



欧智通科技

*Fn-Link*

6223E-UUD

WiFi Single-band 1X1 +  
Bluetooth v2.1+EDR/Bluetooth  
3.0/3.0+HS/4.2

User's Manual

## Revision History

<b>Version</b>	<b>Date</b>	<b>Description</b>	<b>Draft</b>	<b>Approved</b>
1.0	2016-09-26	First release	Colin Ming	William Tan
1.1	2017-02-24	Interface modified.	Colin Ming	William Tan
1.2	2017-06-14	Added RF pin description	Colin Ming	William Tan

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## 1. Introduction

6223E-UUD is a small size and low profile of WiFi + BT Combo module, board size is 12.2mm\*13mm with module thickness of 1.7mm. It can be easily manufactured on SMT process and highly suitable for tablet PC, ultra book, mobile device and consumer products. It provides USB interface for WiFi and Bluetooth. The WiFi throughput can go up to 150Mbps in theory by using 1x1 802.11n SISO technology and Bluetooth can support BT2.1+EDR/BT3.0 and BT4.2.

6223E-UUD uses highly integrated WiFi/BT single chip based on advanced COMS process. 6223E-UUD integrates whole WiFi/BT function blocks into a chip, such as USB/PCM, MAC, BB, AFE, RFE, PA, EEPROM and LDO/SWR, except fewer passive components remained on PCB.

This compact module is a total solution for a combination of Wi-Fi + BT technologies. The module is specifically developed for Smart phones and Portable devices.

## 2. Features

- Operate at ISM frequency bands (2.4GHz)
- USB for WiFi and Bluetooth
- IEEE standards support: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n, IEEE 802.11d, IEEE 802.11e, IEEE 802.11h, IEEE 802.11i
- Fully Qualified for Bluetooth 2.1+EDR specification including both 2Mbps and 3Mbps modulation mode
- Fully qualified for Bluetooth 3.0
- Fully qualified for Bluetooth 4.2 Dual mode
- Full-speed Bluetooth operation with Piconet and Scatternet support
- Enterprise level security which can apply WPA/WPA2 certification for WiFi
- WiFi 1 transmitter and 1 receiver allow data rates supporting up to 150 Mbps downstream and 150 Mbps upstream PHY rates

### 3. General Specification

#### 3.1 General Specification

Model Name	6223E-UUD
Product Description	Support WiFi/Bluetooth functionalities
Dimension	L x W x H: 12.2 x 13 x1.7 (typical) mm
WiFi Interface	Support USB2.0
BT Interface	Support USB2.0
Operating temperature	0°C to 70°C
Storage temperature	-40°C to 85°C

#### 3.1.2 Recommended Operating Rating

	Min.	Typ.	Max.	Unit
Operating Temperature	0	25	70	deg.C
VCC33	3.15	3.3	3.45	V

## 4. WiFi/BT RF Specification

### 4.1 2.4GHz RF Specification

Feature	Description
Operating Frequency	2.400~2.4835GHz
Standards	WiFi: IEEE 802.11b, IEEE 802.11g, IEEE 802.11n, IEEE 802.11d, IEEE 802.11e, IEEE 802.11h, IEEE 802.11i BT: V2.1+EDR/BT v3.0/BT v3.0+HS/BT v4.2
Modulation	WiFi: 802.11b: CCK(11, 5.5Mbps), QPSK(2Mbps), BPSK(1Mbps), 802.11 g/n: OFDM BT: 8DPSK, $\pi/4$ DQPSK, GFSK
PHY Data rates	WiFi: 802.11b: 11,5.5,2,1 Mbps 802.11g: 54,48,36,24,18,12,9,6 Mbps 802.11n: up to 150Mbps BT: 1 Mbps for Basic Rate 2,3 Mbps for Enhanced Data Rate
EVM	802.11b /1Mbps : EVM $\leq$ -10dB 802.11b /11Mbps : EVM $\leq$ -10dB 802.11g /6Mbps : EVM $\leq$ -5dB 802.11g /54Mbps : EVM $\leq$ -25dB 802.11n /6.5Mbps : EVM $\leq$ -5dB 802.11n /65Mbps : EVM $\leq$ -28dB 802.11n /13.5Mbps : EVM $\leq$ -5dB 802.11n /135Mbps : EVM $\leq$ -28dB

