

LTM3210

IEEE 802.11b/g/n 1T1R SDIO IOT Module

Features:

- **Reserving System**
 - IEEE Std. 802.11b
 - IEEE Std. 802.11g
 - IEEE Std. 802.11n
- **Chip Solution**
 - WIFI : Qualcomm QCA4010
- **Size**
 - 30.0mm*16.0mm*3.0mm



Model Overview:

Module Name	Install	Standard	Data Rate	Band	Antenna Interface	Note
LTM3210	SMT	IEEE 802.11b/g/n	135Mbps	2.4 GHz	Stamp Hole	3.3V power supply

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Feedback of customer's Confirmation

We accept the specification after Confirmed

Customer name	Customer signature	Confirmation Date

Please feed back this paper and first paper after your signature by the address,thanks!

ADD: Anzhou,Industrial park,Mianyang,Sichuan

Factory: Sichuan AI-Link Technology Co.,Ltd.

Approved	Checked	Designed	Product	WiFi Module
			Model	LTM3210
			Date	2018-07-03

Record of Modification

No	Date of modification	Main content of modification	Reason of modification	Serial number of modification	Confirm
V1.0	20180703	Initial release			Fengjie

1. Brief description:

IOT MODULE LTM3210 is based on Qualcomm QCA4010 complied with IEEE 802.11b/g/n standard in 2.4GHz ISM band. Supported for 135Mbps high speed wireless network connection.

LTM3210 module includes the following components:

- ◆ QCA4010 chip
- ◆ An integrated Balun to save cost and size, minimize tuning and tolerance
- ◆ A printed antenna
- ◆ 2MB SPI Flash memory and etc

2. Module Interface

LTM3210 manufacturing interface

USB 2.0 interface with integrated controller and PHY for manufacturing test and configuration.

LTM3210 host interfaces

UART host interface to a remote microcontroller with an AT style command set.

