SPECIFICATION

产品规格书

SKI.WB800D.2

IEEE 802.11b/g/n/ax 1T1R USB Wi-Fi Module

Integrated Bluetooth 2.1+EDR/3.0/4.x/5.0

Approved by Shikun		
Checked by 审核	Rechecked by 复审	Approved by 批准
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Please send the original back to us after you have approved and signed.
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Approved by customer		
Comments 确认意见	Approved by 批准签字	Company's seal 盖章
Customer's Name:		

REVISION HISTORY

VERSION	DATE	BOARD ID	PAGE	DESCRIPTION	AUTHOR
V0	2021.05.19	SKI.WB800D.2 A21163	All	First Issued.	Zhou
V1.0	2021.06.19	SKI.WB800D.2 A21163	All	Add PIN describe	Yell
V1.1	2021.06.19	SKI.WB800D.2 B21281	All	Update pin11 describe and PCB Cycle number	Yell
V1.2	2021.10.19	SKI.WB800D.2 B21281	All	Not supporte 11ac	Yell

Content

1. Introduction（简介）

SKI.WB800D.2 is based on AICSEMI AIC8800D, complied with IEEE 802.11b/g/n /ax & BT5.0 standard from 2.4-2.5GHz.

The HW architecture for the module is shown in Figure 1. It combines a WLAN MAC, a 1T1R capable WLAN baseband, and RF in CMOS single chip, which are designed to meet both the low power and high throughput application. The AIC8800D provides a complete solution for a high-performance integrated wireless and Bluetooth device. This documentation describes the engineering requirements specification.

SKI.WB800D.2 是一个基于 AICSEMI AIC8800D 方案的 WiFi&蓝牙模组，符合 IEEE 802.11b/g/n/ax&BT5.0 标准，频段 2.4-2.5GHz。

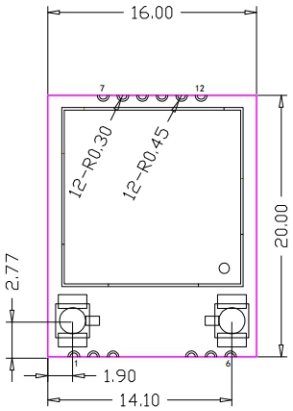
模块的硬件体系结构如图 1 所示。它在 CMOS 单片机中集成了 WLAN MAC、1T1R 能力的无线局域网基带和 RF，旨在满足低功耗和高吞吐量的应用。AIC8800D 为高性能集成无线通信和蓝牙设备提供了完整的解决方案，本文档描述工程需求规范。

2. Features（特性）

Reserving System **接收制式**	IEEE Std. 802.11b
	IEEE Std. 802.11g
	IEEE Std. 802.11n
	IEEE Std. 802.11ax
	Bluetooth 2.1+EDR/3.0/4.x/5.0
Chip Solution 芯片方案	AIC8800D
Band **波段**	2.4GHz
Dimensions **尺寸**	20mm×16mm×3.5mm

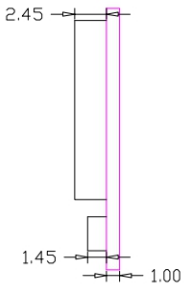
型号	安装方式	支持标准	最大速率	频段	天线接口	备注
SKI.WB800D.2	SMD	IEEE 802.11b/g/n/ax	150Mbps	2.4GHz	WiFi&BT：一代 Ipex	20mm×16mm×3.5mm
		Bluetooth 5.0	3Mbps			

