HK NATER TECH LIMITED

RL-UM02WBS-8723BU Specification

Customer: _____

Description: RL-UM02WBS-8723BU-V1.2

Customer P/N:_____

Date: _____

Customer		
Approve	Auditing	Admit

Provider		
Approve	Auditing	Admit

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SPECIFICATIONS

IEEE 802.11 b/g/n 2.4GHz

BT V2.1/BT V3.0/BT V4.0

WiFi+BT 1T1R Module

RL-UM02WBS-8723BU

Version: V1.2

1.General Description

RTL8723BU is a highly integrated single-chip 802.11n Wireless LAN (WLAN) USB 2.0 Multi-Function network interface controller with integrated Bluetooth 2.1/3.0/4.0 controller. It combines a WLAN MAC, a 1T1R capable WLAN baseband, and RF in s single chip. The RTL8723BU provides a complete solution for a high-performance integrated wireless and Bluetooth device. The integration provides better coordination between 802.11 and Bluetooth, and with sophisticated dynamic power control and packet traffic arbitration, RTL8723BU is able to provide the best coexistence performance Overview.

General

- IEEE 802.11b/g/n 1T1R WLAN and Bluetooth single chip

Host Interface

- Complies with USB2.0 for WLAN and BT controller
- USB Multi-Function for both BT (USB function 0) and WLAN (USB function 1)
- USB LPM/ USB SS supported

WLAN Controller

- CMOS MAC, Baseband PHY, and RF in a single chip for IEEE 802.11b/g/n compatible WLAN
- Integrated Balun and DPDT
- Complete 802.11n solution for 2.4GHz band
- 72.2Mbps receive PHY rate and 72.2Mbps transmit PHY rate using 20MHz bandwidth
- 150Mbps receive PHY rate and 150Mbps transmit PHY rate using 40MHz bandwidth
- Backward compatible with 802.11b/g devices while operating in 802.11n mode
- IEEE 802.11b/g/n compatible WLAN
- IEEE 802.11e QoS Enhancement (WMM)
- IEEE 802.11i (WPA, WPA2). Open, shared key, and pair-wise key authentication services
- WAPI supported
- Switch diversity for DSSS/CCK
- Packet based hardware antenna diversity
- Selectable receiver FIR filters
- Programmable scaling in transmitter and receiver to trade quantization noise against increased probability of clipping
- Fast receiver Automatic Gain Control (AGC)

Other Features

- Supports Wake-On-WLAN via Magic Packet and Wake-up frame
- Support S3/S4 AES/TKIP group key update
- Support Win8 Network List Offload
- Support TCP/UDP/IP checksum offload

Bluetooth Controller

- Compatible with Bluetooth v2.1 and v3.0 Systems
- Supports Bluetooth 4.0 Low Energy(BLE)
- Integrated MCU to execute Bluetooth protocol stack
- Supports all packet types in basic rate and enhanced data rate
- Supports 4 piconets in a scatternet
- Supports Secure Simple Pairing
- Supports Low Power Mode (Sniff/Sniff Sub-rating/Hold/Park)
- Enhanced BT/WIFI Coexistence Control to improve transmission quality in different

WLAN MAC Features

- Frame aggregation for increased MAC efficiency (A-MSDU, A-MPDU)
- Low latency immediate High-Throughput Block Acknowledgement (HT-BA)
- PHY-level spoofing to enhance legacy compatibility
- Multi MACID support with Fast Channel switch
- Channel management and co-existence
- Transmit Opportunity (TXOP) Short Inter-Frame Space (SIFS) bursting for higher multimedia bandwidth
- WiFi Direct supports wireless peer to peer applications

WLAN PHY Features

- IEEE 802.11n OFDM
- One Transmit and one Receive path (1T1R)
- 20MHz and 40MHz bandwidth transmission
- Support 2.4GHz band channels
- Short Guard Interval (400ns)
- DSSS with DBPSK and DQPSK, CCKmodulation with long and short preamble
- OFDM with BPSK, QPSK, 16QAM, 64QAM modulation.