3. Package outline and Mounting:

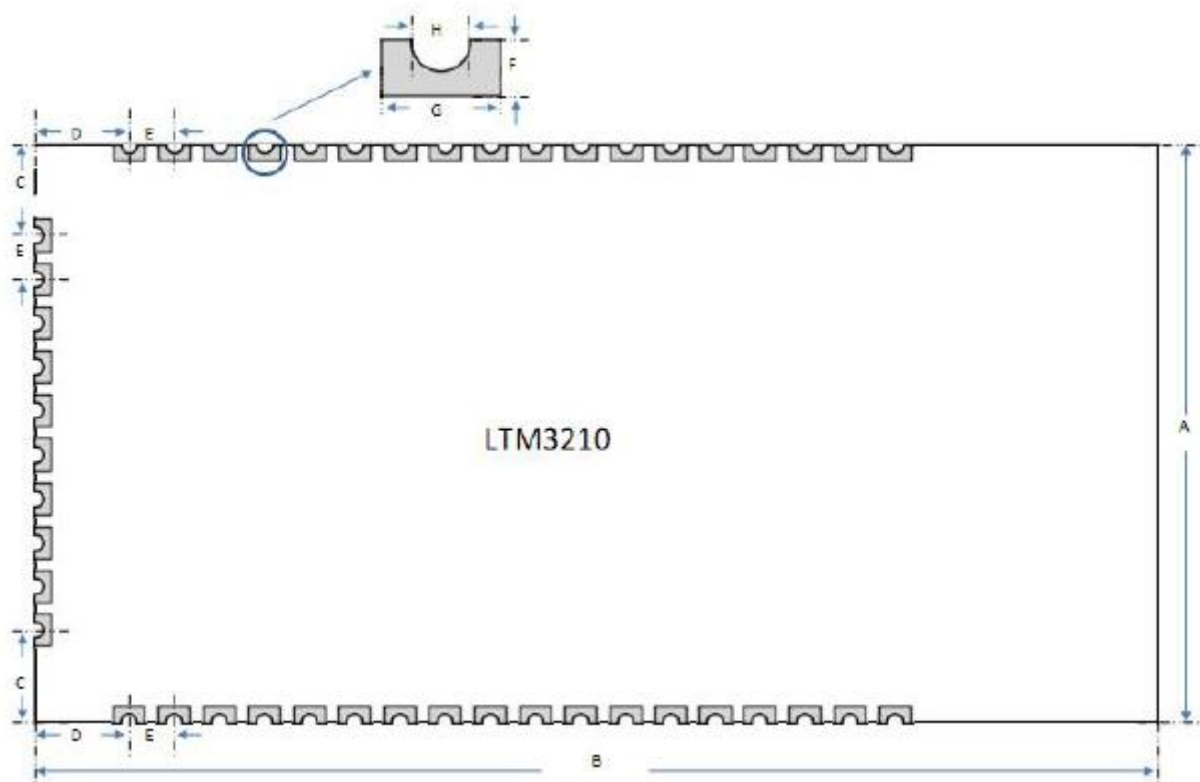


Figure 3.1 LTM3210 module dimensions

Label	Dimension(mm)
A	16
B	30
C	2.285
D	2.54
E	1.27
F	0.4
G	0.7
H(diameter)	0.5
Module height(including the RF shield)	2.6
Total height (with a coax cable plugged into the U.FL connector)	3.6

Table 3.1 LTM3210 module dimensions
NOTE: General tolerance $\pm 0.2\text{mm}$ unless otherwise stated

