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Product Specification

Project Name	802.11a/b/g/n/ac 2T2R WIFI Module
Model NO	F12ASUM13-W3 (USB2.0 Interface,With 4 PIN header,with shielding)
Customer	
Customer's Part NO	

Approved: Szs	Check: Jim Hu	Draft: Lxy
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Feedback of customer's Confirmation		
We accept the specification after Confirmed.		
Customer	Customer signature	Approved Date

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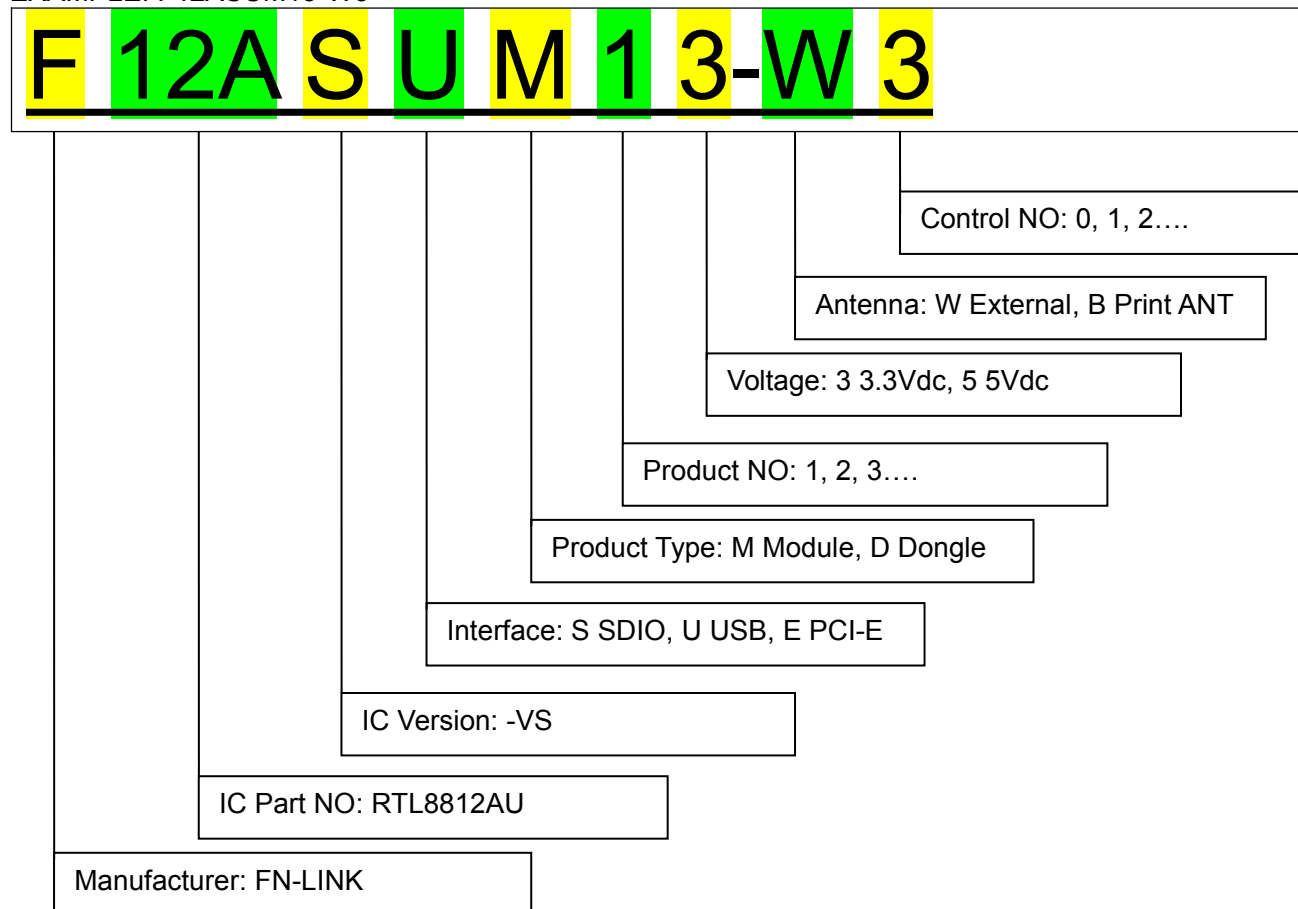
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0. Revision History

