FN-LINK欧智通

PRODUCT SPECIFICATION

HAAS-210

Wi-Fi Single-band 1x1 + BLE 5.0

IOT Combo Module

Version:v1.0

HAAS-210 Module Datasheet

Ordering Information	Part NO.	Description
	FGJ202TRRX-00	TG7100C /802.11b/g/n/ WiFi + BLE 5.0, 1T1R , UART, antenna on board, 16mm*24mm

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

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Revision History

Version	Date	Contents of Revision Change	Preparde	Checked	Approved
V1.0	2021/12/15	Initial Release	FC	ZZQ	QJP

1. General Description

1.1 Introduction

Fn-Link HAAS-210 is a wireless module based on WiFi + BLE single chip SOC TG7100C, which can meet the requirements of low power consumption and high performance IOT. The core processor TG7100C integrates the baseband and MAC design of 2.4G WiFi (802.11b/g/n) and BLE 5.0.The micro-controller subsystem consists of a low-power 32-bit RISC CPU, cache and memory.

With advanced power management unit, Fn-Link HAAS-210 support a variety of low power consumption modes. The program can be downloaded and burned directly through UART.

1.2 Description

Model Name	HAAS-210
Product Description	Support Wi-Fi/BLE functionalities
Dimension	L x W x H: 16 x 24 x 2.65 (typical) mm
Wi-Fi Interface	UART
BT Interface	UART
OS supported	Android /Linux/ Win CE /iOS /XP/WIN7/WIN10
Operating temperature	0°C to 85°C
Storage temperature	-40°C to 85°C

2. Features

General

- 802.11b/g/n compatible WLAN
- Wi-Fi Security WPS / WEP / WPA / WPA2 Personal / WPA2 Enterprise / WPA3
- Support STA and SoftAP, STA+SoftAP and sniffer modes
- Wi-Fi fast connection with BLE assistance
- 32-bit RISC CPU with FPU
- RAM 276KB/ ROM 128KB/ ROM 128KB
- Build-In 32KHz RTC
- supported PWM/UART

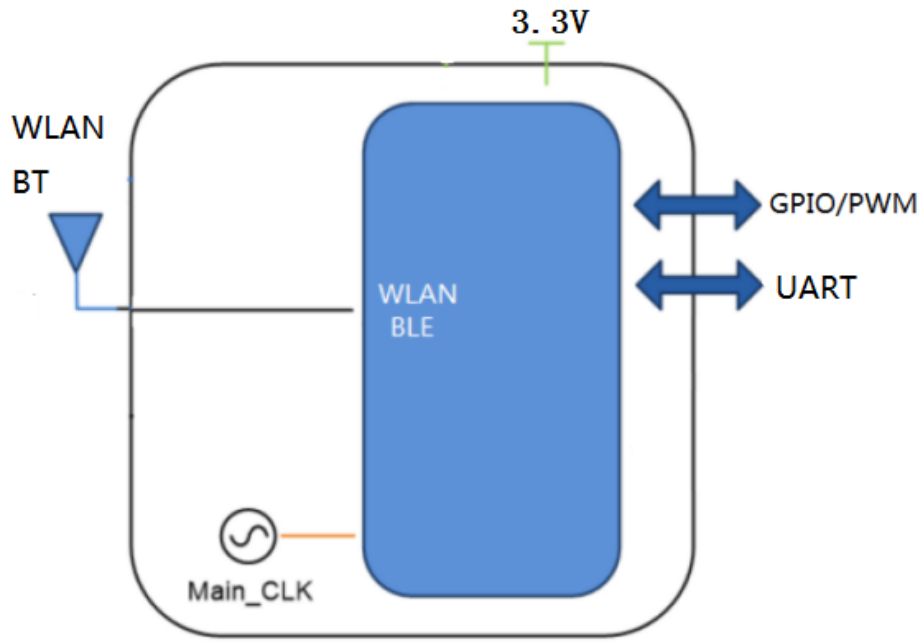
PHY Features

- 72.2Mbps transmit and receive PHY rate using 20MHz bandwidth

Bluetooth Features

- Wi-Fi and BLE coexistence
- Bluetooth® Low Energy 5.0
- BLE 5.0 Channel Selection#2 is supported