3. Package Outline and Mounting（外形及安装尺寸）



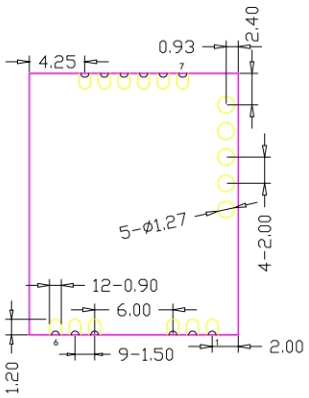
模组俯视图

Module top view



模组侧视图

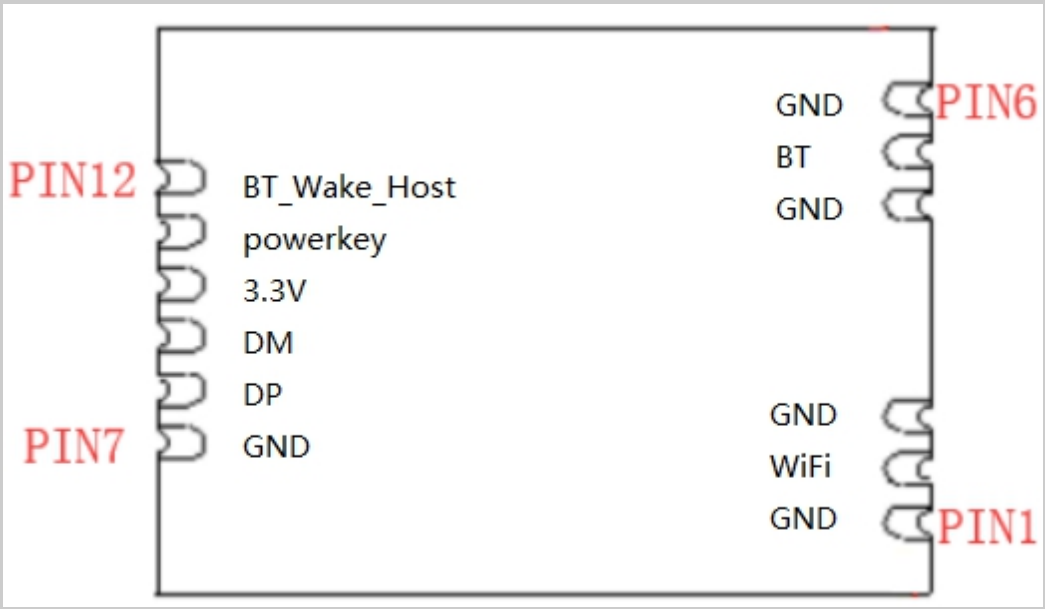
Module side view



模组底视图

Module bottom view

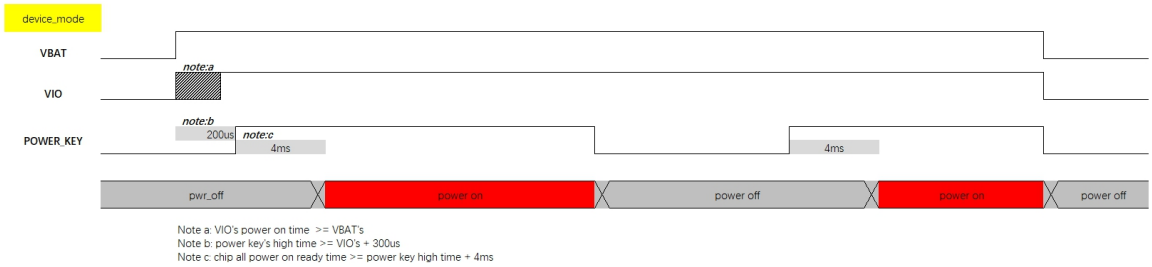
4. Pin Definition（引脚定义）



正视图　Top view

PIN	SYMBOL	DESCRIPTION
1	GND	Ground\地
2	WiFi（NC）	NC，WiFi 默认使用模组 WiFi ipex
3	GND	Ground\地
4	GND	Ground\地
5	BT（NC）	NC，WiFi 默认使用模组 BT ipex
6	GND	Ground\地
7	GND	Ground\地
8	DP	WLAN/BT USB2.0 DP Signal\WLAN/BT USB2.0 差分正电压信号
9	DM	WLAN/BT USB2.0 DM Signal\WLAN/BT USB2.0 差分负电压信号
10	3.3V	3.3V
11	Powerkey	WiFi is enabled, low level is active, the module has a pull-up 47K Remark: 1. For alternative projects, if the original motherboard has this PIN11 NC, the module board needs to retest the power on and off, USB communication and other functions; 2. For new projects, it is recommended that PIN11 be controlled, and the timing requirements are as follows;
12	BT_Wake_Host	Bluetooth wakes the host, low level is active, there is a weak pull-up inside the module, it is recommended that the customer reserve the pull-up

Powerkey timing requirements:The timing requirements of Powerkey and VBAT (power supply 3.3V) are as shown in the figure below. Powerkey lags at least 200us after power-on. In actual use, it is recommended that customers use GPIO to control powerkey.), the module starts normally!