4. Pin Definition:

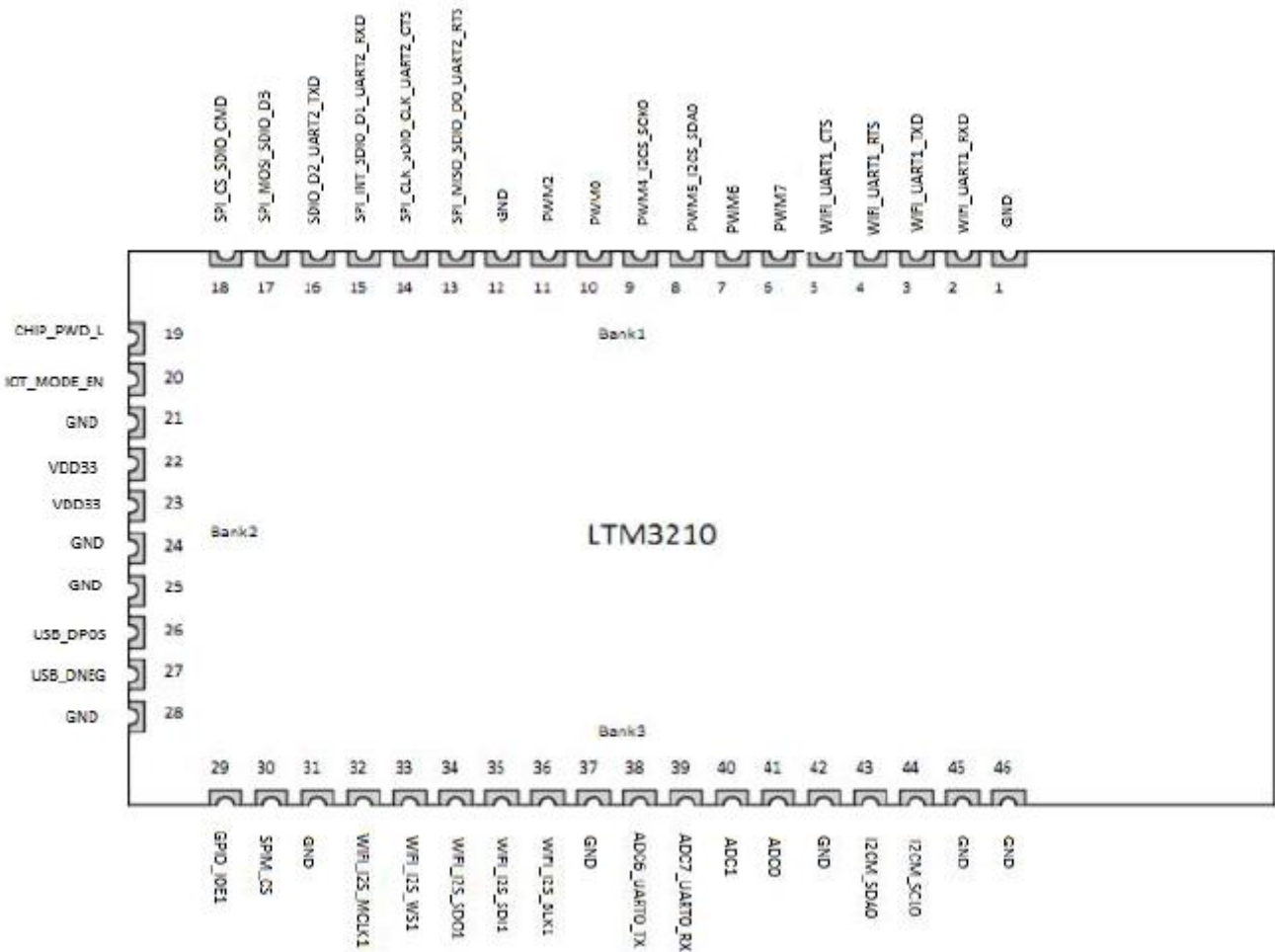


Figure 4.1 top view

Pin	Signal/Interface	ALT1	ALT2	ALT3	GPIO No.
1	GND	Ground			
2	WIFI_UART1_RXD	High speed UART RXD			GPIO[24]
3	WIFI_UART1_TXD	High speed UART TXD			GPIO[23]
4	WIFI_UART1_RTS	High speed UART RTS			GPIO[22]
5	WIFI_UART1_CTS	High speed UART CTS			GPIO[21]
6	PWM7	PWM7			GPIO[13]
7	PWM6	PWM6			GPIO[12]
8	PWM5_I2CS_SDA0	PWM5	I2C Slave SDA0		GPIO[11]
9	PWM4_I2CS_SCK0	PWM4	I2C Slave SCK0		GPIO[10]
10	PWM0	PWM0			GPIO[6]
11	PWM2	PWM2			GPIO[8]
12	GND	Ground			
13	SPI_MISO_SDIO_D0_UART2_RTS	SPI MISO (master or slave)	SDIO Data0	UART RTS	GPIO[4]
14	SPI_CLK_SDIO_CLK_UART2_CTS	SPI CLK (master or slave)	SDIO CLK	UART CTS	GPIO[5]
15	SPI_INT_SDIO_D1_UART2_RXD	SPI Interrupt (slave)	SDIO Data1	UART RXD	GPIO[3]
16	SDIO_D2_UART2_TXD		SDIO Data2	UART TXD	GPIO[2]
17	SPI_MOSI_SDIO_D3	SPI MOSI (master or slave)	SDIO Data3		GPIO[1]
18	SPI_CS_SDIO_CMD	SPI CS (master or slave)	SDIO Command		GPIO[0]
19	CHIP_PWD_L	Module reset, active low			
20	IOT_MODE_EN	Wakeup manager enable			
21	GND	Ground			
22	VDD33	3.3V power supply			
23	VDD33	3.3V power supply			
24	GND	Ground			
25	GND	Ground			
26	USB_DPOS	USB Data+			
27	USB_DNEG	USB Data-			
28	GND	Ground			
29	GPIO_IOE1	external wakeup			
30	SPIM_CS	Flash memory /CS pin			GPIO[35]
31	GND	Ground			
32	WIFI_I2S_MCLK1	I2S MCLK1			GPIO[33]
33	WIFI_I2S_WS1	I2S WS1			GPIO[32]
34	WIFI_I2S_SDO1	I2S SDO1			GPIO[31]
35	WIFI_I2S_SDI1	I2S SDI1			GPIO[30]
36	WIFI_I2S_BLK1	I2S BLK1			GPIO[27]
37	GND	Ground			
38	ADC6_UART0_TX	ADC6	Debug UART TXD		GPIO[29]
39	ADC7_UART0_RX	ADC7	Debug UART RXD		GPIO[28]
40	ADC1	ADC1			
41	ADC0	ADC0			
42	GND	Ground			
43	I2CM_SDA0	I2C Master SDA0			GPIO[25]
44	I2CM_SCL0	I2C Master SCL0			GPIO[26]
45	GND	Ground			
46	GND	Ground			

Table 4.1 LTM3210 pin assignment

5. Bootstrap Signals

Pin NO.	Bootstrap name	Description	
11	Test mode enable	Should be low while reset released, for normal function	
18	Host mode[1]	Bootstrap for host interface selection. Default mode is 00.	
13	Host mode[0]		
	00		USB/manufacturing test and configuration/hostless
	01		Hostless (serial AT command) mode
	10		SPI host mode
	11	SDIO host mode	
20	IOT mode enable	Keep high always, for normal function	