3. Block Diagram



4. General Specification

4.1 WI-FI Specification

Feature	Description	
WLAN Standard	IEEE 802.11 b/g/n Wi-Fi compliant	
Frequency Range	2.400 GHz ~ 2.4835 GHz (2.4 GHz ISM Band)	
Number of Channels	2.4GHz：Ch1 ~ Ch14	
Test Items	**Typical Value**	**EVM**
Output Power	802.11b /11Mbps : 18dBm ± 2 dB	EVM ≤ -9dB
	802.11g /54Mbps : 14dBm ± 2 dB	EVM ≤ -25dB
	802.11n /MCS7 : 14dBm ± 2 dB	EVM ≤ -28dB
Spectrum Mask	Meet with IEEE standard	
Freq. Tolerance	±20ppm	
Receive Sensitivity (11b,20MHz) @8% PER	- 1Mbps PER @ -92 dBm	≤-83
	- 11Mbps PER @ -85 dBm	≤-76
Receive Sensitivity (11g,20MHz) @10% PER	- 6Mbps PER @ -89 dBm	≤-85
	- 54Mbps PER @ -70 dBm	≤-68
SISO Receive Sensitivity (11n,20MHz) @10% PER	- MCS=0 PER @ -89 dBm	≤-85
	- MCS=7 PER @ -68 dBm	≤-67

4.2 Bluetooth Specification

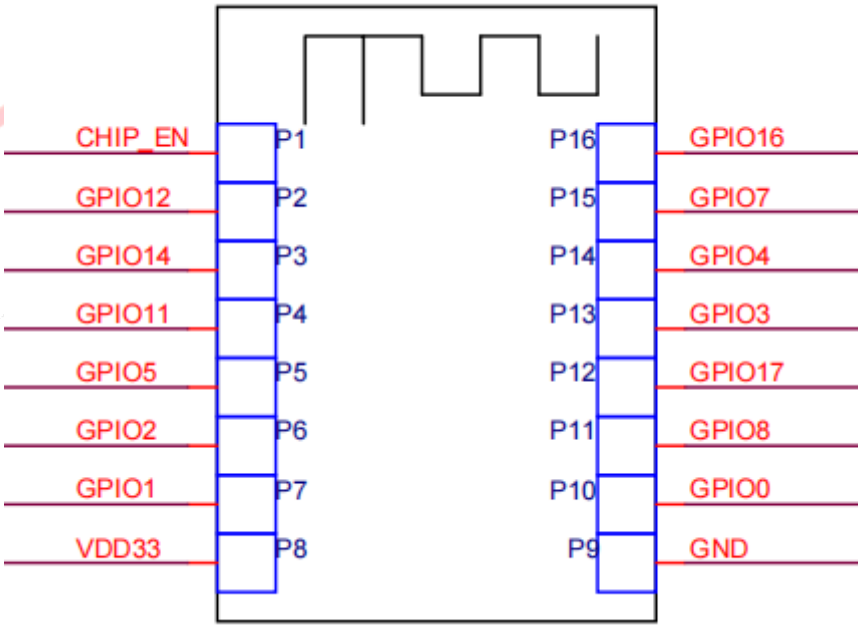
Feature	Description
General Specification	
Bluetooth Standard	Bluetooth 5.0 of 1Mbps.
Host Interface	UART
Antenna Reference	Small antennas with 0~2 dBi peak gain
Frequency Band	2402 MHz ~ 2480 MHz
Number of Channels	39 channels