5. Product Pictures（实物图片）

正视图（**top view**）

背视图（**bottom view**）

Silkscreen instructions:
(1) Inside the red box: B stands for Bluetooth, W stands for WIFI
(2) Inside the blue box: B21281 is the product cycle number
(3) Inside the yellow box: SKI.WB800D.2 is the product model
(4) The content of the product nameplate is as follows

6. Key Materials（关键物料）

序号	关键件名称	型号	规格/材料	备注
1	integrated circuit	AIC8800D	QFN48	
2	PCB	SKI.WB800D.2	FR-4,2LAY	
3	Crystal oscillation	2.3.3.400001535	40MHz	

7. General Requirements（一般要求）

No.	Feature	Description
8-1	Operation Voltage 工作电压范围	3.3V±0.3
8-2	Current Consumption 最大电流	600mA
8-3	Ripple 纹波	≤120mV@3.3v
8-4	Operation Temperature 工作温度范围	0°C to +40°C
8-5	Antenna Type 天线类型	External antenna
8-6	Interface	High Speed USB 2.0 Interface
8-7	Storage Temperature 存储温度	-40°C to +125°C

8. Electrical Characteristics（电气特性）

除非另有说明，电气规范试验都在下列条件下进行：

环境条件温度：25℃±5℃；

电源电压：模块输上入电压 3.3V（±10%）；

The Test for electrical specification was performed under the following condition unless otherwise specified.

Ambient condition Temperature :25℃ ± 5℃;

Power supply voltages：3.3V (±10%) input power at the Module;

8.1 IEEE 802.11b Section

Items	Contents				
Specification	IEEE802.11b				
Mode	CCK				
Channel	CH1 to CH13				
Data rate	1, 2, 5.5, 11Mbps				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels(Calibrated)					
17dBm Target (For Each antenna port) @ 11b/11Mbps	15	17	19	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	-	10	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5 Minimum Input Level Sensitivity (each chain)					
1) 1Mbps (FER ≦8%)	-	-	-83	dBm	
2) 2Mbps (FER ≦8%)	-	-	-80	dBm	
3) 5.5Mbps (FER ≦8%)	-	-	-79	dBm	
4) 11Mbps (FER ≦8%)	-	-	-76	dBm	
6 Maximum Input Level (FER ≦8%)	-10	-	-	dBm	

8.2 IEEE 802.11g Section

Items	Contents
Specification	IEEE802.11g

Mode	OFDM				
Channel	CH1 to CH13				
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels					
15dBm Target (For Each antenna port) @ 11g/54Mbps	12	14	16	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	-	10	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5 Minimum Input Level Sensitivity (each chain)					
1) 6Mbps (PER ≦10%)	-	-	-85	dBm	
2) 9Mbps (PER ≦10%)	-	-	-84	dBm	
3) 12Mbps (PER ≦10%)	-	-	-82	dBm	
4) 18Mbps (PER ≦10%)	-	-	-80	dBm	
5) 24Mbps (PER ≦10%)	-	-	-77	dBm	
6) 36Mbps (PER ≦10%)	-	-	-73	dBm	
7) 48Mbps (PER ≦10%)	-	-	-69	dBm	
8) 54Mbps (PER ≦10%)	-	-	-65	dBm	
6 Maximum Input Level (PER ≦10%)	-20	-	-	dBm	

8.3 IEEE 802.11n HT20 Section(2.4GHz)

Items	Contents				
Specification	EEE802.11n HT20 @ 2.4GHz				
Mode	OFDM				
Channel	CH1 to CH13				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
2. Power Levels					

14dBm Target (For Each antenna port) @ 2.4G/MCS7	12	14	16	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 ≦10%)	-	-	-82	dBm	
2) MCS1 (PER ≦10%)	-	-	-79	dBm	
3) MCS2 (PER ≦10%)	-	-	-77	dBm	
4) MCS3 (PER ≦10%)	-	-	-74	dBm	
5) MCS4 (PER ≦10%)	-	-	-70	dBm	
6) MCS5 (PER ≦10%)	-	-	-66	dBm	
7) MCS6 (PER ≦10%)	-	-	-65	dBm	
8) MCS7 (PER ≦10%)	-	-	-64	dBm	
7. Maximum Input Level (PER ≦10%)	-20	-	-	dBm	