Table 5.1 Bootstrap Signals

6. Timing specifications

6.1 SPI master interface timing

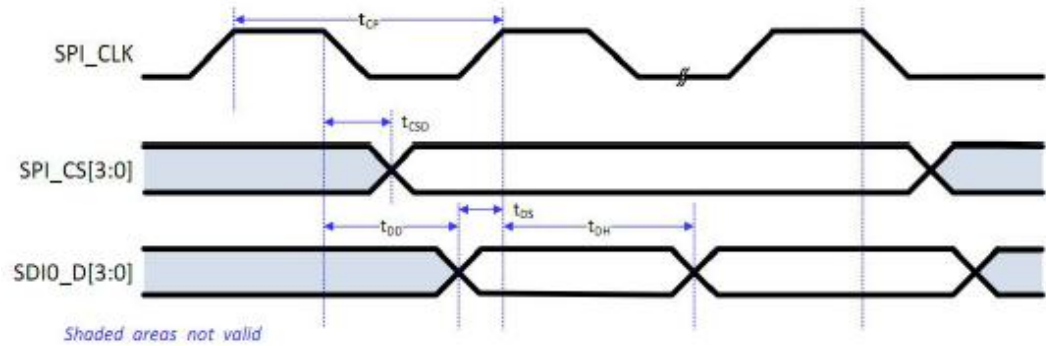


Figure 6.1 SPI master timing

Parameter	Description	Min	Max	Unit
t_{CP}	Clock period	30.7	1000	ns
t_{CSD}	Chip select valid delay	-5.5	5	ns
t_{DD}	Data valid delay	-5.5	5	ns
t_{DS}	Data setup	3	-	ns
t_{DH}	Data hold	0	-	ns

Table 6.1 SPI master timing

6.2 SPI slave interface timing

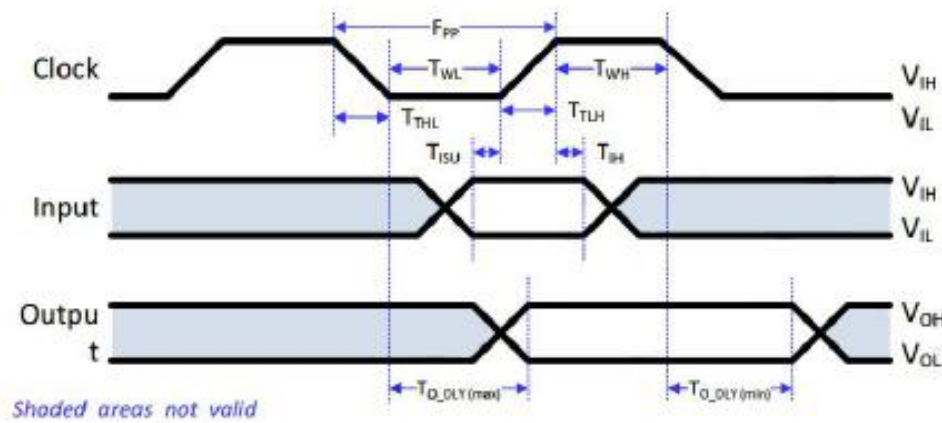


Figure 6.2 SPI slave timing

Parameter	Description	Min	Max	Unit
f_{PP}	Clock frequency	0	48	MHz
t_{WL}	Clock low time	8.3	-	ns
t_{WH}	Clock high time	8.33	-	ns
t_{TLH}	Clock rise time	-	2	ns
t_{THL}	Clock fall time	-	2	ns
t_{SU}	Input setup time	5	-	ns
t_H	Input hold time	5	-	ns
t_{O_DLY}	Output delay	0	5	ns

Table 6.1 SPI slave timing

7. Product Pictures



TOP VIEW



BOTTOM VIEW

8. Key Materials

Items	Category	MPN	Description	MFR	Notes
1	IC	QCA4010	116 QFN	Qualcomm	
2	PCB	LTM3210	FR-4,2LAY	Sunlord IQPCB	
3	Crystal	E3SB40E000900E	40M	JWT Hosonic	

9. General Requirements:

No.	Feature	Description
7-1	Operation Voltage	3.3V+/-0.3
7-2	Current Consumption	Total3.3V@Max 410mA BW 40 MHZ@14dbm
7-3	Operation Temperature	0°C to +70°C
7-4	Antenna Type	Integral PCB antenna
7-5	SDIO	SDIO slave Interface
7-6	Storage Temperature	-45°C to +135°C