	802.11n /13.5Mbps : $EVM \leq -5dB$ 802.11n /135Mbps : $EVM \leq -28dB$
Receiver Sensitivity (WiFi)	802.11b@8% PER 1Mbps $\leq -91dBm$ 2Mbps $\leq -89dBm$ 5.5Mbps $\leq -87dBm$ 11Mbps $\leq -85dBm$ Max input level $\geq -8$
	802.11g@10% PER 6Mbps $\leq -87dBm$ 9Mbps $\leq -86dBm$ 12Mbps $\leq -84dBm$ 18Mbps $\leq -82dBm$ 24Mbps $\leq -79dBm$ 36Mbps $\leq -75dBm$ 48Mbps $\leq -71dBm$ 54Mbps $\leq -70dBm$ Max input level $\geq -20$
	802.11n@10% PER HT20_MCS 0 $\leq -87dBm$ HT40_MCS 0 $\leq -84$ HT20_MCS 1 $\leq -84dBm$ HT40_MCS 1 $\leq -81$ HT20_MCS 2 $\leq -82dBm$ HT40_MCS 2 $\leq -79$ HT20_MCS 3 $\leq -79dBm$ HT40_MCS 3 $\leq -76$ HT20_MCS 4 $\leq -75dBm$ HT40_MCS 4 $\leq -72$ HT20_MCS 5 $\leq -71dBm$ HT40_MCS 5 $\leq -68$ HT20_MCS 6 $\leq -70dBm$ HT40_MCS 6 $\leq -67$ HT20_MCS 7 $\leq -69dBm$ HT40_MCS 7 $\leq -66$ Max input level $\geq -20$
Receiver Sensitivity (BT)	-89dBm @ 1Mbps -86dBm @ 2Mbps -83dBm @ 3Mbps
Operating Channel	WiFi 2.4GHz: 11: (Ch. 1-11) – United States  BT 2.4GHz: Ch. 0 ~78



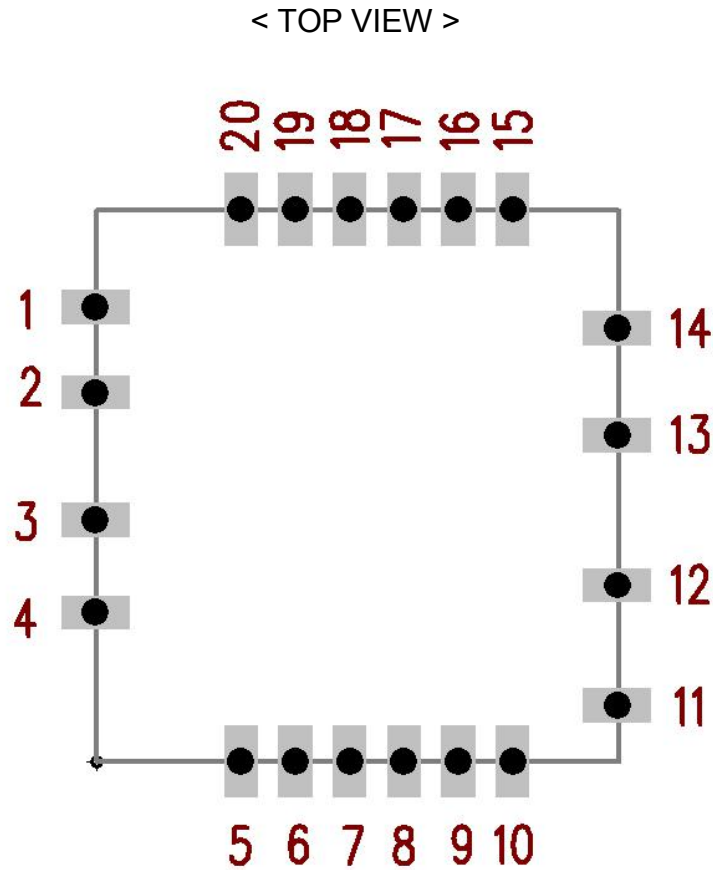
Media Access Control	WiFi: CSMA/CA with ACK BT: AFH, Time Division
Antenna	External Antenna
Network Architecture	WiFi: Ad-hoc mode (Peer-to-Peer ) Infrastructure mode Software AP WiFi Direct BT: Pico Net, Scatter Net
Security	WiFi: WPA, WPA-PSK, WPA2, WPA2-PSK, WEP 64bit & 128bit, IEEE 802.11x, IEEE 802.11i BT: Simple Paring
OS Supported	Android /Linux/ Win CE /iOS /XP/WIN7
Host Interface	WiFi: USB BT: USB
Operating Voltage	3.3±10% Vdc I/O supply voltage
Dimension	Typical L12.0*W12.0*H1.7mm