RF Specification			
	Min(dBm)	**Typical**(dBm)	**Max**(dBm)
Output Power	0	5	15
Sensitivity @ BER=0.1% for GFSK (1Mbps)			-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	EN	I	Power enable of module ON: pull high ; OFF: pull low	AVDD33
2	GPIO12	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table	VDDIO
3	GPIO14	—	GPIO Pin. The MUX Function can be referred to Pin Function Table	VDDIO
4	GPIO11	I/O	GPIO Pin. Chip Jtag TDO pin，Not recommended	
5	GPIO5	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table	VDDIO
6	GPIO2	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table	VDDIO
7	GPIO1	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table	VDDIO
8	VCC	P	3.3V Input	3.3V
9	GND	—	Ground connections	
10	GPIO0	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table	VDDIO
11	GPIO8	I/O	Boot strap selection.Pin state sampled on rising edge of CHIP_EN. High: Boot from interface. Low: Boot from flash.	
12	GPIO17	I/O	GPIO Pin. The MUX Function can be referred to Pin Function Table	VDDIO
13	GPIO3	I/O	GPIO Pin/UART RX 通信接口	VDDIO
14	GPIO4	I/O	GPIO Pin/UART TX 通信接口	VDDIO
15	GPIO7/UART_RX	I	GPIO Pin/UART RX debug 接口	VDDIO
16	GPIO16/UART_TX	O	GPIO Pin/UART TX debug 接口	VDDIO

P: POWER I: INPUT O: OUTPUT

5.3 Pin Function Group Table

Pin #	Name	Flash	SDIO	SPI	UART(Default/SWAP=1)	I2C Master	PWM	Analog	External_PA	JTAG (Default /SWAP=1)
13	GPIO 0	SF2_D1	CLK	MISO/ MOSI	SIG0/SIG4	SCL	PWM _CH0		FEM0	TMS/TCK

7	GPIO 1	SF2_D2	CMD	MOSI/ MISO	SIG1/SIG5	SDA	PWM _CH1		FEM1	TDI/TDO
10	GPIO 2	SF2_D3	DAT0	SS	SIG2/SIG6	SCL	PWM _CH2		FEM2	TCK/TMS
14	GPIO 3		DAT1	SCLK	SIG3/SIG7	SDA	PWM _CH3		FEM3	TDO/TDI
11	GPIO 4		DAT2	MISO/ MOSI	SIG4/SIG0	SCL	PWM _CH4	ADC_CH1	FEM0	TMS/TCK
12	GPIO 5		DAT3	MOSI/ MISO	SIG5/SIG1	SDA	PWM _CH0	ADC_CH4	FEM1	TDI/TDO
15	GPIO 7			SCLK	SIG7/SIG3	SDA	PWM _CH2		FEM3	TDO/TDI
17	GPIO 8			MISO/ MOSI	SIG0/SIG4	SCL	PWM _CH3		FEM0	TMS/TCK
2	GPIO 11			SCLK	SIG3/SIG7	SDA	PWM _CH1	ADC_CH1 0 /IRTX	FEM3	TDO/TDI
5	GPIO 12			MISO/ MOSI	SIG4/SIG0	SCL	PWM _CH2	ADC_CH0	FEM0	TMS/TCK
6	GPIO 14			SS	SIG6/SIG2	SCL	PWM _CH4	ADC_CH2 /DAC_B	FEM2	TCK/TMS
16	GPIO 16			MISO/ MOSI	SIG0/SIG4	SCL	PWM _CH1		FEM0	TMS/TCK
4	GPIO 20	SF1_D0 /SF2_D0		MISO/ MOSI	SIG4/SIG0	SCL	PWM _CH0		FEM0	TMS/TCK

6. Electrical Specifications

6.1 Power Supply DC Characteristics

The digital IO supports VDD33 or VDD18 application.