10. Electrical Characteristics:

10-1 IEEE 802.11b Section:

Items	Contents				
Specification	IEEE802.11b				
Mode	DSSS				
Channel	CH1 to CH11				
Data rate	1, 2, 5.5, 11Mbps				
	Min.	Typ.	Max.	Unit	Remark
TX Characteristics					
1. Power Levels(Calibrated)					
1) for each data rate		18.5		dBm	
2. Spectrum Mask @ target power					
1) fc +/-11MHz to +/-22MHz	-	-	-30	dBr	
2) fc > +/-22MHz	-	-	-50	dBr	
3 Constellation Error(EVM)@ target power					
1) 1Mbps	-	-	-10	dB	
2) 2Mbps	-	-	-10	dB	
3) 5.5Mbps	-	-	-10	dB	
4) 11Mbps	-		-10	dB	
4. Frequency Error	-10	-5	10	ppm	
RX Characteristics					
5 Minimum Input Level Sensitivity(each chain)					
1) 1Mbps (FER $\leq$ 8%)	-		-83	dBm	
2) 2Mbps (FER $\leq$ 8%)	-		-80	dBm	
3) 5.5Mbps (FER $\leq$ 8%)	-		-79	dBm	
4) 11Mbps (FER $\leq$ 8%)	-		-76	dBm	
6 Maximum Input Level (FER $\leq$ 8%)	-10	-	-	dBm	

10-2 IEEE 802.11g Section:

Items	Contents				
Specification	IEEE802.11g				
Mode	OFDM				
Channel	CH1 to CH11				
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps				
	Min.	Typ.	Max.	Unit	Remark
TX Characteristics					
1. Power Levels					
1) for each data rate	-	21.5	-	dBm	
2. Spectrum Mask @ target power					
1) at fc +/-11MHz	-	-	-20	dBr	
2) at fc +/-20MHz	-	-	-28	dBr	
3) at fc > +/-30MHz	-	-	-40	dBr	
3 Constellation Error(EVM)@ target power					
1) 6Mbps	-	-	-5	dB	
2) 9Mbps	-	-	-8	dB	
3) 12Mbps	-	-	-10	dB	
4) 18Mbps	-	-	-13	dB	
5) 24Mbps	-	-	-16	dB	
6) 36Mbps	-	-	-19	dB	
7) 48Mbps	-	-	-22	dB	
8) 54Mbps	-	-	-25	dB	
4 Frequency Error	-10	-5	10	ppm	
RX Characteristics					
	Min.	Typ.	Max.	Unit	
5 Minimum Input Level Sensitivity(each chain)					
1) 6Mbps (PER $\leq 10\%$)	-		-85	dBm	
2) 9Mbps (PER $\leq 10\%$)	-		-84	dBm	
3) 12Mbps (PER $\leq 10\%$)	-		-82	dBm	
4) 18Mbps (PER $\leq 10\%$)	-		-80	dBm	
5) 24Mbps (PER $\leq 10\%$)	-		-77	dBm	
6) 36Mbps (PER $\leq 10\%$)	-		-73	dBm	
7) 48Mbps (PER $\leq 10\%$)	-		-69	dBm	
8) 54Mbps (PER $\leq 10\%$)	-		-65	dBm	
6 Maximum Input Level (PER $\leq 10\%$)	-20	-	-	dBm	

10-3 IEEE 802.11n HT20 Section:

Items	Contents				
Specification	IEEE802.11n HT20 @ 2.4GHz ISM				
Mode	OFDM				
Channel	CH1 to CH11				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7				
	Min.	Typ.	Max.	Unit	Remark
TX Characteristics	Min.	Typ.	Max.	Unit	
2. Power Levels					
1) for each data rate	-	19.5	-	dBm	
3. Spectrum Mask @target power					
1) at fc +/-11MHz	-	-	-20	dBr	
2) at fc +/-20MHz	-	-	-28	dBr	
3) at fc > +/-30MHz	-	-	-45	dBr	
4. Constellation Error(EVM)@ target power					
1) MCS0	-	-	-5	dB	
2) MCS1	-	-	-10	dB	
3) MCS2	-	-	-13	dB	
4) MCS3	-	-	-16	dB	
5) MCS4	-	-	-19	dB	
6) MCS5	-	-	-22	dB	
7) MCS6	-	-	-25	dB	
8) MCS7	-	-	-28	dB	
5. Frequency Error	-10	-	10	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
6. Minimum Input Level Sensitivity(each chain)					
1) MCS0 (PER $\leq$ 10%)	-		-82	dBm	
2) MCS1 (PER $\leq$ 10%)	-		-79	dBm	
3) MCS2 (PER $\leq$ 10%)	-		-77	dBm	
4) MCS3 (PER $\leq$ 10%)	-		-74	dBm	
5) MCS4 (PER $\leq$ 10%)	-		-70	dBm	
6) MCS5 (PER $\leq$ 10%)	-		-66	dBm	
7) MCS6 (PER $\leq$ 10%)	-		-65	dBm	
8) MCS7 (PER $\leq$ 10%)	-		-64	dBm	
7. Maximum Input Level (PER $\leq$ 10%)	-20	-	-	dBm	

10-4 IEEE 802.11n HT40 Section:

Items	Contents				
Specification	IEEE802.11n HT40 @ 2.4GHz ISM				
Mode	OFDM				
Channel	CH3 to CH9				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7				
	Min.	Typ.	Max.	Unit	Remark
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels (Calibrated)					
1) for each data rate	-	19.2	-	dBm	
2. Spectrum Mask @target power					
1) at fc +/-22MHz	-	-	-20	dBr	
2) at fc +/-40MHz	-	-	-28	dBr	
3) at fc > +/-60MHz	-	-	-45	dBr	
3. Constellation Error(EVM)@target power					
1) MCS0	-	-	-5	dB	
2) MCS1	-	-	-10	dB	
3) MCS2	-	-	-13	dB	
4) MCS3	-	-	-16	dB	
5) MCS4	-	-	-19	dB	
6) MCS5	-	-	-22	dB	
7) MCS6	-	-	-25	dB	
8) MCS7	-	-	-28	dB	
4. Frequency Error	-10	-5	10	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5. Minimum Input Level Sensitivity(each chain)					
1) MCS0 (PER $\leq$ 10%)			-79	dBm	
2) MCS1 (PER $\leq$ 10%)			-76	dBm	
3) MCS2 (PER $\leq$ 10%)			-74	dBm	
4) MCS3 (PER $\leq$ 10%)			-71	dBm	
5) MCS4 (PER $\leq$ 10%)			-67	dBm	
6) MCS5 (PER $\leq$ 10%)			-63	dBm	
7) MCS6 (PER $\leq$ 10%)			-62	dBm	
8) MCS7 (PER $\leq$ 10%)	-		-61	dBm	
6. Maximum Input Level(PER $\leq$ 10%)	-20	-	-	dBm	

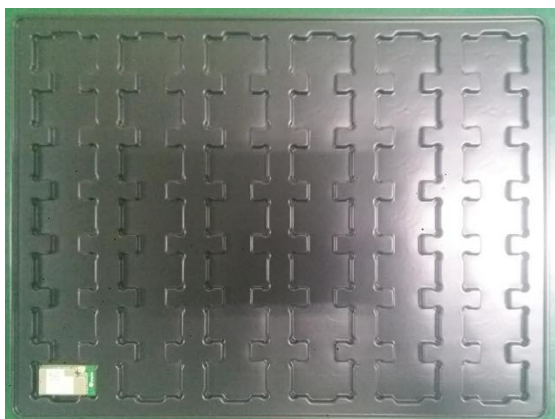
11.Mechanical, Environmental and Reliability Tests