## 5. Power Consumption

power Consumption (Typical by using SWR)	WiFi only: TX Mode: (Throughput mode) 170mA (MCS7/BW40/13dBm) RX Mode: (Throughput mode) 130mA (MCS7/BW40/-60dBm) Associated Idle power saving with DTIM=3 2.1mA Unassociated Idle: 0.1mA RF disable Mode: 0.1mA  BT: Inquiry & Page Scan: 0.9 mA ACL no traffic: 7.5mA SCO HV3: 15.0mA
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## 6. Pin Assignments

### 6.1 Pin Outline



### 6.2 Pin Definition

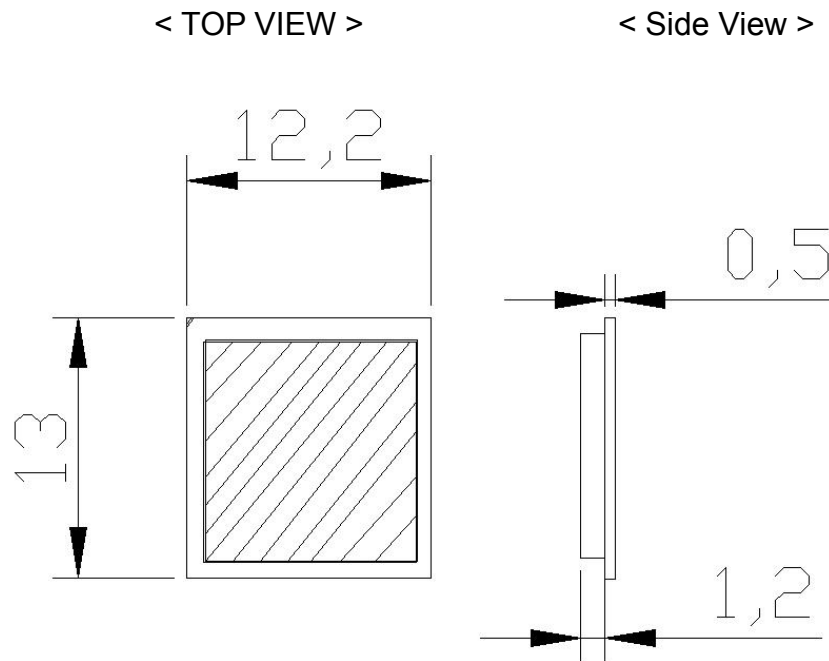
NO	Name	Type	Description
1	GND	—	Ground connections
2	ANT 0	I/O	BT/WiFi RF I/O for single Antenna , BT RF I/O for dual antenna
3	ANT1	I/O	WiFi RF I/O only for dual antenna
4	GND	—	Ground connections
5	PCM_IN	I	PCM data in
6	PCM_OUT	O	PCM data output
7	PCM_SYNC	I/O	PCM sync signal
8	PCM_CLK	I/O	PCM clock
9	BT_WAKE_HOST	O	Bluetooth device wake up host
10	HOST_WAKE_BT	I	Host wake up Bluetooth device
11	VDD33	—	Main power voltage source input 3.3V

<b>12</b>	USB_DM	I/O	USB2.0 differential pair for WLAN And Bluetooth
<b>13</b>	USB_DP	I/O	USB2.0 differential pair for WLAN And Bluetooth
<b>14</b>	GND	—	Ground connections
<b>15</b>	3DD_SEL	—	Not connecting
<b>16</b>	WL_EN	I	WLAN enable
<b>17</b>	BT_EN	I	Bluetooth enable
<b>18</b>	NC	I	Not connecting
<b>19</b>	HOST_WAKE_WL	I	Host wake up WLAN device
<b>20</b>	WL_WAKE_HOST	O	WLAN device wake up host