  Convolutional Coding Rate: 1/2, 2/3, 3/4, and 5/6
- Maximum data rate 54Mbps in IEEE 802.11g; and 150Mbps in IEEE 802.11n

profiles

- Bluetooth 4.0 Dual Mode support: Simultaneous LE and BR/EDR
- Supports multiple Low Energy states
- Support 3D Glasses application
- Support Intel Latency Tolerance Reporting (LTR)

Bluetooth Transceiver

- Fast AGC control to improve receiving dynamic range
- Supports AFH to dynamically detect channel quality to improve transmission quality
- Integrated internal Class 1, Class 2, and Class 3 PA
- Bluetooth 3.0+HS compliant
- Supports Enhanced Power Control
- Supports Bluetooth Low Energy
- Integrated 32K oscillator for power management

Peripheral Interfaces

- General Purpose Input/Output (8 pins)
- 4-wire EEPROM control interface (93C46)
- Three configurable LED pins
- Flexible XTAL frequency selection(52, 48, 40, 38.4, 27, 26, 25, 24, 20, 19.2, 17.664, 16, 14.318, 13 and 12MHz)
- Support XTAL or external clock input

2.General Specification

Model	RL-UM02WBS-8723BU-V1.2
Product Name	WLAN 11b/g/n USB2.0 module
Major Chipset	Realtek RTL8723BU
Standard	WIFI: IEEE802.11n 、IEEE 802.11g、IEEE 802.11b BT :V2.1/BT V3.0/BT V4.0
Data Transfer Rate	1,2,5.5,6,11,12,18,22,24,30,36,48,54,60,90,120 and maximum of 150Mbps
Modulation Method	DSSS,DBPSK, DQPSK, CCK and OFDM (BPSK/QPSK/16-QAM/ 64-QAM)
Frequency Band	2.400GHz ~ 2.4835 GHz
Spread Spectrum	IEEE 802.11b: DSSS (Direct Sequence Spread Spectrum) ,CCK(Com plem e ntary Code Keying) IEEE 802.11g/n:OFDM (Orthogonal Frequency Division Multiplexing)
Operation Range	Up to 180 meters in open space
OS Support	Windows 2000,XP32-64,Vista 32/64,Win7 32/64,Linux,Mac, Android, WIN CE
Security	WEP, TKIP, AES, WPA, WPA2
Bus Interface	WiFi：USB2.0 BT: USB2.0
Operating Channel	WiFi 2.4GHz: 11: (Ch. 1-11) – United States；13: (Ch. 1-13) – Europe ； 14: (Ch. 1-14) – Japan BT 2.4GHz: Ch. 0 ~78
Power Consumption	3.3 V ±0.2V I/O supply voltage
Operating Temperature	-10 ~ +70° C ambient temperature
Storage Temperature	-10 ~ 70°C ambient temperature
Humidity	5 to 90 % maximum (non-condensing)
Dimension	13. 4 x 12. 2 x 1.6mm (LxWxH) +-0.2MM

3.Block Diagram

Single-Band 11n (1x1) Solution with Integrated Bluetooth Controller with Antenna Diversity