8.4 IEEE 802.11n HT40 Section(2.4GHz)

Items	**Contents**				
Specification	IEEE802.11n HT40 @ 2.4GHz				
Mode	OFDM				
Channel	CH3 to CH11				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels (Calibrated)					
14dBm Target (For Each antenna port) @ 2.4G/MCS7	12	14	16	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	-25	-	25	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5. Minimum Input Level Sensitivity (each chain)					
1) MCS0 (PER ≦10%)	-	-	-79	dBm	
2) MCS1 (PER ≦10%)	-	-	-76	dBm	
3) MCS2 (PER ≦10%)	-	-	-74	dBm	
4) MCS3 (PER ≦10%)	-	-	-71	dBm	
5) MCS4 (PER ≦10%)	-	-	-67	dBm	
6) MCS5 (PER ≦10%)	-	-	-63	dBm	
7) MCS6 (PER ≦10%)	-	-	-62	dBm	
8) MCS7 (PER ≦10%)	-	-	-61	dBm	
6. Maximum Input Level (PER ≦10%)	-20	-	-	dBm	

8.5 IEEE 802.11ax Section(2.4GHz)

Items	Contents				
Specification	IEEE802.11ax				
Mode	BPSK, QPSK, 16QAM, 64QAM,256QAM, 1024QAM and OFDMA				
Channel	HE20：CH1 to CH13 HE40：CH3 to CH11				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7/8/9				
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels (Calibrated)					
1) For antenna port（MCS9）	10	12	14	dBm	
2. Spectrum Mask @VHT20/VHT40/VHT80 target power					
1) at fc +/-11MHz/21MHz/41MHz	-	-	-20	dBr	
2) at fc +/-20MHz/40MHz/80MHz	-	-	-28	dBr	
3) at fc +/-30MHz/60MHz/120MHz	-	-	-40	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	-	-	-27		dB	
9) MCS8	-	-	-30		dB	
10) MCS9	-	-	-32		dB	
11) MCS10			-34		dB	
12) MCS11			-35		dB	
4. Frequency Error	-20	-	20		ppm	
RX Characteristics	Min.	Typ.	Max.		Unit	
5.Minimum Input Level Sensitivity (each chain)			HE 20	HE 40		
1) MCS0 (PER ≦10%)	-	-	-82	-79	dBm	
2) MCS1 (PER ≦10%)	-	-	-79	-76	dBm	
3) MCS2 (PER ≦10%)	-	-	-77	-74	dBm	
4) MCS3 (PER ≦10%)	-	-	-74	-71	dBm	
5) MCS4 (PER ≦10%)	-	-	-70	-67	dBm	
6) MCS5 (PER ≦10%)	-	-	-66	-63	dBm	
7) MCS6 (PER ≦10%)	-	-	-65	-62	dBm	
8) MCS7 (PER ≦10%)	-	-	-64	-61	dBm	
9) MCS8(PER ≦10%)	-	-	-59	-56	dBm	
10) MCS9(PER ≦10%)	-	-	-57	-54	dBm	
11) MCS10(PER ≦10%)	-	-	-54	-51	dBm	
12) MCS11(PER ≦10%)	-	-	-52	-49	dBm	
6. Maximum Input Level (PER ≦10%)	-30	-	-		dBm	

8.6 Bluetooth Specification

8.6.1 BR Specification

Items	Contents				
Host Interface	USB				
Antenna Reference	Small antennas with 0~2 dBi peak gain				
Channel	CH0 to CH78				
Modulation	GFSK				
	Min.	Typ.	Max.	Unit	Remark
TX Characteristics					
1.Output Average Power	-	6	-	dBm	
2.Modulation Characteristics					
1)Delta f1(Avg)	-	157	-	kHz	

2)Delta f2max(For at least 99.9% of all Delta f2max)	-	121	-	kHz	
3)Delta f2/ Delta f1	-	0.85	-	kHz	
3.Initial Carrier Frequency Tolerance	-	±20	-	kHz	
4. Carrier Frequency Drift					
1) One Slot packet drift (DH1)	-	±15	-	kHz	
2) Three Slot packet drift (DH3)	-	±15	-	kHz	
3) Five Slot packet drift (DH5)	-	±15	-	kHz	
4) Max Drift Rate	-	±15	-	kHz/50us	
RX Characteristics					
1. Receiver Sensitivity (BER<0.1%)	-	-92	-	dBm	
2. Maximum usable signal (BER<0.1%)	-	-5	-	dBm	