## 7. Dimensions

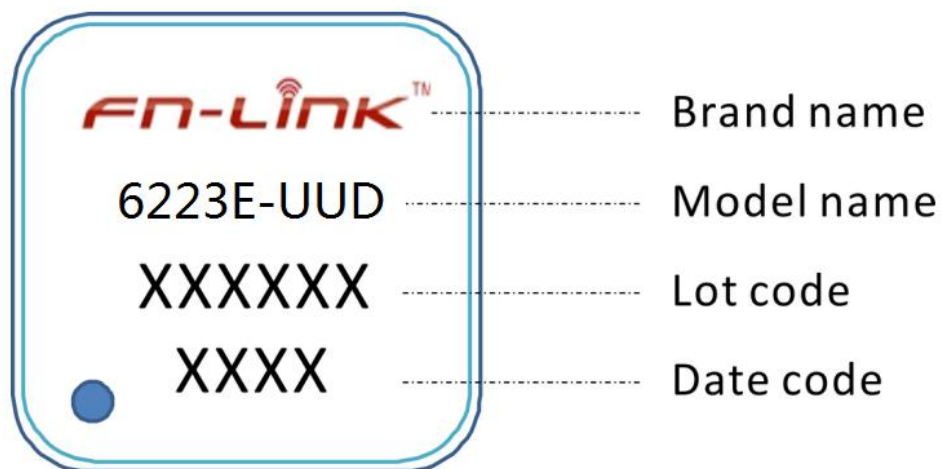
### 7.1 Physical Dimensions

(Unit: mm)