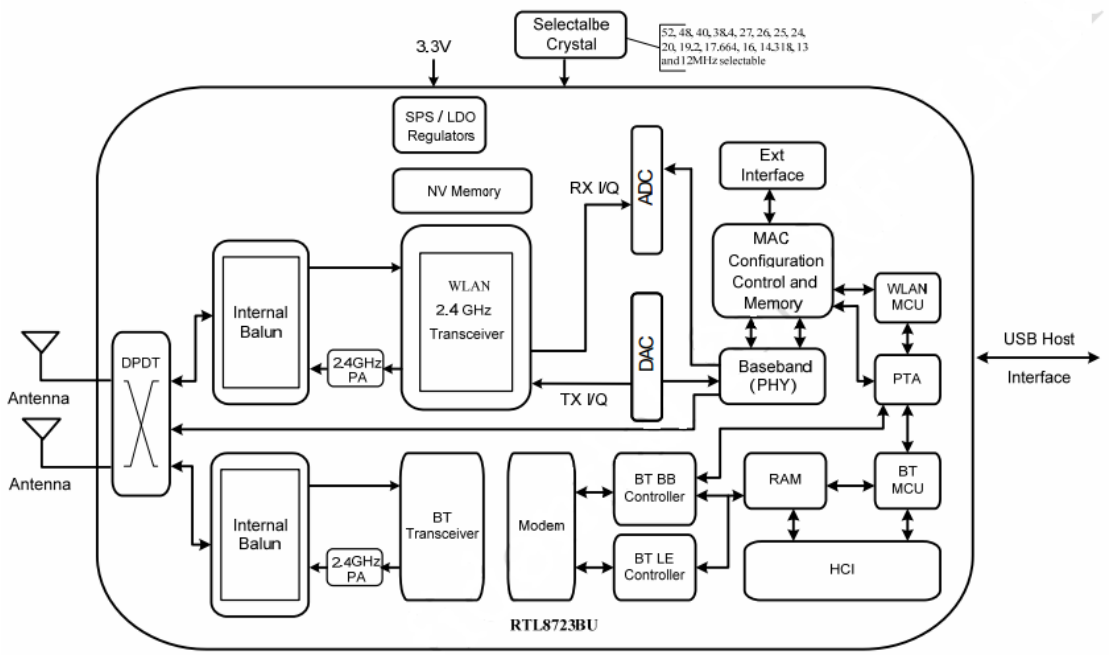


Figure 1. Single-Band 11n (1x1) and Integrated Blue tooth Controller Solution with Antenna Diversity

4.Power Supply DC Characteristics

Symbol	Parameter	Minimum	Typical	Maximum	Units
VA33, VA33_PAD_S0, VA33_PA_S0,VA33_PAD_S1 VA33_PA_S1,VA33_WLG_SYN,VA33_AFE,VD33IO,VDD_IO	3.3V Supply Voltage	3.0	3.3	3.6	V
VA12,VA12_BT,VA12_BT_SYN,VA12_WLG,VA12_WLG_SYN, VA12_AFE, VD12D	1.2V Core Supply Voltage	1.10	1.2	1.32	V
IDD33	3.3V Rating Current	-	-	600	mA

DC Characteristics

Module	Voltage	Current Consumption (linking)
RL-UM02WBS-8723BU-V1.2	3.3V	160mA (上网或者看电影时的功耗)

5.Electrical Specifications

1) RF Characteristics for IEEE802.11b (11Mbps mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11b			
Mode	CCK 11 Mbps			
Channel frequency	2412 ~ 2484 MHz			
RX (per≤85 dBm@8%)	-85 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (17±2 dBm)		17		dBm
EVM (≤-18)		-18		dB

2) RF Characteristics for IEEE802.11g (54Mbps mode unless otherwise specified)

Items	Contents			
Specification	IEEE802.11g			
Mode	OFDM 54 Mbps			
Channel frequency	2412 ~ 2484 MHz			
RX (per≤70 dBm@10%)	-70 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (14±2dBm)		14		dBm
EVM (≤-28)		-28		dB

3) RF Characteristics for IEEE802.11n (BW20_MCS7)

Items	Contents			
Specification	IEEE802.11n (BW20_MCS7)			
Mode	OFDM 65 Mbps			
Channel frequency	2412 ~ 2484 MHz			
RX (per≤65 dBm@10%)	-65 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (13±2 dBm)		13		dBm
EVM (≤-28)		-28		dB

4) RF Characteristics for IEEE802.11n (BW40_MCS7)