8.6.2 EDR Specification

Items	Contents				
Host Interface	USB				
Antenna Reference	Small antennas with 0~2 dBi peak gain				
Channel	CH0 to CH78				
Modulation	π/4-DQPSK 、8PSK				
	Min.	Typ.	Max.	Unit	Remark
TX Characteristics					
1.Relative Transmit Power	-	6	-	dBm	
1) π/4-DQPSK	-	-1.5	-	dBm	
2) 8PSK	-	-1.5	-	dBm	
2. Frequency Stability					
1) Omega-i	-	±4	-	kHz	
2) Omega-0	-	±4	-	kHz	
3) Omega-0 + Omega-i	-	±4	-	kHz	
3. Modulation Accuracy					
1) RMS DEVM					
π/4-DQPSK	-	±9	-	%	
8PSK	-	±9	-	%	
2) Peak DEVM					
π/4-DQPSK	-	±28	-	%	
8PSK	-	±21	-	%	
3) 99% DEVM					
π/4-DQPSK	-	±15	-	%	
8PSK	-	±12	-	%	
RX Characteristics					
1. Receiver Sensitivity (BER<0.01%)					

1) π/4-DQPSK	-	-91	-	dBm	
2) 8PSK	-	-85	-	dBm	
2. Maximum usable signal (BER<0.1%)					
1) π/4-DQPSK	-	-5	-	dBm	
2) 8PSK	-	-5	-	dBm	

8.6.3 LE Specification

Items	Contents				
Host Interface	USB				
Antenna Reference	Small antennas with 0~2 dBi peak gain				
Channel	CH0 to CH39				
	Min.	Typ.	Max.	Unit	remark
TX Characteristics					
1. Output power at NOC	-	6	-	dBm	
2. Modulation Characteristics					
1)Delta f1(Avg)	225	-	275	kHz	
2)Delta f2max(For at least 99.9% of all Delta f2max)	185	-	-	kHz	
3)Delta f2/ Delta f1	0.8	0.94	-	Hz/Hz	
3. Carrier frequency offset and drift					
1) Frequency Offset	-150	-	150	kHz	
2) Frequency Drift	-50	-	50	kHz	
3) Max Drift Rate	-20	-	20	Hz/us	
4.In-band Spurious Emissions					
1)±2M offset	-	-	20	dBm	
2)>±3MHz offset	-	-	30	dBm	
RX Characteristics					
1. Receiver Sensitivity (BER<30.8%)	-	-95	-	dBm	
2. Maximum usable signal (BER<30.8%)	-	-5	-	dBm	

9. Mechanical,Environmental and Reliability Tests

（机械、环境和可靠性测试）

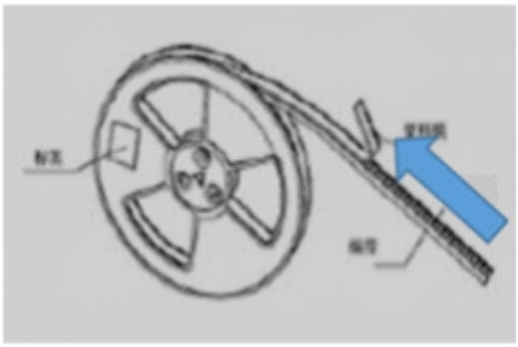
Test Items		Test Conditions	Qty	Criteria Condition
10-1	**Drop test**	The packed samples within 100Kg can be tested Drop height: Face Side: 800/600/450mm Edge line: 600/450/350mm	1xBox	After drop test, the outer box and inner box will not been broken by appearance visual inspection.

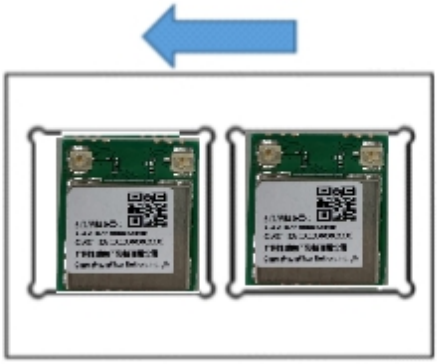
		Drop time: 1 each Face and edge.		
10-2	**Vibration test**	X-Y-Z direction, first Frequency changing from 10Hz to 30Hz to 10Hz,amplitude 0.75mm, 5 times vibrations, then frequency Changing from 30Hz to 55 Hz to 30 Hz, amplitude 0.15mm, 5 time vibration.	3	After test, the Appearance, Power EVM and Frequency error shall be satisfied with the specification.
10-3	**Impact test**	Impact acceleration: 50m/sec2; Impact duration: 16ms; Impact times: 1000.	3	After test, the Appearance, Power EVM and Frequency error shall be satisfied with the specification.
10-4	**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.
10-5	**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.
10-6	**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.
10-7	**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.