### Marking Description

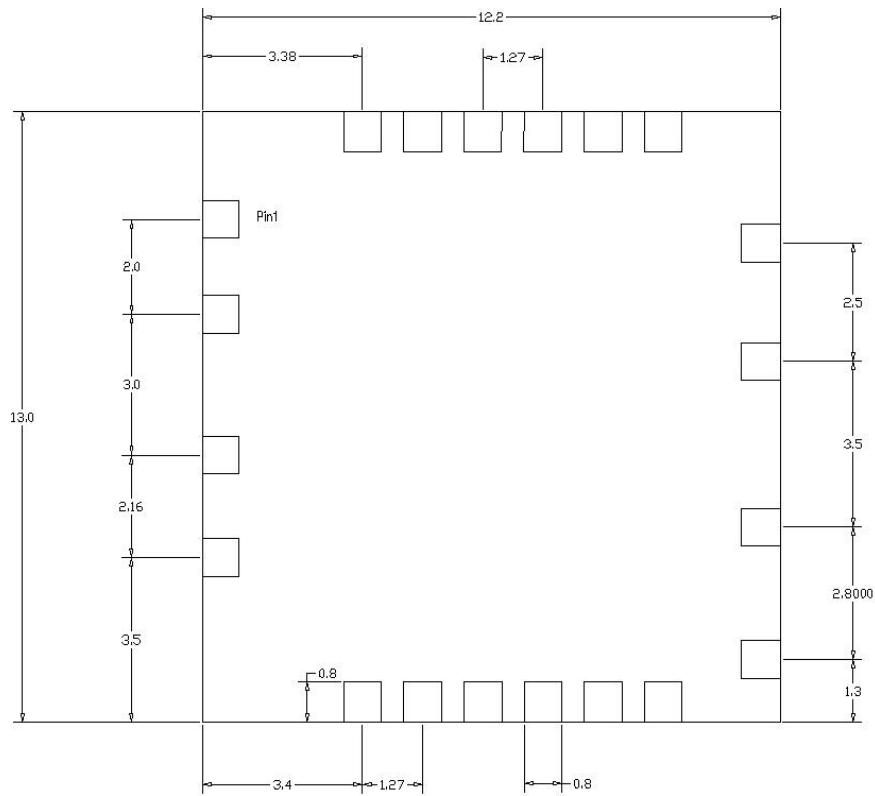
< TOP VIEW >



**7.2 Module Physical Dimensions**

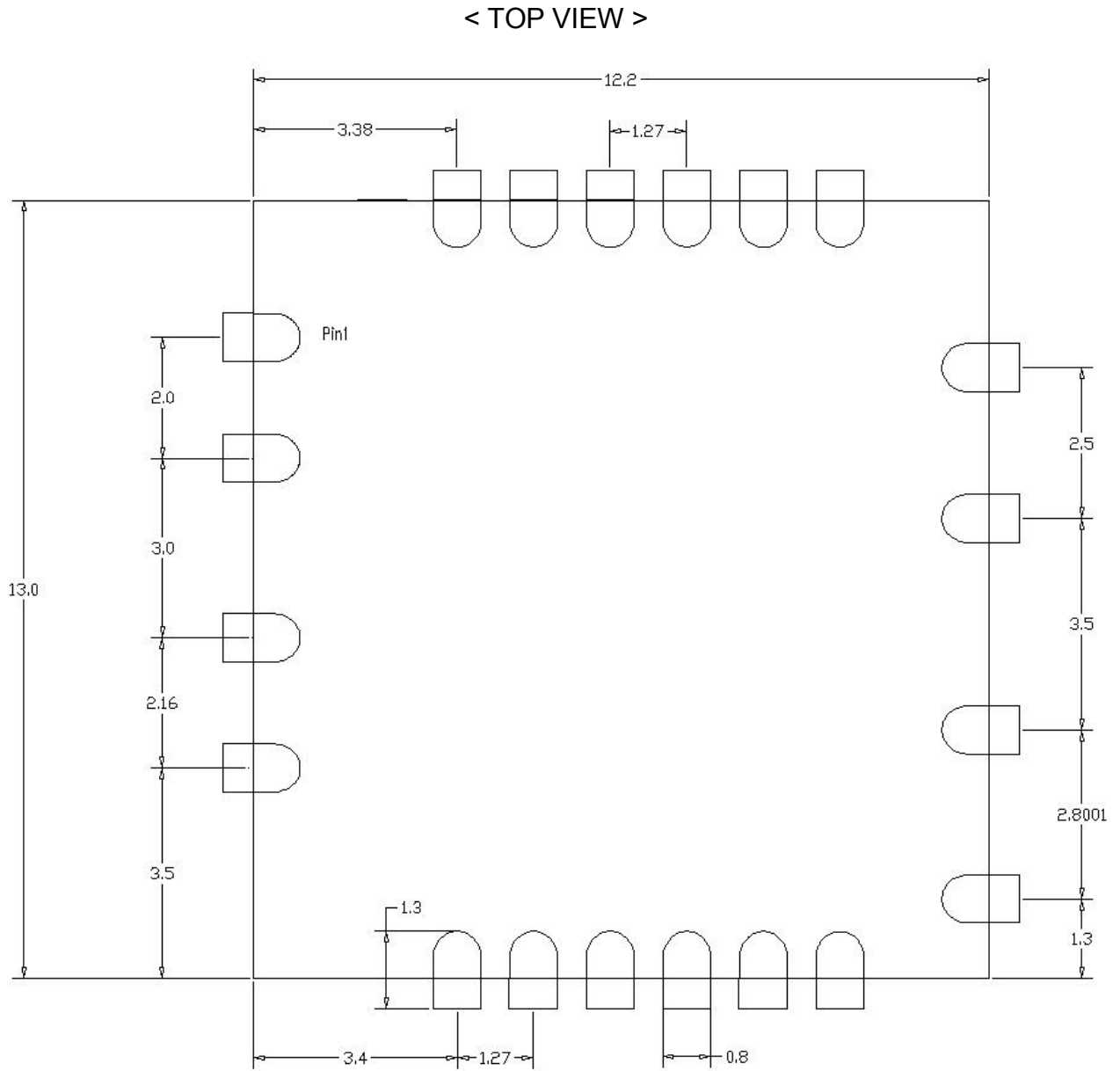
(Unit: mm)