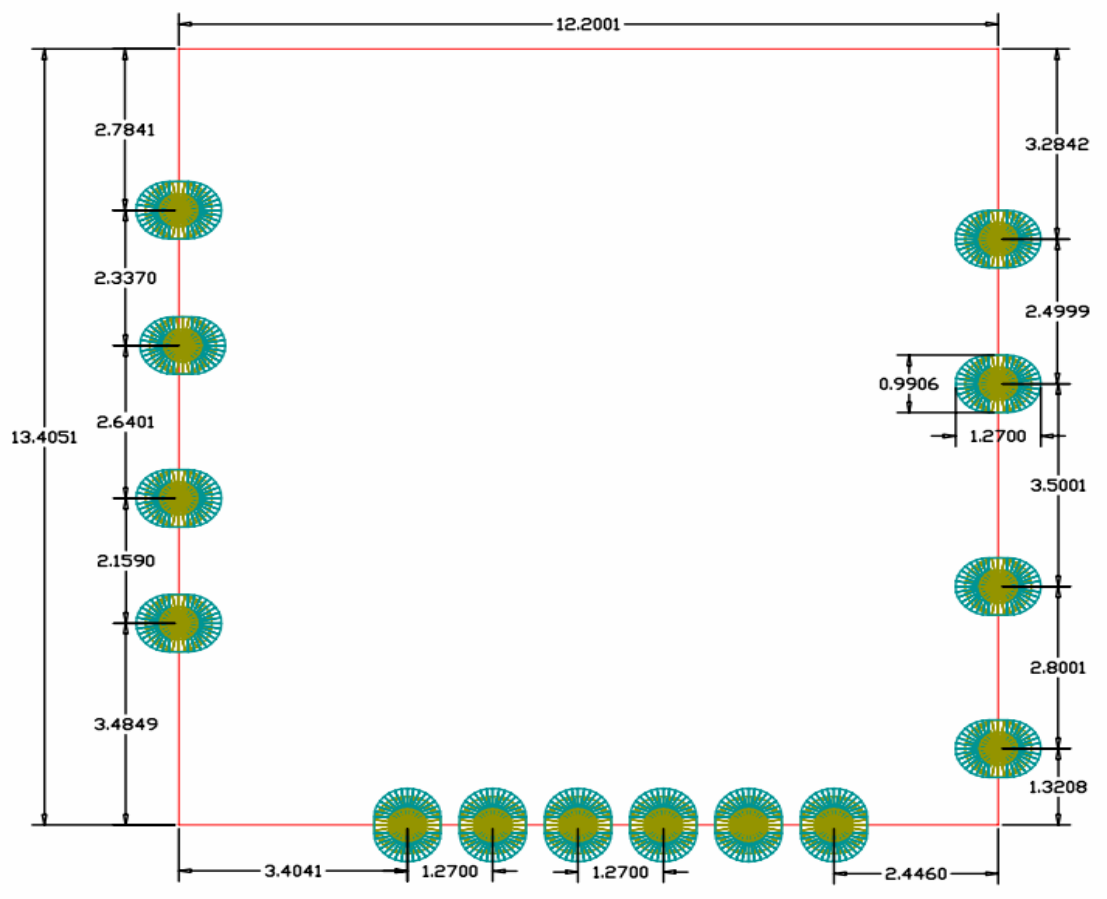
Items	Contents			
Specification	IEEE802.11n (BW40_MCS7)			
Mode	OFDM 135 Mbps			
Channel frequency	2412 ~ 2484 MHz			
RX (per≤65 dBm@10%)	-65 dBm			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level (13±2 dBm)		13		dBm
EVM (≤-28)		-28		dB

6.Bluetooth Specification

Feature		Description		
General Specification				
Bluetooth Standard		Bluetooth V3.3 of 1, 2 and 3 Mbps.		
Host Interface		UART		
Antenna Reference		Small antennas with 0~2 dBi peak gain		
Frequency Band		2.400 GHz ~ 2483.5 GHz		
Number of Channels		79 channels		
Modulation		FHSS, GFSK, DPSK, DQPSK		
RF Specification				
		Min	Typical	Max
Output Power (Class 1.5)			10	
Output Power (Class 2)			2	
Sensitivity @ BER=0.1%	for GFSK (1Mbps)		-89	
Sensitivity @ BER=0.01%	for π/4-DQPSK (2Mbps)		-85	
Sensitivity @ BER=0.01%	for 8DPSK (3Mbps)		-83	
Maximum Input Level		GFSK (1Mbps):-20dBm		
		π/4-DQPSK (2Mbps) :-20dBm		
		8DPSK (3Mbps) :-20dBm		

