SPECIFICATION

产品规格书

SKI.WB800D.3 B21495

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

Integrated BT 5.2

Approved by Shikun		
Checked by 审核	Rechecked by 复审	Approved by 批准

Please send the original back to us after you have approved and signed.
客户承认签章后敬请寄回正本一份。

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
V0.0	2021.6.16	SKI.WB800D.3A（21175）	All	First Issued	Fan

Content

1. Introduction（简介）

SKI.WB800D.3 module is based on AICSEMI AIC8800D solution.SKI.WB800D.3 is a Wi-Fi 6 / BT 5.2 combo low-power, high-performance and high-integrated wireless communication module ，which is designed for meeting the customers' needs of small size and low cost. This module supports both WLAN and BT functions. Its WLAN/BT function supports the USB 2.0 interface, and the module meets the requirements of standard protocol IEEE 802.11 b/g/n/ax. Such units as power management, power amplifier and low-noise amplifier are integrated in the main chip of the module.This documentation describes the engineering requirements specification.

SKI.WB800D.3 模块基于爱科微 AIC8800D 方案。SKI.WB800D.3 是一款内置高性能的 Wi-Fi 6 / BT 5.2 组合的低功耗、高性能、高集成度无线通信模块，专为满足客户小尺寸、低成本的需求而设计。该模块支持 WLAN 和 BT 功能。WLAN/BT 功能支持 USB 2.0，满足 IEEE 802.11 a/b/g/n/ac/ax 标准协议要求。本文档描述了工程要求规范。

2. Features（特性）

Protocol **支持标准**	IEEE Std. 802.11b/g/a/n/ac/ax BT 5.2
Chip Solution **芯片方案**	AIC8800D
Band **波段**	2.4GHz：2400~2483.5MHz 5GHz: **B1:**5150~5250MHz **B2:**5250~5350MHz **B3:**5350~5470MHz **B4:**5745~5825MHz
Bandwidth **占用带宽**	20MHz/40MHz
Dimensions **尺寸**	19mm×17mm×3.2mm
Remark **备注**	

型号	安装方式	支持标准	数据速率 (MAX)	频段	天线接口	备注
SKI.WB800D.3	SMD	IEEE 802.11a/b/g/n/ac/ax	229Mbps	2.4GHz/5GHz	IPEX *2	

3. Block Diagram（结构框图）

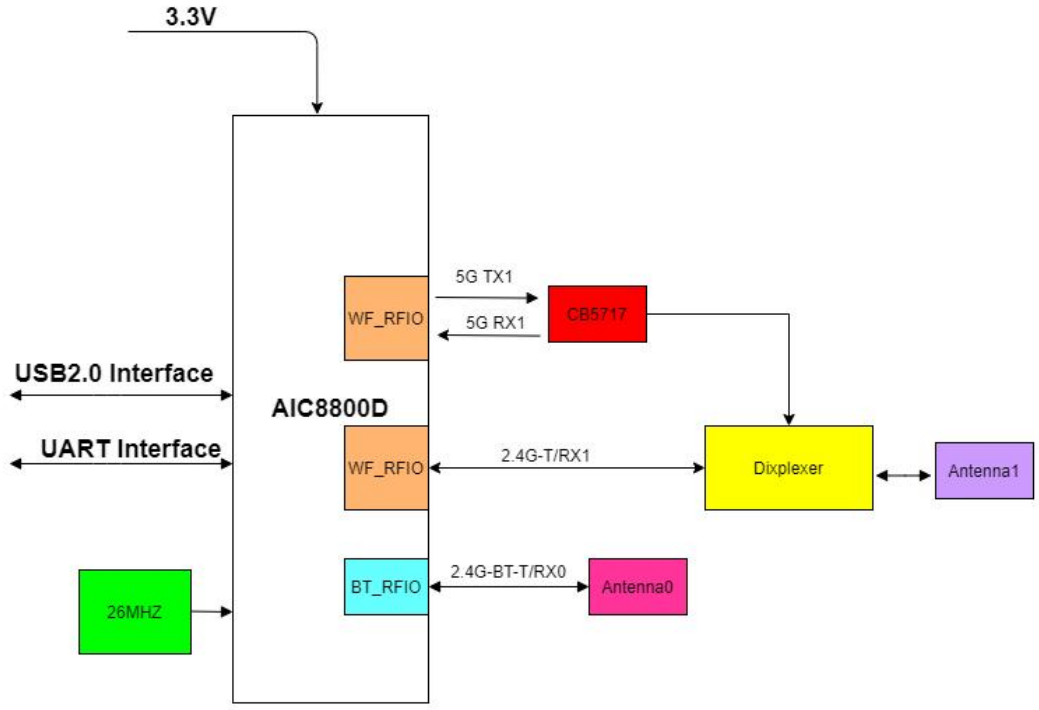
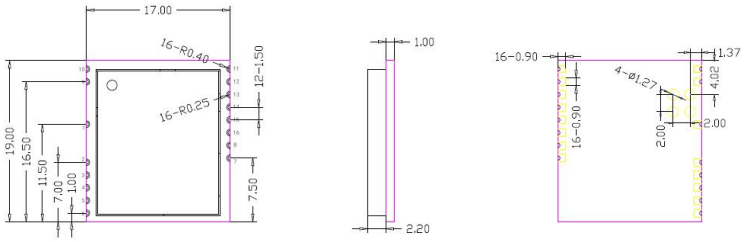