	MIN	TYP	MAX	Unit
Operating Temperature	0	25	85	deg.C
VBAT	2.1	3.3	3.63	V

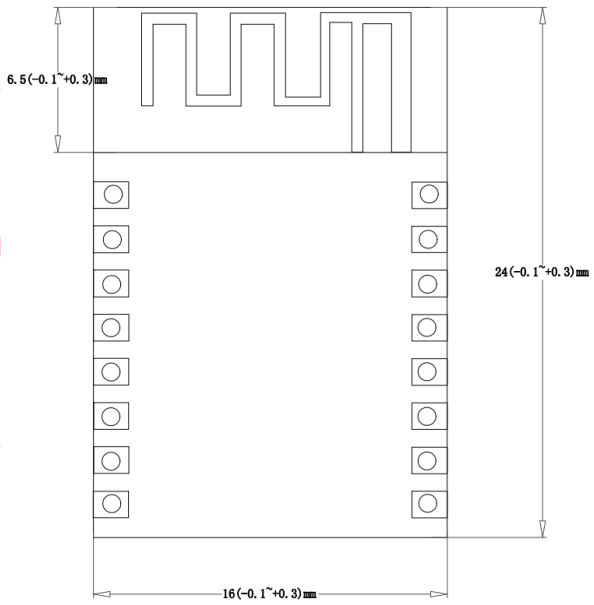
6.2 Power Consumption

Mode		Note	Performance @3.3Vdc 25◦C			
			Min.	Typ	Max.	Unit
RX	11b			35		mA
	11g			39		
	11n			39		

	BLE 1Mbps	Duty 60%		31		
TX	11b - 11Mbps @21dBm	Duty 50%		190		
		Duty 99%		310		
	11g - 54Mbps @18dBm	Duty 50%		145		
		Duty 99%		230		
	11n - MCS7 @17dBm	Duty 50%		130		
		Duty 99%		215		
	BLE 1Mbps @15dBm	Duty 86%		133		

7. Size reference

7.1 Module Picture

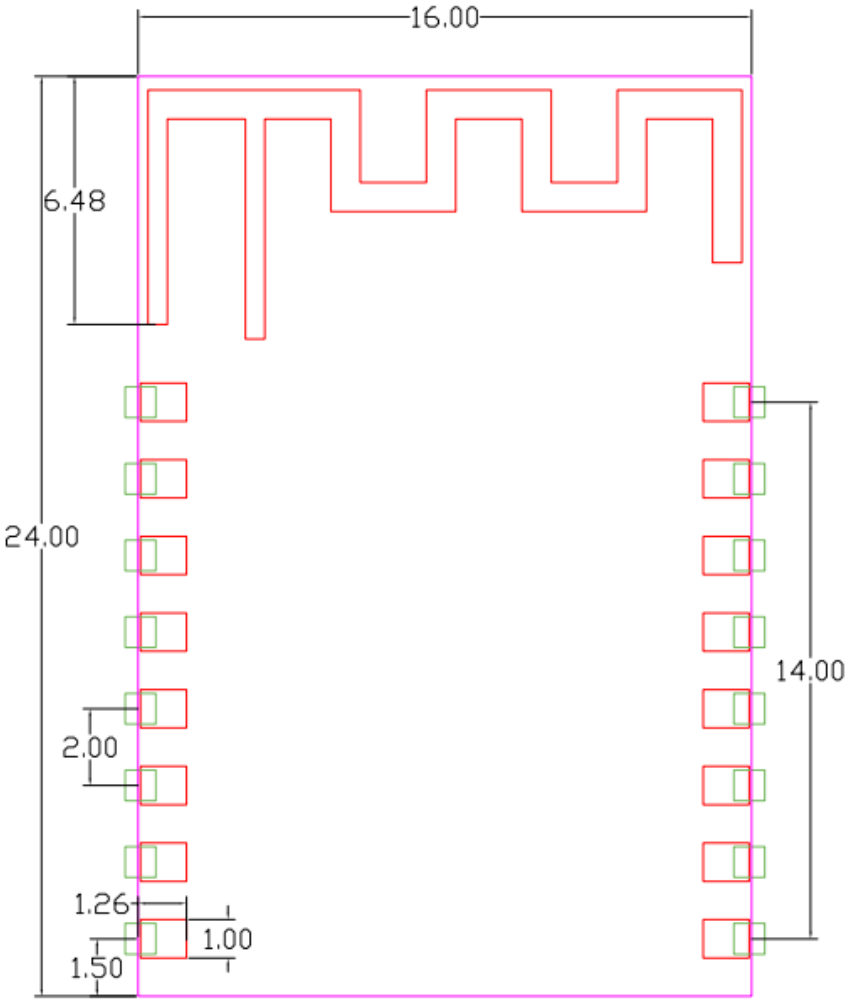
L x W : 16 x 24 (+0.3/-0.1) mm	
H: 2.65 (±0.2) mm	
Weight	TBD