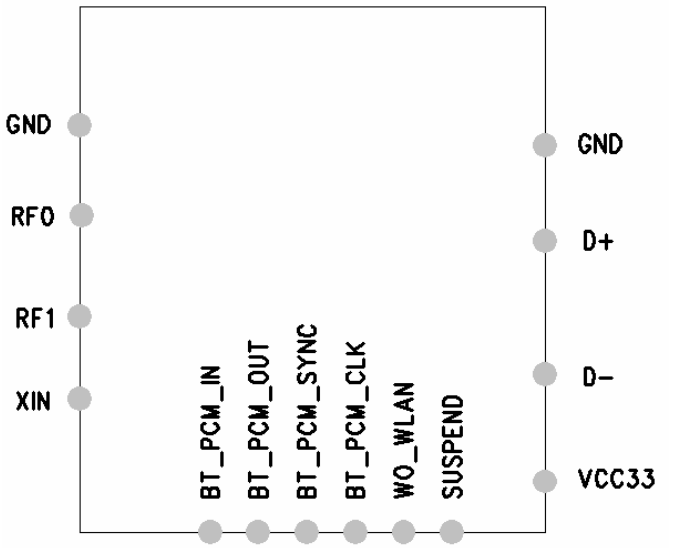
7.Mechanical

Dimensions (mm)	Length	Width	Height
	13.4 **(Tolerance:±0.2mm)**	12.2 **(Tolerance:±0.2mm)**	1.6 **(Tolerance:±0.2mm)**

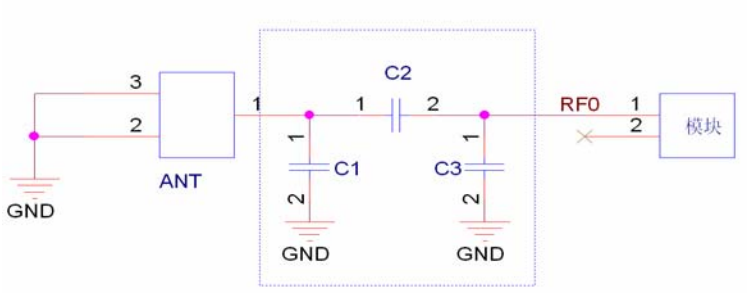


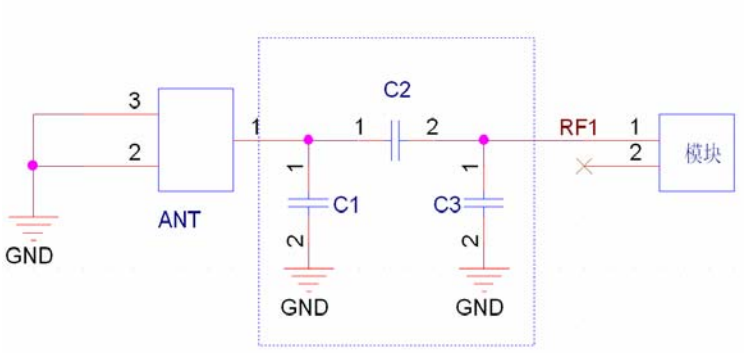
8.Module Pin Assignment

Pin	Function	Description
1	GND	Grond
2	RF0	WLAN/BT RF TX/RX signal0
3	RF1	WLAN/BT RF TX/RX signal port 1
4	XIN	40MHz crystal reference clock input
5	GND	Grond
6	D+	High-Speed USB D+ Signal
7	D-	High-Speed USB D- Signal
8	VCC33	VDD3.3V for Digital IO
9	SUSPEND	Host wakeup pin
10	WO_WLAN	Host wakeup pin
11	BT_PCM_CLK	PCM clock
12	BT_PCM_SYNC	PCM sync
13	BT_PCM_OUT	PCM output
14	BT_PCM_IN	PCM input



9.1.WIFI RF Circuit reference pictures

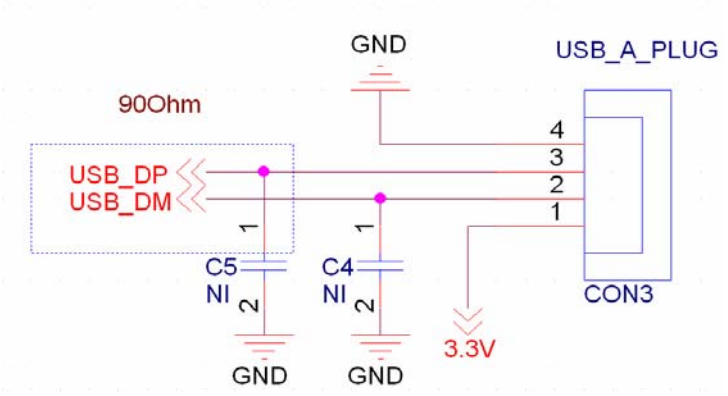




注:1.以上虚线框的部分需要进行天线匹配，以实际天线匹配的电子元器件参数为准.