Figure 1 SKI.WB800D.3 Block Diagram

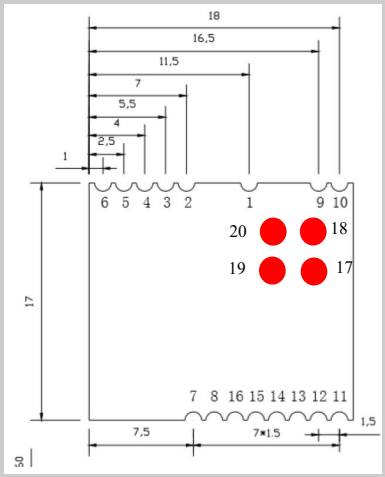
4. Package Outline and Mounting（外形及安装尺寸）



模组俯视图 Top view　　模组侧视图 Side view　　模组底视图 Bottom view

NOTE:
1. 板内顶层器件最高2. 2mm;
2. 模组外形尺寸公差为±0. 15mm，板厚以及未标注公差为±0. 1mm;

5. Pin Definition（引脚定义）



PIN	SYMBOL	DESCRIPTION
1	LED	LED0\ LED 灯控制
2	AGND	Ground\ 接地
3	MAIN	Wi-Fi RF port0(2.4G+5G)connect to external antenna\ 2.4G&5G WIFI 射频输入，外置天线
4	AGND	Ground\ 接地
5	AUX	Wi-Fi RF port1(BT)connect to external antenna\ BT 射频输入，外置天线
6	AGND	Ground\接地
7	BT_DIS	BT Disable，L Active\ 蓝牙使能控制，高电平使能，默认高电平
8	WL_DIS	WIFI Disable，L Active\ WIFI 使能控制，高电平使能，默认高电平
9	VDD33	3.3V input\ 3.3V 供电输入
10	AGND	Ground\接地
11	WL_USB_DM	WLAN USB2.0 DM Signal\ USB 差分负电压信号
12	WL_USB_DP	WLAN USB2.0 DP Signal\ USB 差分正电压信号
13	AGND	Ground\接地
14	PDN	Power Down，L Active\供电使能，高电平有效
15	D_WAKE_H	WIFI Device Wake Host， L Active\ WIFI 从机唤醒主机，低电平有效
16	H_WAKE_D	Host Wake WIFI Device，L Active\ 主机唤醒 WIFI 从机，低电平有效
17	0_TX	WIFI&BT Uart0_TX\WIFI 和蓝牙串口 TX 通信（模组底部）
18	0_RX	WIFI&BT Uart0_RX\WIFI 和蓝牙串口 RX 通信（模组底部）
19	1_TX	BT Uart1_TX\蓝牙串口 TX 通信（模组底部）
20	1_RX	BT Uart1_TX\蓝牙串口 RX 通信（模组底部）