7.2 Marking Description

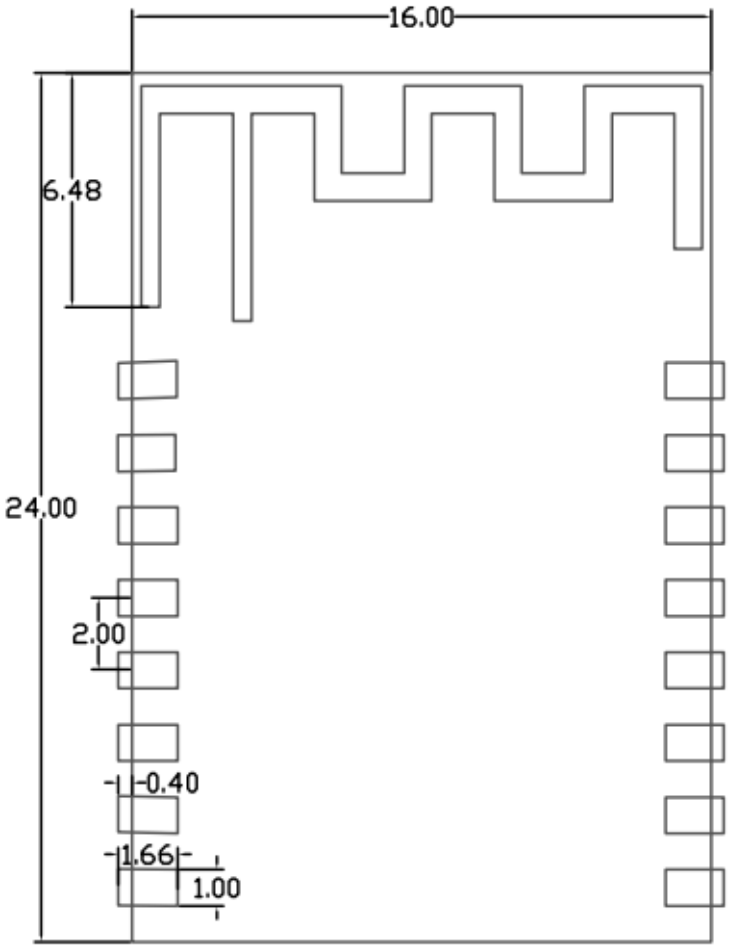
< TOP VIEW >

7.3 Physical Dimensions

<TOP View>



7.4 Layout Recommendation

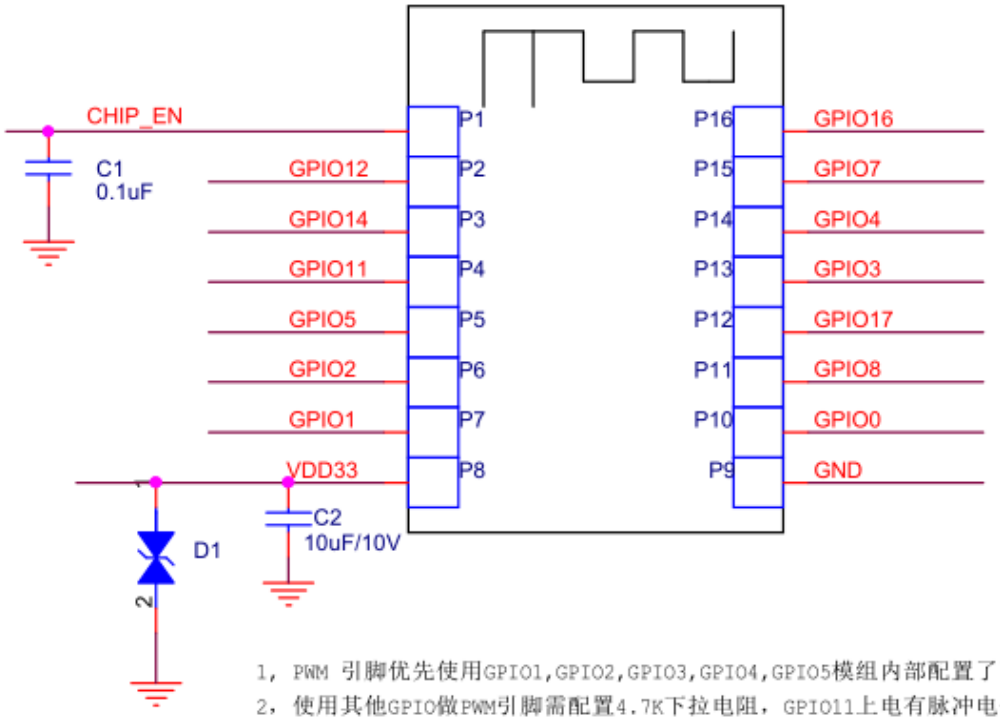


8. The Key Material List

Item	Part Name	Description	Manufacturer
1	PCB	J202T-RR FR4, 4 L, GREEN	XY-PCB, GDKX, Sunlord, SLPCB
2	Crystal	3225 40MHz 12pF	ECEC, Hosonic, TKD, JWT
3	Chipset	TG7100C	阿里平头哥
4	Shielding	J202T-RR Shielding	信太，精力通

9. Reference Design

9.1 Reference Design



1，PWM 引脚优先使用GPIO1,GPIO2,GPIO3,GPIO4,GPIO5模组内部配置了下拉；
2，使用其他GPIO做PWM引脚需配置4.7K下拉电阻，GPIO11上电有脉冲电平慎用；
3，GPIO16和GPIO7配置下载，不可更换，通讯口可以自定义配置，最好先与原厂沟通；
4，GPIO8是boot引脚慎用。

9.2 Antenna clearance area requirements

When using PCB antenna on Wi-Fi module, make sure the distance between PCB on motherboard and other metal devices is at least 16mm.The shaded areas in the figure below need to be marked away from metal devices, sensors, interference sources, and other materials that may interfere with the signal.