2.以上为 RF 走线要做 50 欧姆阻抗，走线不能走 90 度，走线长度不能超过 15mm.

9.2. interface electrical characteristics



注：1.USB 数据线需要做 90Ohm 的阻抗。

2.建议电源输入端留一个电源开关，每次开关卡时可以做一个上电断电的作用

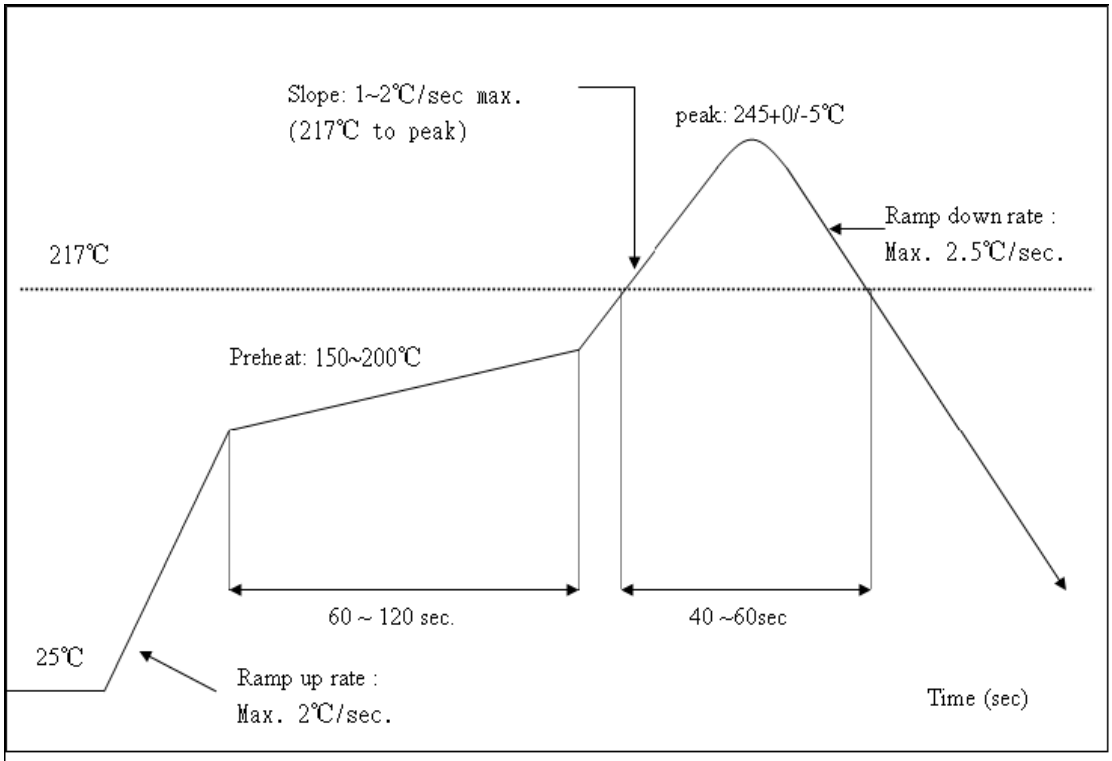
可以使用 wifi 复位，就不会有打不开 wifi 的错误现象出现。

Note:1.Two root go line do difference , but also required to make 90Ohm the impedance test.e get lock can do

2.Suggested that leave a power switch power supply input terminal ,every tim a electric power is on

10.Recommended Reflow Profile

Referred to IPC/JEDEC standard.
Peak Temperature : <250°C
Number of Times : ≤2 times



ENVIRONMENTAL

Operating

Operating Temperature: 0°C to +70 °C
Relative Humidity: 5-90% (non-condensing)

Storage

Temperature: -40°C to +80°C (non-operating)
Relevant Humidity: 5-95% (non-condensing)

MTBF caculation

Over 150,000hours

11.Wireless module before the SMT note:

1.When customers Open stencil must be sure the hole bigger to the Wireless module plate, please press 1 to 1 and 0.7 mm is widened to open outward, the thickness of 0.12 mm.