REV NO	Date	Modifications	Approved	Draft
Rev1.0	2019-09-12	First Released	Szs	Lxy

0.1 MODEL NO DIFINITION

EXAMPLE: F12ASUM13-W3



1. Introduction

F12ASUM13-W3 is a highly integrated single-chip MIMO (Multiple In, Multiple Out) Wireless LAN(WLAN) USB2.0 network interface controller complying with the wireless very high throughput IEEE 802.11ac Draft 2.0 and 802.11n specifications. The RTL8812AU provides a complete solution for a high-performance wireless client and also supports WIFI Direct feature that can easily build a WIFI P2P PAN network.

1.1 Overview

The general hardware for the module is shown in Figure 1. This WLAN Module design is based on Realtek RTL8812AU. It is a highly integrated single-chip MIMO Wireless LAN (WLAN) USB2.0 network interface controller complying with the 802.11a/b/g/n/ac specification. It combines a MAC, a 2T2R capable baseband, support 2.4G & 5G band, and RF in a single chip. It is designed to provide excellent performance and enhance the advantages of robust system and cost-effective.

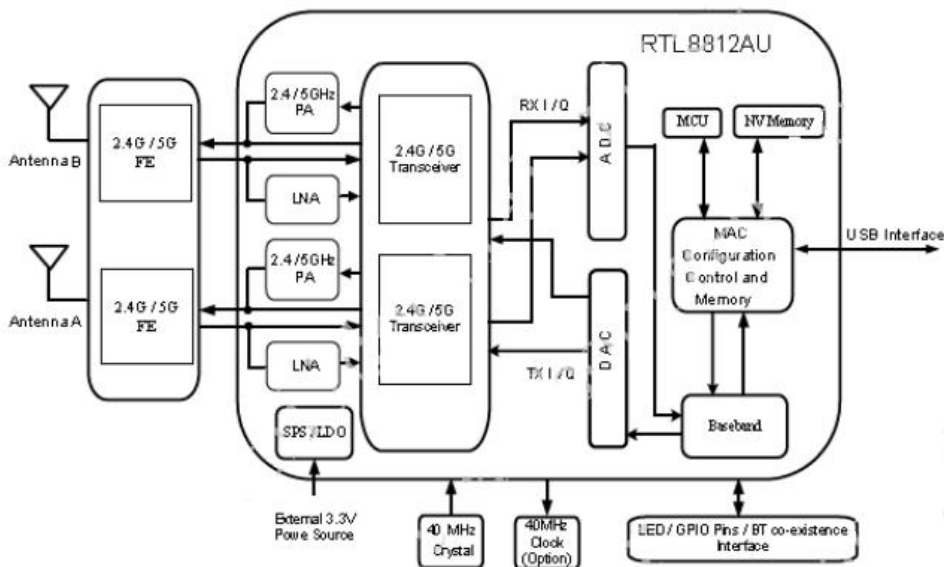


Figure 1. Dual-Band MIMO 2x2 Solution—RTL8812AU (11ac 2x2 MAC/BB/RF + PA)

1.2 SPECIFICATION REFERENCE

This specification is based on additional references listed as below.