< TOP VIEW >

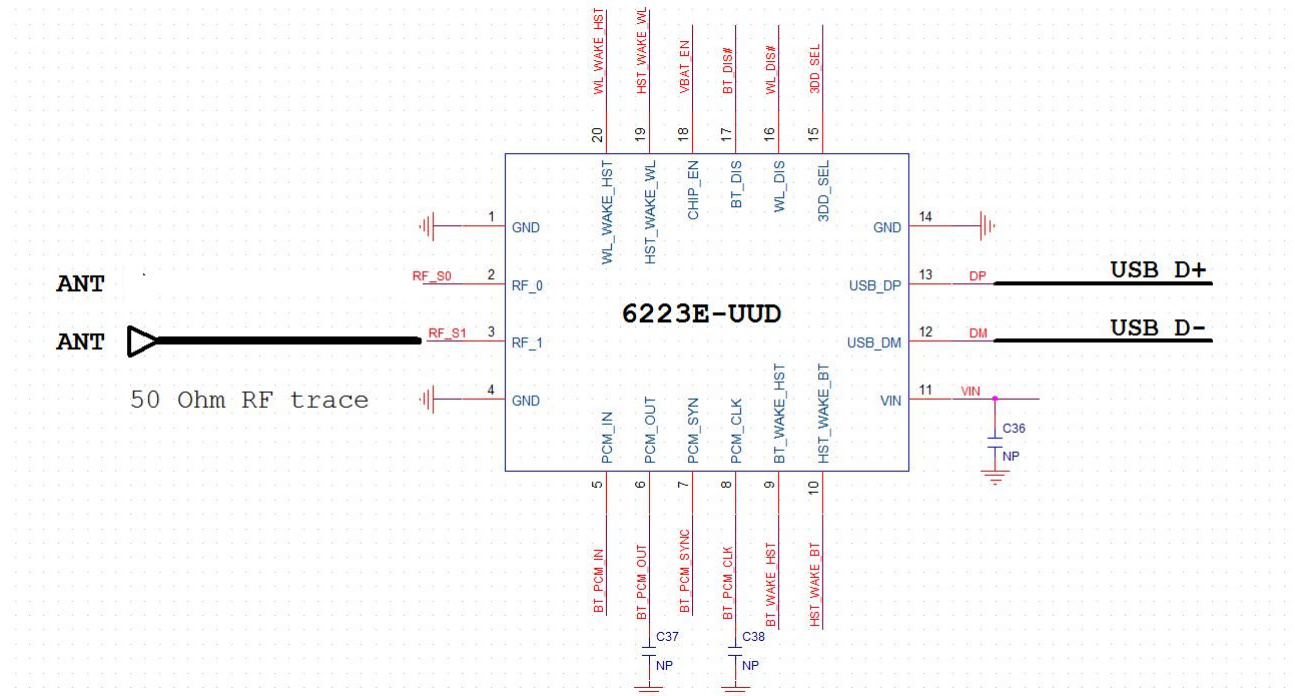


### 7.3 Layout Recommendation

(Unit: mm)