2.Can't get the wifi module bare hands when needs,must we wear the gloves and static ring.

3.The furnace temperature according to the size of the customer the mainboard ,generally like to stick on a tablet standard temperature of 250 + - 5,can do 260 + - 5.

Storage and use Wifi module control should pay attention to the following matters:

1.Module of the storage life of vacuum packaging：

1-1.Storage life：12 months. Storage conditions:<40℃. Relative humidity:<90%R.H.

1-2.After this bag is opened , devices that will be subjected to infrared reflow, vapor-phase reflow, or equivalent processing must be :

1-3.Check the humidity card :stored at ≦20%RH.If :30%~40%(pink)or greater than 40%(red).Labeling module has moisture absorption.

① Mounthed within 168 hours at factory conditions of: t≦30%℃，≦60%R.H.

② Once opened, the workshop the preservation of life for 168 hours.

1-4.If baking is required,devices may be baked for:

① Modules must be to remove module moisture problem.

② Baking temperature: 125 ℃, 8 hours.

③ After baking, put proper amount of desiccant to seal packages.

1-5.Module vacuum packing 2000 PCS per disc.

2.Module reel packaging items as follows.

2-1.Storage life：12 months. Storage conditions:<40℃. Relative humidity:<90%R.H.

2-2.Module apart packing after 168 hours，To launch patch need to bake, to remove the module hygroscopic, baking temperature conditions：125℃，8hours.

2-3.Reel packing 2000 PCS or 1000 PCS per disc.

3.Module pallet packaging items as follows：

3-1.Storage life：3 months. Storage conditions:<40℃. Relative humidity:<90%R.H.

3-2.Module if not used within 48 hours, before launch the need for baking, baking temperature: 125 ℃, 8 hours.

3-3.Pallet packaging each plate is 100 PCS to 1000 PCS or 2000 PCS shipment.

11.Wifi 模块贴片装机前注意事项：

1.客户在开钢网时一定要将 wifi 模块焊盘的孔开大，请按 1 比 1 再向外扩大 0.7mm 比例开钢网，厚度按 0.12mm.

2.有需要拿 wifi 模块时不可以光手去拿，一定要戴上手套以及静电环.

3.过炉温度要根据客户主板的大小而定，一般像平板电脑上的标准温度为250+-5°，也可以做到260+-5°

Wifi 模块储存及使用管制应注意事项如下：

1.模块的真空包装之储存期限：

1-1.保存期限：12个月，储存环境条件：温度在：<40℃，相对湿度：<90%R.H.

1-2.模块包装被拆后，SMT 组装之时限：

1-3.检查湿度卡：显示值应小于30%（蓝色），如：30%~40%(粉红色）或者大于40%（红色）表示模块已吸湿气.

① 工厂环境温度湿度管制：≦30%℃，≦60%R.H。

② 拆封后，车间的保存寿命为 168 小时.

1-4.如在拆封后的 168 个小时内未使用完，需要烘烤，烘烤条件如下：

① 模块须重新烘烤，以除去模块吸湿问题.

② 烘烤温度条件：125℃，8 小时.

③ 烘烤后，放入适量的干燥剂再密封包装.

1-5.模块真空包装每盘 2000pcs，真空包装图片<1>

2.模块卷盘包装事项如下：

2-1.保存期限：12个月，储存环境条件：温度在：<40℃，相对湿度：<90%R.H.

2-2.模块拆开包装168小时后，如要上线贴片需要重新烘烤，以除去模块吸湿问题，烘烤温度条件125℃，8小时。

2-3.卷盘包装标准为每盘 2000pcs，也可以 1000pcs.

3.模块托盘包装事项如下：

3-1.保存期限：3个月，储存环境条件：温度在：<40℃，相对湿度：<90%R.H.

3-2.模块如在 48 小时内未使用，在上线之前需要进行烘烤，烘烤温度条件：125℃，8 小时。

3-3.托盘包装每盘为 100pcs，以 1000pcs 或 2000pcs 出货.