- IEEE 802.11a
- IEEE 802.11b
- IEEE 802.11g
- IEEE 802.11n
- IEEE 802.11ac
- IEEE 802.11e(WMM)、
- IEEE 802.11i(WPA,WPA2)
- IEEE 802.11hTPC
- IEEE 802.11k、WAPI

2. GENERAL SPECIFICATION

2.1 WiFi Specifications

Features	Descriptions
Main Chipset	Realtek RTL8812AU-VS-CG

Operating Frequency	2.4G: 2412MHz~2462MHz ; 2422MHz~2452MHz 5G: 5180MHz-5240MHz ; 5745MHz-5825MHz	
Host Interface	USB2.0	
WIFI Standard	IEEE802.11a/b/g/n/ac 2T2R	
2.4G/5G At the same time work	Non support	
Modulation	802.11b: CCK(11, 5.5Mbps), QPSK(2Mbps), BPSK(1Mbps) 802.11 a/g: OFDM 802.11n: MCS0-7 802.11ac: MCS0-9	
PHY Data rates	802.11a: 54,48,36,24,18,12,9,6 Mbps 802.11b: 11,5.5,2,1 Mbps 802.11g: 54,48,36,24,18,12,9,6 Mbps 802.11n: 6.5~300Mbps 802.11ac: up to 866.7Mbps	
EVM	802.11b /11Mbps : EVM $\leq$ -9dB 802.11a/g /54Mbps : EVM $\leq$ -25dB 802.11n /MCS7 : EVM $\leq$ -28dB 802.11ac /MCS9 : EVM $\leq$ -32dB	
Receiver Sensitivity Bandwidth: 20MHz	802.11b@8% PER 1Mbps $\leq$ -88dBm 2Mbps $\leq$ -87dBm 5.5Mbps $\leq$ -85dBm 11Mbps $\leq$ -82dBm	
	802.11g@10% PER 6Mbps $\leq$ -86dBm 9Mbps $\leq$ -85dBm 12Mbps $\leq$ -84dBm 18Mbps $\leq$ -82dBm 24Mbps $\leq$ -80dBm 36Mbps $\leq$ -77dBm 48Mbps $\leq$ -73dBm 54Mbps $\leq$ -71dBm	802.11a@10% PER 6Mbps $\leq$ -86dBm 9Mbps $\leq$ -85dBm 12Mbps $\leq$ -84dBm 18Mbps $\leq$ -82dBm 24Mbps $\leq$ -80dBm 36Mbps $\leq$ -77dBm 48Mbps $\leq$ -73dBm 54Mbps $\leq$ -71dBm
	802.11n 2.4G @10% PER MCS 0 $\leq$ -83dBm MCS 1 $\leq$ -82dBm MCS 2 $\leq$ -80dBm MCS 3 $\leq$ -78dBm MCS 4 $\leq$ -75dBm MCS 5 $\leq$ -71dBm MCS 6 $\leq$ -69dBm MCS 7 $\leq$ -67dBm	802.11n 5G @10% PER MCS 0 $\leq$ -83dBm MCS 1 $\leq$ -82dBm MCS 2 $\leq$ -80dBm MCS 3 $\leq$ -78dBm MCS 4 $\leq$ -75dBm MCS 5 $\leq$ -71dBm MCS 6 $\leq$ -69dBm MCS 7 $\leq$ -67dBm

Receiver Sensitivity Bandwidth: 40MHz	802.11n 2.4G @10% PER MCS 0 ≤-80dBm MCS 1 ≤-79dBm MCS 2 ≤-77dBm MCS 3 ≤-75dBm MCS 4 ≤-72dBm MCS 5 ≤-68dBm MCS 6 ≤-66dBm MCS 7 ≤-64dBm	802.11n 5G @10% PER MCS 0 ≤-80dBm MCS 1 ≤-79dBm MCS 2 ≤-77dBm MCS 3 ≤-75dBm MCS 4 ≤-72dBm MCS 5 ≤-68dBm MCS 6 ≤-66dBm MCS 7 ≤-64dBm
Receiver Sensitivity Bandwidth: 80MHz	802.11ac 5G @10% PER MCS 0 ≤-76dBm MCS 1 ≤-73dBm MCS 2 ≤-71dBm MCS 3 ≤-68dBm MCS 4 ≤-64dBm MCS 5 ≤-60dBm MCS 6 ≤-59dBm MCS 7 ≤-58dBm MCS 8 ≤-53dBm MCS 9 ≤-51dBm	
RF Antenna	External Antenna	
OS Support	Android / Win CE /iOS /Linux/Windows 2000/XP/WIN7	
Security	WEP,TKIP,AES,WPA,WPA2	
Dimension	Typical L27.0*W20.0*T3.5mm (With 4 PIN header)	