## 8. Reference Design

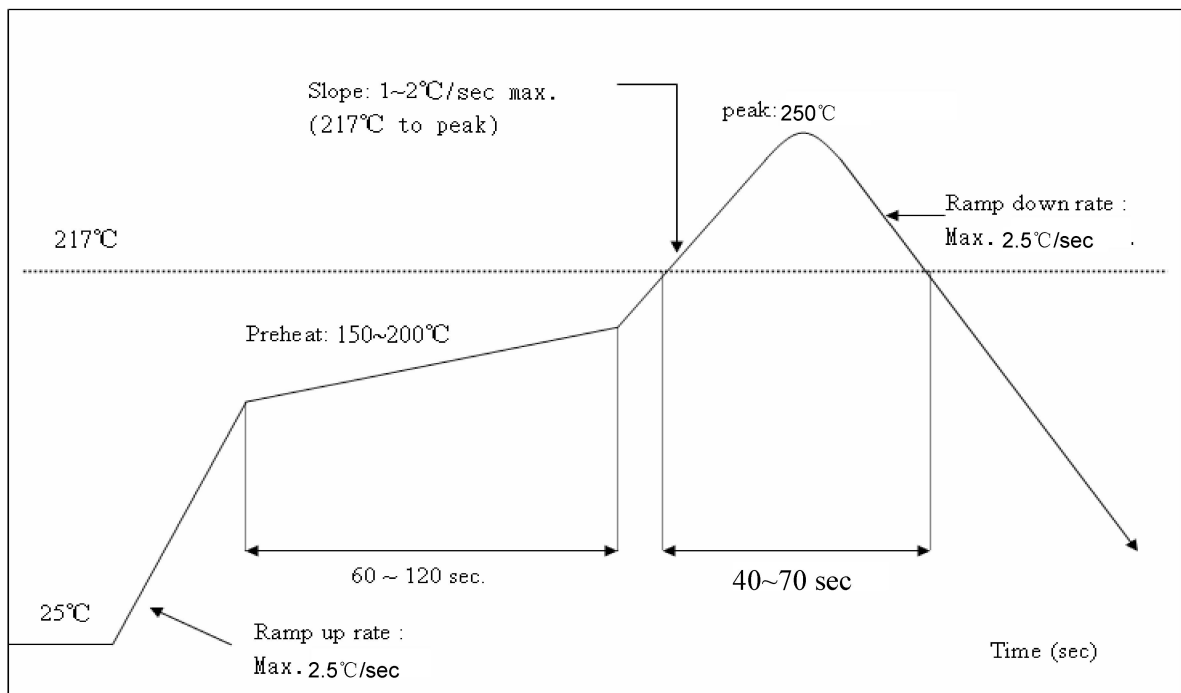


## 9. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ≤2 times



## 10. Package Information

the take-up package



Using self-adhesive tape

Size of black tape:24mm\*32.6m the cover tape :2.13mm\*32.6m

Color of plastic disc: blue

A roll of 2000pcs



NY bag size:460mm\*385mm



size : 350\*350\*35mm





The packing case size: 350\*210\*370mm

**FCC 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. (2) This device must accept any interference received, including interference that may cause undesired operation.

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.

**WARNING:** Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**LABEL OF THE END PRODUCT:**

The final end product must be labelled in a visible area with the following "Contains TX FCC ID: 2AATL-6223E-UUD". If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: 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.

**RF Exposure**

This device has been evaluated and shown compliant with the FCC RF Exposure limits under fixed exposure conditions (antennas are greater than 20cm from a person's body) when installed in certain specific OEM configurations.

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. Due to missing shielding the module is strictly limited to integration by the Grantee himself or his dedicated OEM integrator under control of the Grantee. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

**IMPORTANT NOTE:**

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

(1) According to FCC Part 15 Subpart C Section 15.212, the radio elements of the modular transmitter must have their own shielding. However, due to there is no shielding for this WIFI/BT module, this module is granted as a Limited Modular Approval.

This module has been designed to operate with a PIFA antenna having a maximum gain of 2.99dBi. Only this type of antenna may be used, the manufacturer recommended antenna as below:

No.	Brand	Model name	Antenna Type	Connector	Gain (dBi)
1	ZHONGTIAN XUN	2.00001213	PIFA	I-PEX	2.99
2	XK	XKFPC-2D4-5D8-1 50	PIFA	I-PEX	0.0
3	XK	XK-QX2400-PCB-1 40	PIFA	I-PEX	2.0
4	ZHONGTIAN XUN	2.00001050	PIFA	I-PEX	0.38

(2) Integration is typically strictly restricted to Grantee himself or dedicated OEM integrators under control of the Grantee.

In the event that these conditions can not 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 can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

The module will be responsible to satisfy SAR/RF Exposure requirements, when the module integrated into any (portable, mobile, fixed) host device.

This module is intended for OEM integrator only and the OEM integrators and instructed to ensure that the end user has no manual instructions to remove or install the device. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module.

The module has no shielding and tested stand alone. This module is tested and approved as Limited modular approval with stand alone configuration, any OEM incorporated this radio module into any system are require additional testing and evaluation.

The module must in the end-product be installed in such manner that the authorized antennas can be used, any change of the antenna will void the certification.

**EU Regulatory Conformance**

Hereby, we(FN-LINK TECHNOLOGY LIMITED) declared that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU