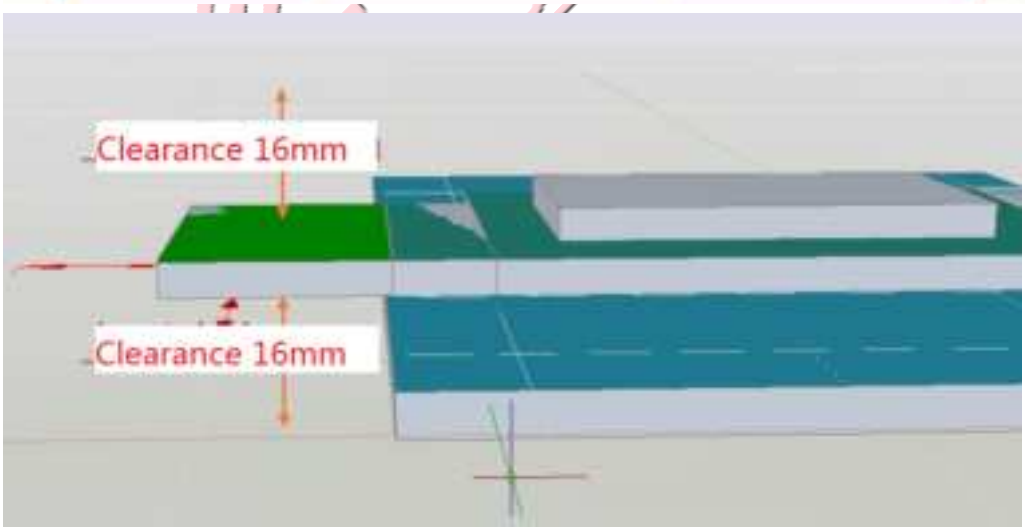
Item	Part Name	Description	Manufacturer
1	Crystal	2016 26Mhz ±10ppm,9pF,	ECEC, TKD, Hosonic, JWT, TXC
2	Chipset	ECR6600-TS2D5	奕斯伟
3	PCB	HM-WB01 18X20X0.8mm	XY-PCB,GDKX,Sunlord, SL-PCB
4	Shielding	Shielding	信太，精力通，卓益

9. Reference Design

9.1 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。





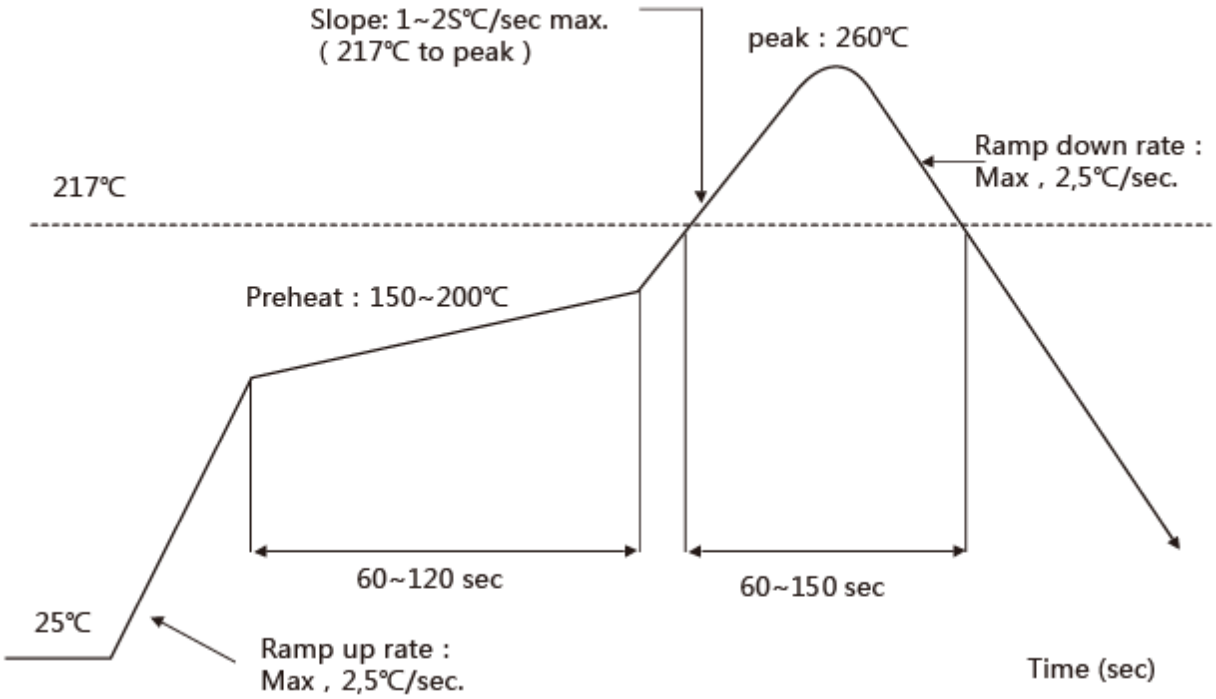
10. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature: 260±5 °C