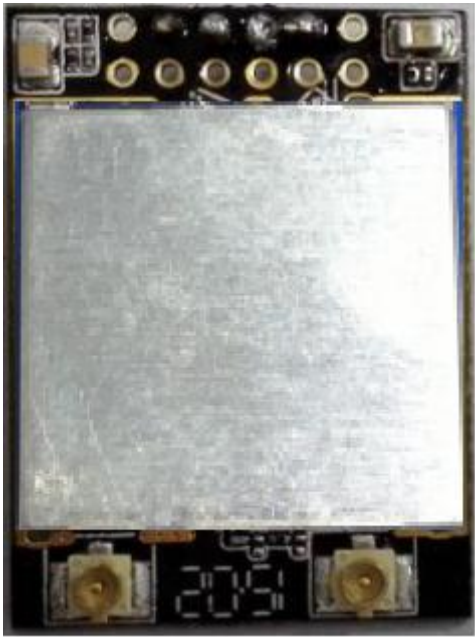
2.2 Power Consumption

Test Environment: Win XP SP3、Voltage:3.3V

Mode		Current (mA)
2.4G	LINK	170
	Tx (CCK 11M)	330
	Tx (OFDM 54M)	180
	Tx (MCS7 20M)	200
	Tx (MCS7 40M)	180
	Rx	170
5 G	LINK	220
	80M MCS0	400
	80M MCS9	270
	40M MCS0	550
	40M MCS15	320
	20M MCS0	440
	20M MCS15	340
Disable		30

3. Mechanical Specification

3.1 Outline Drawing(Unit: $\pm 0.15\text{mm}$)

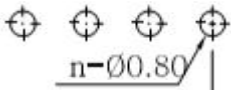
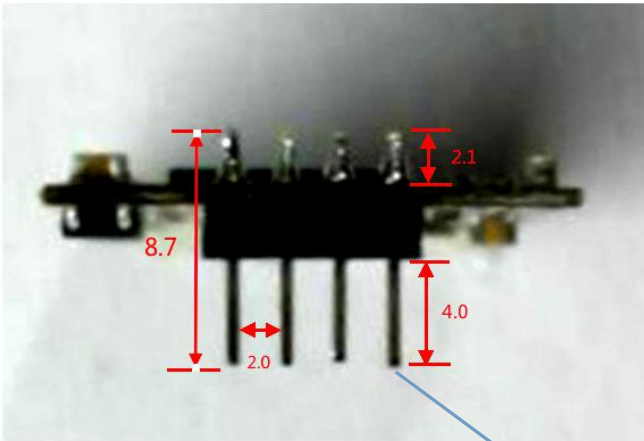
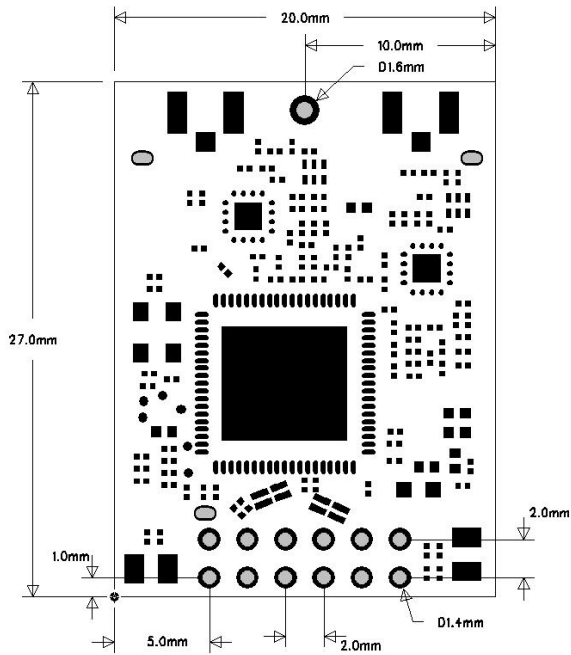


(TOP VIEW)

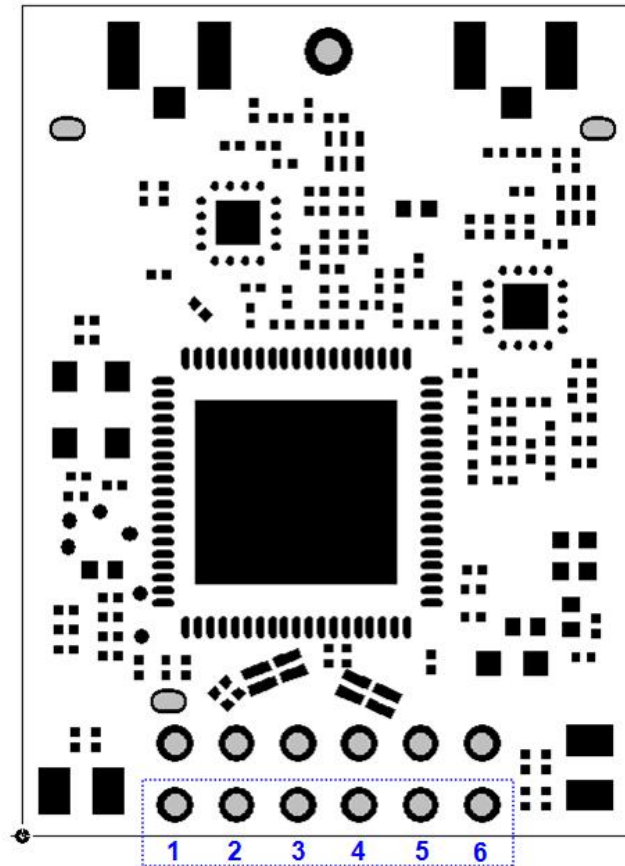


(BOTTOM VIEW)

(Top View)

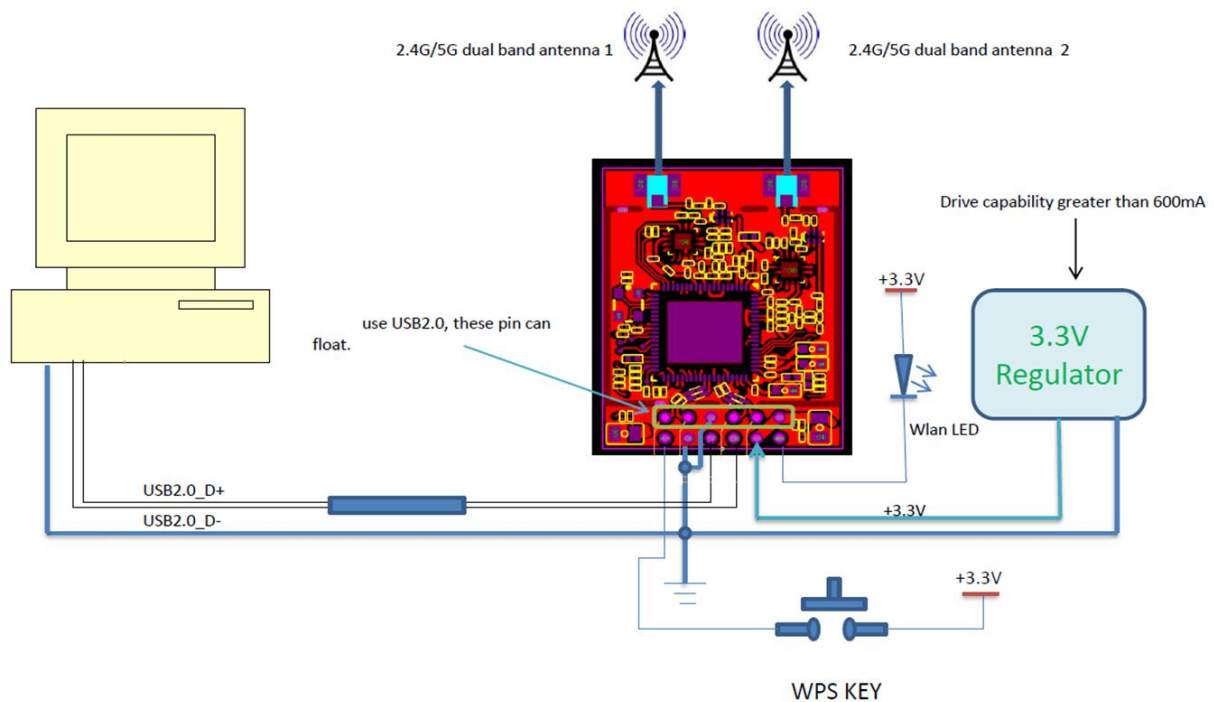


3.2 Connector Pin Definition



Pin #	Name	Description
1	PB-P2	WPS Switch (high potential)
2	GND	Ground
3	DP	USB Data +
4	DM	USB Data -
5	3.3VCC	3.3V Power Supply
6	LED	External LED control

3.3 Typical application circuit



4. Environmental Requirements

4.1 Operating& Storage Conditions

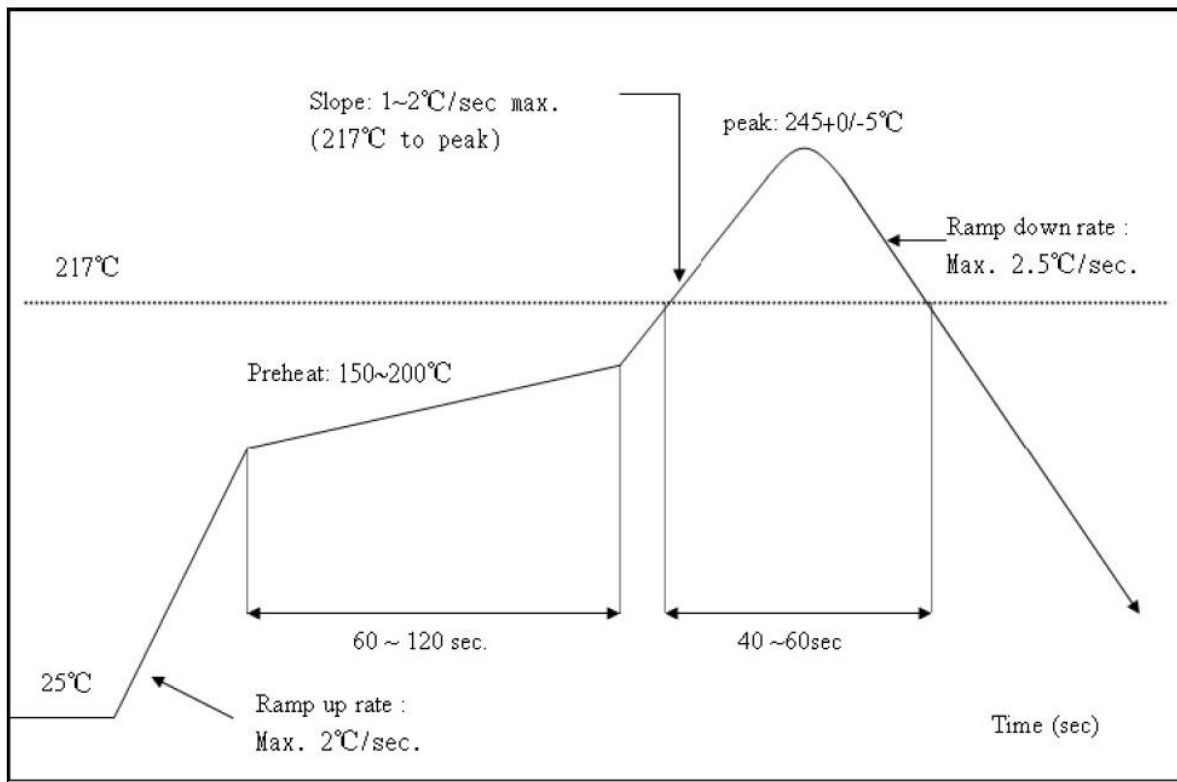
Operating	Temperature: 0°C to +70°C
	Relative Humidity: 10-90% (non-condensing)
Storage	Temperature: -40°C to +80°C (non-operating)
	Relative Humidity: 5-90% (non-condensing)
MTBF (Mean Time Between Failures)	Over 150,000hours