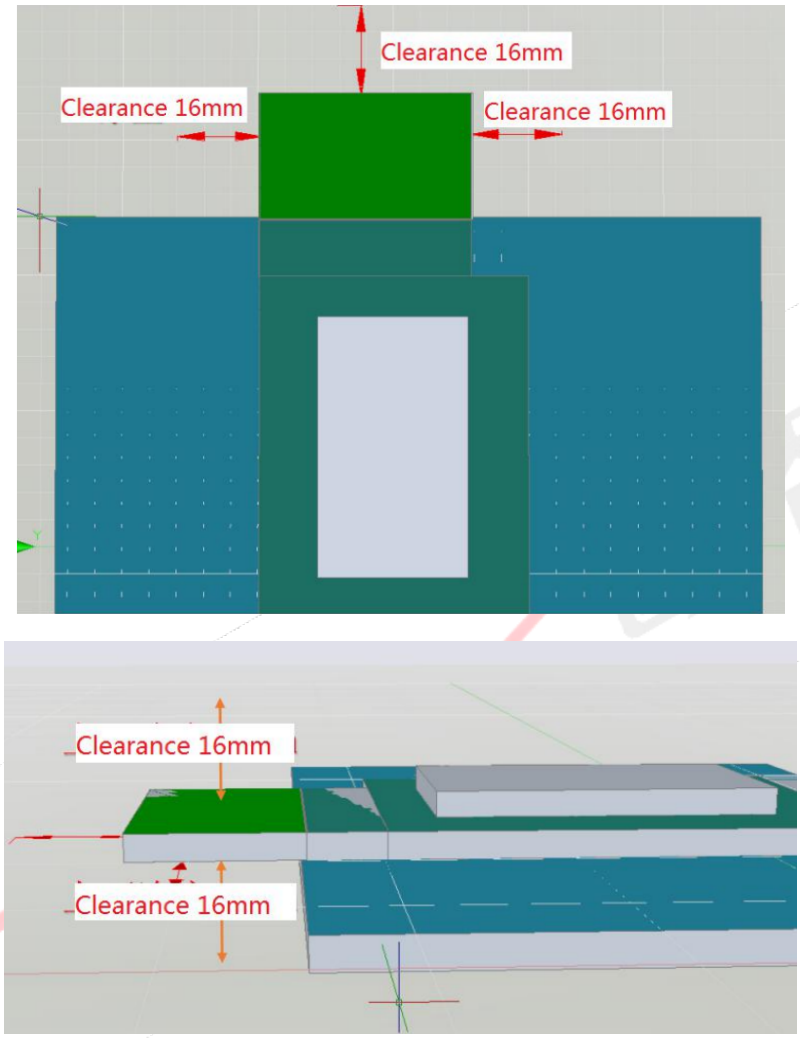


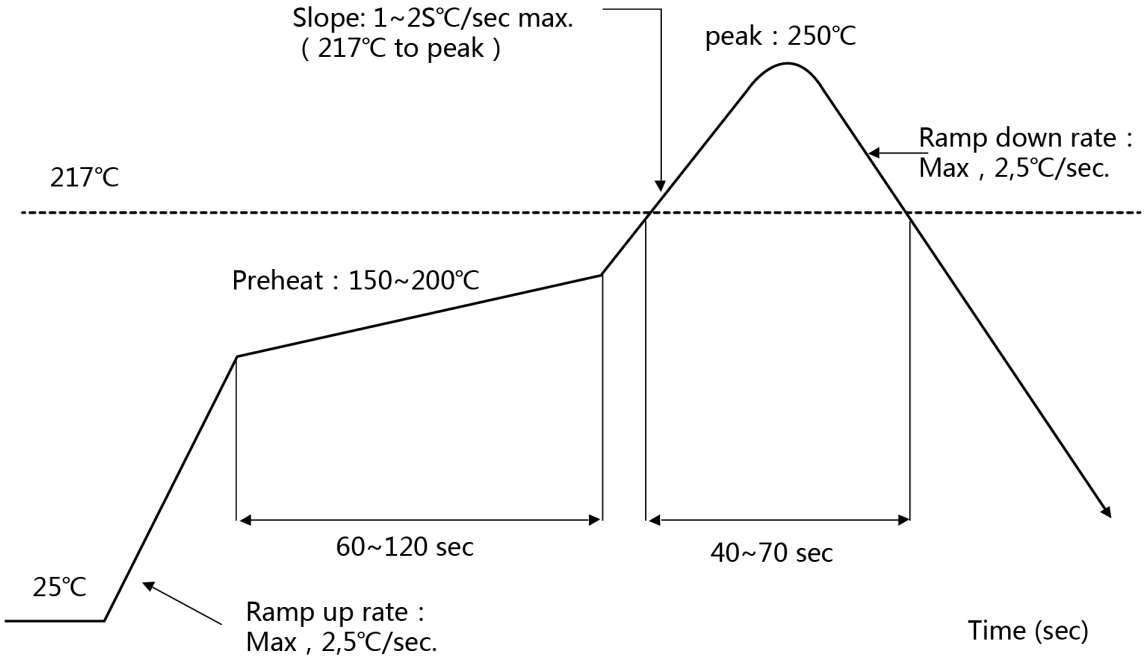
Figure 9-2 antenna clearance area requirements

10. Recommended Reflow Profile

Referred to IPC/JEDEC standard.

Peak Temperature : <250°C

Number of Times : ≤2 times



11. RoHS compliance

All hardware components are fully compliant with EU RoHS directive

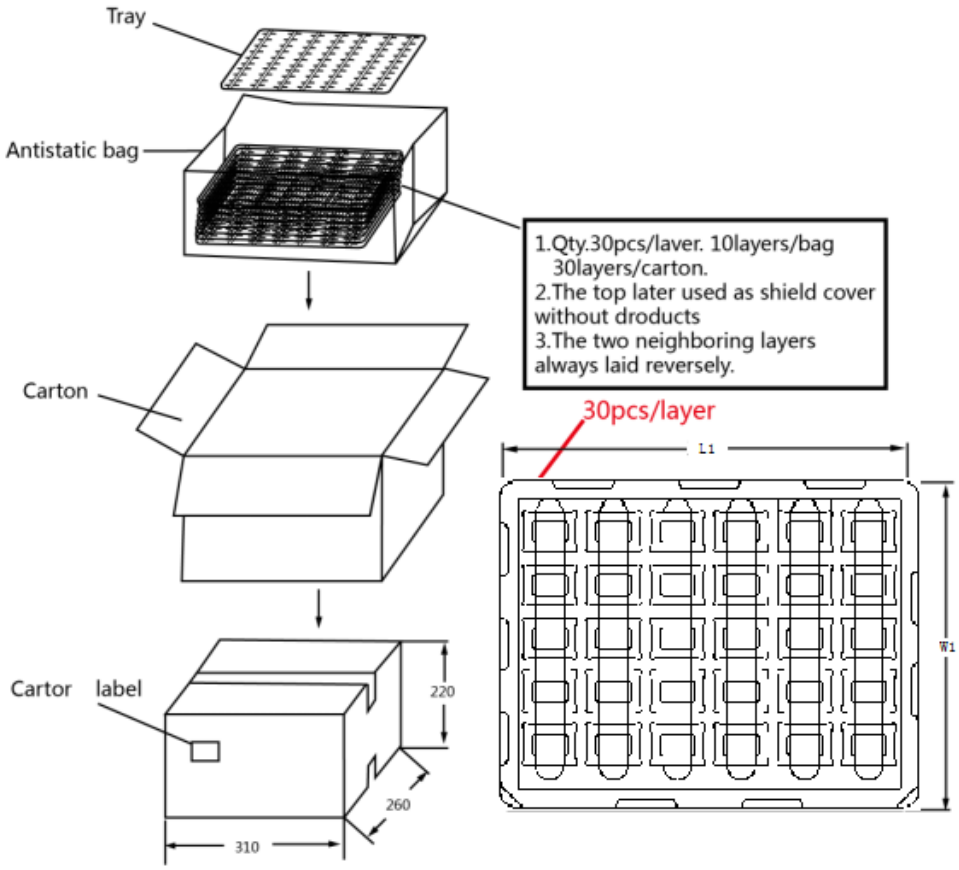
12. Package

Layer size: L1=250mm, W1=190mm

Layer material: PVC

Carton size: L=310mm, W=260mm, H=220mm

Carton material: A=A



13. 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

b) “IPC/JEDEC J-STD-033A paragraph 5.2” is respected

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

e) Baking is required if the humidity indicator inside the bag indicates 10% RH or more