Test Items		Test Conditions	Qty	Criteria Condition
4-1	Drop test	The packed samples within 100Kg can be tested Drop height: Face Side: 800/600/450mm Edge line: 600/450/350mm Drop time: 1 each Face and edge.	1xBox	After drop test, the outer box and inner box will not been broken by appearance visual inspection.
4-2	Vibration test	X-Y-Z direction, first Frequency changing from 10Hz to 30Hz to 10Hz ,amplitude 0.75mm, 5 times vibrations, then frequency Changing from 30Hz to 55 Hz to 30 Hz, amplitude 0.15mm, 5 time vibration.	3	After test, the Appearance, Power EVM and Frequency error shall be satisfied with the specification.
4-3	Impact test	Impact acceleration: 50m/sec ² ; Impact duration: 16ms; Impact times: 1000.	3	After test, the Appearance, Power EVM and Frequency error shall be satisfied with the specification.
4-4	Soldering ability test	Soldering temperature: 235±5℃ Soldering duration: 2±0.5S	3	1. After soldering, the soldered area must be covered by a smooth bright solder layer, some deficiencies such as a small amount of the pinhole, not wetting are allowed, but the deficiencies can not be in the same place; 2. At least 90% of soldered area shall be covered continuously by the soldering material.
4-5	Humidity test	Leave samples in 40±3℃, 93% RH @ 96 hours	3	Leave samples in standard test condition for 2 hours then test, the Appearance, Power, EVM and Frequency error functional parameter shall be satisfied with the test specification.
4-6	High temperature load life test	Thermostat cabinet temperature: 55±5℃ Applied voltage: 110% rated voltage Working duration: 200 hour (Supply Voltage Cycle 23h power on, 1h power off)	60	After test, leave samples in standard condition for 1 hour and test, Power, EVM and Frequency error shall be satisfied with the test specification.
4-7	High temperature load test	Temperature: 55±5℃ Samples work for 16 hours	3	After test, the Appearance, Power, EVM and Frequency error shall be Satisfied with the test specification.
4-8	Low temperature storage test	Leave the samples in -25±3℃@24 hours	3	Leave samples in standard test condition for 2 hours then test, the Appearance, Power, EVM and Frequency error shall be satisfied with the test specification.

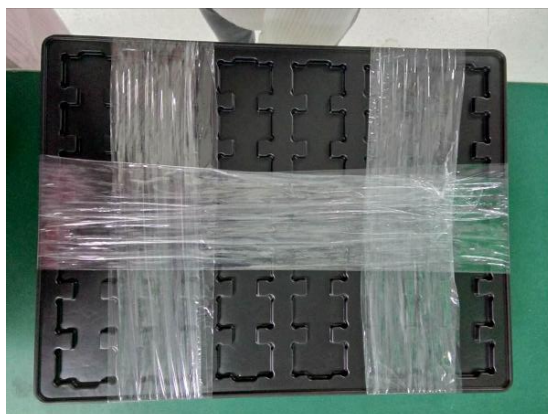
4-9	Low temperature load test	Leave samples in $-15\pm3^{\circ}\text{C}$ @ 2 hours, samples' function shall be normal, the let samples work for 1 hour	3	After test, leave the samples in standard condition and tested the Appearance, Power, EVM and Frequency error shall be satisfied with the test specification.
4-10	Temperature circle test	One cycle duration $-10\pm3^{\circ}\text{C}$ @3H $40\pm3^{\circ}\text{C}$ @3H Total cycle: 10x	3	After test, leave the samples in standard condition and tested Power EVM and Frequency error shall be qualified and all the characters shall be satisfied with the test specification.
4-11	Continuous TP test	Twice cycle duration $-10\pm3^{\circ}\text{C}$ @4H $+60\pm3^{\circ}\text{C}$ @4H, $+25^{\circ}\text{C}$ @2H	3	During test, There will not been appeared signal disconnection or interruption between DUT and AP.
4-12	ESD	Discharge voltage: 2kV C: 150pF Discharge resistance: 330Ω Positive 10 times 1 time for each second	3	The products can recoverable smoothly after ESD test.

12.Package

(1) put the products into the trays



(2) tie up the trays



(3) put the trays into the box



(4) fill the interspace with cystosepiment



(5) paste the sticker on the box



13.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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Labeling Instruction for End User Device Integrator

Please notice that 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 FCC ID: XXXXXX" any similar wording that expresses the same meaning may be used.

§ 15.19 Labelling requirements shall be complied on end user device.

Labelling rules for special device, please refer to §2.925, § 15.19 (a)(5) and relevant KDB publications. For E-label, please refer to §2.935.

Installation Notice

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

The module is limited to installation in mobile application, a separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and difference antenna configurations.

FCC Part 15B Compliance Requirements for End User Device

The OEM integrator is responsible for ensuring that the host product which is installed and operating with the module is in compliant with Part 15B requirements.

Please note that For a Class B digital device or peripheral, the instructions furnished the user manual of the end-user product shall include statement set out in §15.105 Information to the user or such similar statement and place it in a prominent location in the text of the manual.