4.2 Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : $<250^{\circ}\text{C}$

Number of Times : ≤ 2 times



4.3 Patch WIFI modules installed before the notice:

WIFI module installed note:

1. Please press 1 : 1 and then expand outward proportion to 0.7 mm, 0.12 mm thickness When open a stencil
2. Take and use the WIFI module, please insure the electrostatic protective measures.
3. Reflow soldering temperature should be according to the customer the main size of the products, such as the temperature set at $250 \pm 5^{\circ}\text{C}$ for the MID motherboard.

About the module packaging, storage and use of matters needing attention are as follows:

1. The module of the reel and storage life of vacuum packing: 1). Shelf life: 8 months, storage environment conditions: temperature in: $< 40^{\circ}\text{C}$, relative humidity: $< 90\%\text{RH}$.
2. The module vacuum packing once opened, time limit of the assembly:
 - 1) check the humidity display value should be less than 30% (in blue), such as: 30% ~ 40% (pink), or greater than 40% (red) the module have been moisture absorption.
 - 2) factory environmental temperature humidity control: $\leq -30^{\circ}\text{C}$, $\leq 60\%\text{RH}$.
 - 3) Once opened, the workshop the preservation of life for 168 hours.
3. Once opened, such as when not used up within 168 hours:
 - 1) The module must be again to remove the module moisture absorption.
 - 2) The baking temperature: 125°C , 8 hours.
 - 3) After baking, put the right amount of desiccant to seal packages.

5. Package

TBD...

Antenna info:
External antenna
Manufacture: SHENZHEN OFEIXIN TECHNOLOGY LIMITED
Model: ANT-B2458X-08701
Antenna gain 2.0dBi per antenna
Antenna number:2

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.

Any 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.

We will retain control over the final installation of the modular such that compliance of the end product is assured. In such cases, an operating condition on the limit modular approval for the module must be only approved for use when installed in devices produced by a specific manufacturer. If any hardware modify or RF control software modify will be made by host manufacturer,C2PC or new certificate should be apply to get approval,if those change and modification made by host manufacturer not expressly approved by the party responsible for compliance ,then it is illegal.

FCC Radiation Exposure Statement

The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device. Indoor use only.

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. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

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 the following: "Contains Transmitter Module FCC ID: 2AATL-F12ASUM13 Or Contains FCC ID: 2AATL-F12ASUM13"

When the module is installed inside another device, the user manual of the host must contain below warning statements;

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.

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.

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

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

Any company of the host device which install this modular with limit modular approval should perform the test of radiated & conducted emission and spurious emission,etc. according to FCC part 15C : 15.247 and 15.407 and 15.209 & 15.207 ,15B Class B requirement, Only if the test result comply with FCC part 15C : 15.247 and 15.407 and 15.209 & 15.207 ,15B Class B requirement, then the host can be sold legally.