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

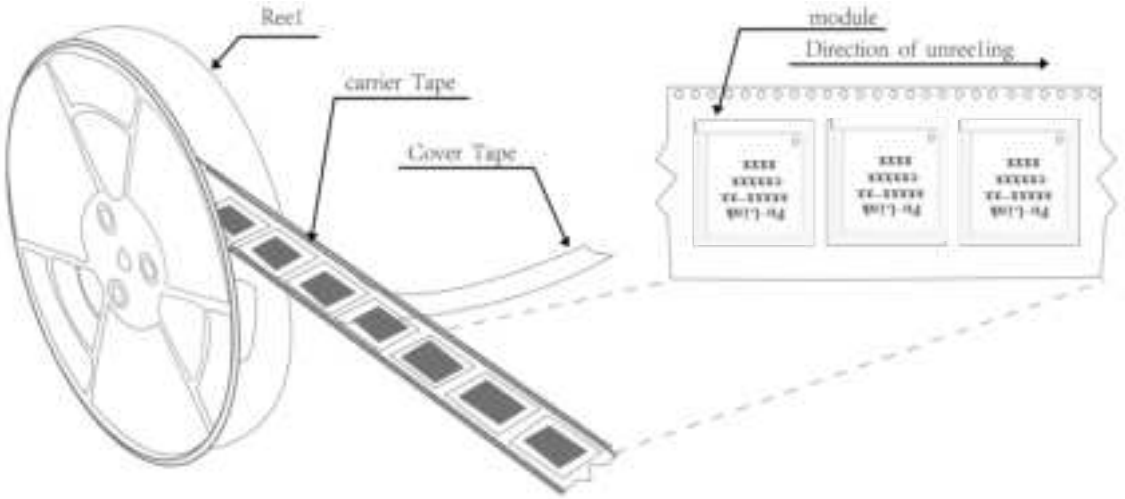
Number of Times: 2 times



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:32mm*20.2m the cover tape :25.5mm*32.6m

Color of plastic disc: blue

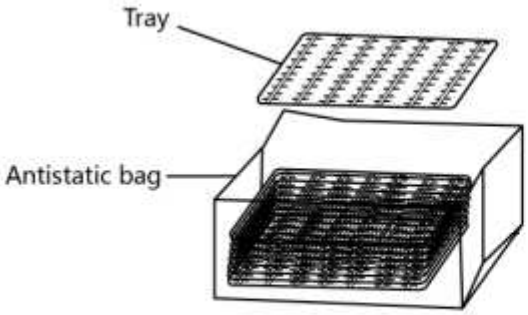
NY bag size: 415mm*450mm

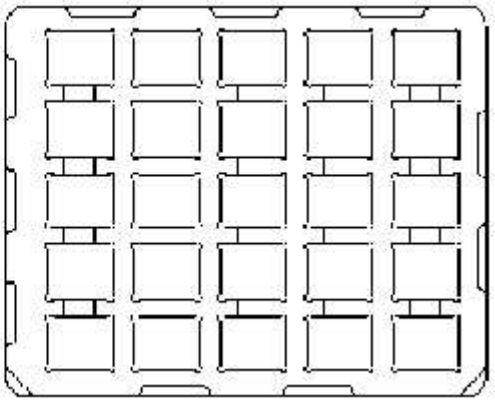
size ： 350X350X35mm

Carton size:360X210X370mm

11.3 Tray

Use pallet packaging for less than 300 pieces





12. 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

FCC Statement

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.

FCC Radiation Exposure Statement

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment and it also complies with Part 15 of the FCC RF Rules. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and consider removing the no-collocation statement.

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.

Caution!

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

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

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. As long as the two conditions above are met, additional transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required for the installed module.

Important Note:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Federal Communications Commission of the U.S. Government (FCC) and the Canadian Government authorizations are no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator shall be responsible for re-evaluating the end-product (including the transmitter) and obtaining a separate FCC authorization in the U.S. and Canada.

OEM Integrators - End Product Labeling Considerations:

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 product must be labeled in a visible area with the following: “Contains, FCC ID: 2ARNB-HMWB01”. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

OEM Integrators - End Product Manual Provided to the End User:

The OEM integrator shall not provide information to the end user regarding how to install or remove this RF module in end product user manual. The end user manual must include all required regulatory information and warnings as outlined in this document.

Canada Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;

2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102 and compliance with RSS-102 RF exposure, users can obtain Canadian information on RF exposure and compliance.

Le dispositif rencontre l'exemption des limites courantes d'évaluation dans la section 2.5 de RSS 102 et la conformité à l'exposition de RSS-102 rf, utilisateurs peut obtenir l'information canadienne sur l'exposition et la conformité de rf.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Cet émetteur ne doit pas être Co-placé ou ne fonctionnant en même temps qu'aucune autre antenne ou émetteur. Cet équipement devrait être installé et actionné avec une distance minimum de 20 centimètres entre le radiateur et votre corps.

Caution!

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. The final end product must be labelled in a visible area with the following:

"Contains FCC ID: 2ARNB-HMWB01".

"Contains IC: 24490-HMWB01".