10-8	**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.
10-9	**Low temperature load test**	Leave samples in -15±3℃@ 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.
10-10	**Temperature circle test**	One cycle duration -10±3℃@3H 40±3℃ @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.
10-11	**Continuous TP test**	Twice cycle duration -10±3℃@4H +60±3℃@4H, +25@2H@2H	3	During test, There will not been appeared signal disconnection or interruption between DUT and AP.
10-12	**ESD**	Discharge voltage: 1kV C: 150pF Discharge resistance：330Ω Positive10 times 1 time for each second	3	The products can recoverable smoothly after ESD test.

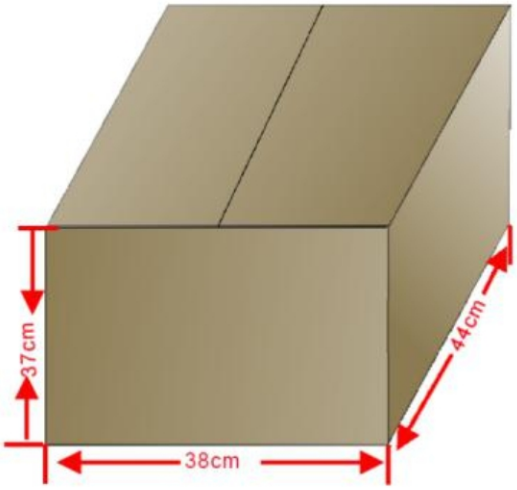
10. Package（包装）

(1) Schematic diagram of taping packaging
Tape feeding method (the arrow represents the feeding direction of the tape packaging):





(2) Schematic diagram of the outer box drawings



(3) Information on packaging requirements
550pcs/tray*8 trays/box=4400pcs/box

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.
Caution: The user is cautioned that 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.

FCC RF Radiation Exposure Statement:
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 any part of your body.

Canada Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada’s licence-exempt RSS(s). Operation is subject to the following two conditions:
(1) This device may not cause interference.
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux
CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1)L'appareil ne doit pas produire de brouillage;
2)L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Please notice that if the ISED certification 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 IC: 24728-SKIWB800D21” any similar wording that expresses the same meaning may be used.

l'appareil hôte doit porter une étiquette donnant le numéro de certification du module d'Industrie Canada, précédé des mots « Contient un module d'émission », du mot « IC: 24728-SKIWB800D21 » ou d'une formulation similaire exprimant le même sens, comme suit

The device meets the exemption from the routine evaluation limits in section 2.5 of RSS 102 and compliance with RSS-102 RF exposure, users can obtain Canadian information on RF exposure and compliance.
Le dispositif rencontre l'exemption des limites courantes d'évaluation dans la section 2.5 de RSS 102 etla conformité à l'exposition de RSS-102 rf, utilisateurs peut obtenir l'information canadienne surl'exposition et la conformité de rf.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.
Cet émetteur ne doit pas être Co-placé ou ne fonctionnant en même temps qu'aucune autre antenne ouémetteur. Cet équipement devrait être installé et actionné avec une distance minimum de 20 centimètres entre le radiateur et votre corps.

This radio transmitter 24728-SKIWB800D21 has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.
Le présent émetteur radio 24728-SKIWB800D21 a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.
The concrete contents to check are the following three points.
1）Must use PIFA antenna with gain not exceeding 1.79dBi;
2）Should be installed so that the end user cannot modify the antenna;
3）Feed line should be designed in 50ohm
Fine tuning of return loss etc. can be performed using a matching network.
Le contenu concret à vérifier sont les trois points suivants.
1) Doit utiliser une antenne PIFA avec un gain ne dépassant pas 1,79 dBi ;
2) doivent être installés de façon que l'utilisateur final ne peut pas modifier l'antenne
3) La ligne d’alimentation doit être conçue en 50ohm
Le réglage précis de la perte de rendement, etc. peut être effectué en utilisant un réseau correspondant.

Frequency (MHz) fréquences	Antenna Type types d'antenne	Antenna Gain (dBi) Gain maximal d'antenne
2402-2480 2412-2462	PIFA Antenna	**BT Antenna MAX: 1.79dBi** WIFI **Antenna MAX: 1.79dBi**

Notice to OEM integrator

Must use the device only in host devices that meet the FCC/ISED RF exposure category of mobile, which means the device is installed and used at distances of at least 20cm from persons.
The end user manual shall include FCC Part 15 /ISED RSS GEN compliance statements related to the transmitter as show in this manual.
Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B, ICES 003.
Host manufacturer is strongly recommended to confirm compliance with FCC/ISED requirements for the transmitter when the module is installed in the host.

Must have on the host device a label showing Contains FCC ID: 2AR82-SKIWB800D21， IC: 24728-SKIWB800D21

l'hôte doit utiliser l'instrument uniquement dans des dispositifs qui répondent à la fcc / (catégorie d'exposition rf mobile, ce qui signifie le dispositif est installé et utilisé à une distance d'au moins 20 cm de personnes.
le manuel de l'utilisateur final doit inclure la partie 15 / (fac rss gen déclarations de conformité relatives à l'émetteur que de montrer dans ce manuel.
le fabricant est responsable de la conformité de l'hôte, le système d'accueil avec le module installé avec toutes les autres exigences applicables du système comme la partie 15 b, ices - 003.
accueillir le fabricant est fortement recommandé de confirmer la conformité avec les exigences de la fcc / (émetteur lorsque le module est installé dans l'hôte.

le dispositif d'accueil doivent avoir une étiquette indiquant contient FCC ID:2AR82-SKIWB800D21， IC: 24728-SKIWB800D21

Requirement per KDB996369 D03

2.2 List of applicable FCC rules

List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies. DO NOT list compliance to unintentional-radiator rules (Part 15 Subpart B) since that is not a condition of a module grant that is extended to a host manufacturer. See also Section 2.10 below concerning the need to notify host manufacturers that further testing is required.3

Explanation: This module meets the requirements of FCC part 15.247.

2.3 Summarize the specific operational use conditions

Describe use conditions that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to-point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If the use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in 5 GHz DFS bands.

Explanation: The EUT has PIFA Antenna with IPEX connector, and the antenna cannot be changed.

2.4 Limited module procedures

If a modular transmitter is approved as a "limited module," then the module manufacturer is responsible for approving the host environment that the limited module is used with. The manufacturer of a limited module must describe, both in the filing and in the installation instructions, the alternative means that the limited module manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting conditions.

A limited module manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply regulation. The alternative method could include that the limited module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval.

This limited module procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module.

Explanation: The module is not a limited module.

2.5 Trace antenna designs

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ – Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects: layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.

a) Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna);

b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered);

c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout;

d) Appropriate parts by manufacturer and specifications;

e) Test procedures for design verification; and

f) Production test procedures for ensuring compliance.

The module grantee shall provide a notice that any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

Explanation: Yes, The module with trace antenna designs, and This manual has been shown the layout of trace design, antenna, connectors, and isolation requirements.

2.6 RF exposure considerations

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).

Explanation: This module complies with FCC RF radiation exposure limits set forth for an uncontrolled environment, This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body." This module is designed to comply with the FCC statement, FCC ID is: 24728-SKIWB800D21.

2.7 Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an “omni-directional antenna” is not considered to be a specific “antenna type”)).

For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product. The module manufacturers shall provide a list of acceptable unique connectors.

Explanation: The EUT has PIFA Antenna with IPEX connector, and the antenna cannot be changed.

2.8 Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This includes advising host product manufacturers that they need to provide a physical or e-label stating “Contains FCC ID” with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.

Explanation: The host system using this module, should have label in a visible area indicated the following texts: “Contains FCC ID: 2AR82-SKIWB800D21, Contains IC: 24728-SKIWB800D21”

2.9 Information on test modes and additional testing requirements

Additional guidance for testing host products is given in KDB Publication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product. The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host.

Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer’s determination that a module as installed in a host complies with FCC requirements.

Explanation: Top band can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

2.10 Additional testing, Part 15 Subpart B disclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Explanation: The module without unintentional-radiator digital circuity, so the module does not require an evaluation by FCC Part 15 Subpart B. The host should be evaluated by the FCC Subpart B.