6. Product Pictures（实物图片）

正视图（**top view**）

背视图（**bottom view**）

7. Key Materials（关键物料）

No./序号	关键件名称 Key name	型号 Model number	规格/材料 specification	备注 Remark
1	IC/集成电路	AIC8800D	48-QFN	
2	PCB	SKI.WB800D.3	FR-4,4LAY	
3	crystal/晶体振荡器	SMD3225	26MHz	
4	duplexer/双工器	SLFD18-5R950G-07T	/	
5	amplifier/放大器	CB5717	/	

8. 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
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	USB	High Speed USB 2.0 Interface
8-7	Storage Temperature 存储温度	-40°C to +85°C

9. 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+/-0.3；

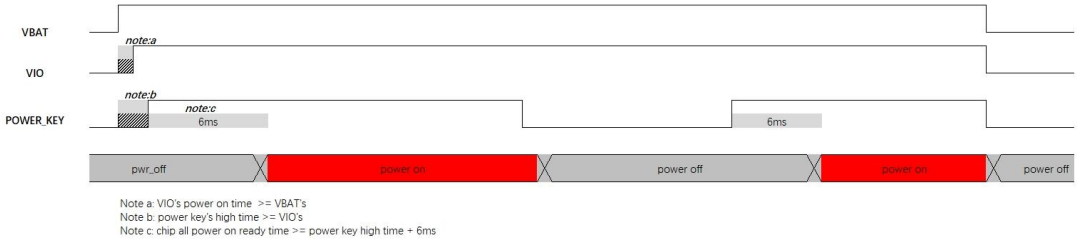
The Test for electrical specification was performed under the following condition unless otherwise specified：

Ambient condition Temperature :25℃ ± 5℃;

Power supply voltages：3.3V+/-0.3 input power at the Module;

10. Reference Design（参考设计）

10.1 Timing specification（时序规范）

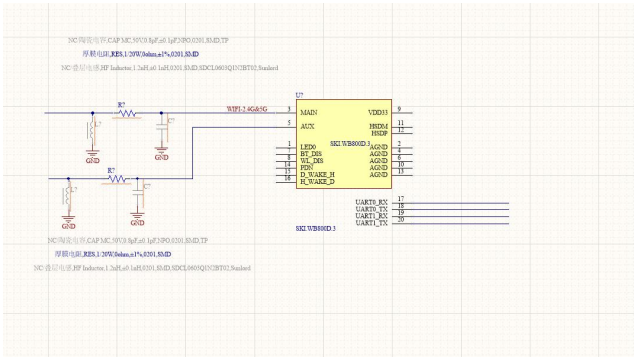


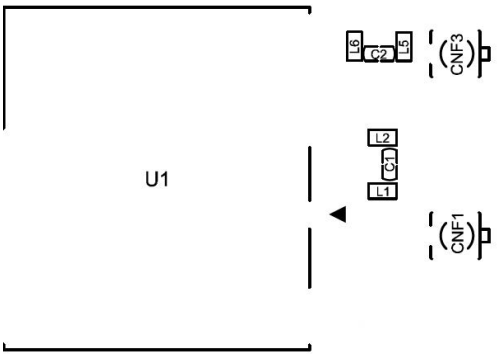
时序要求

10.2 DC Electrical Characteristics（直流电气特性）

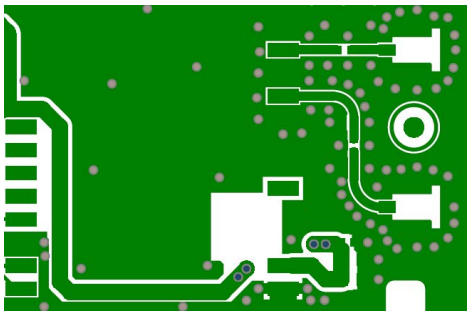
Symbol	Description	conditions	Min.	Typ.	Max.	Unit
VDD33	Power supplies	-	3.0	3.3	3.6	V
VDDIO	I/O input power supplies	-	3.0	3.3	3.6	V
			1.7	1.8	1.9	
I_{VDD33}	Power supply current	-	-	-	800	mA
I_{VDDIO}	I/O supply current	-	-	-	50	mA
V_{IH}	High-level input voltage	VDDIO=3.3V	VDDIO*0.625	-	VDDIO+0.3	V
		VDDIO=1.8V	VDDIO*0.65			
V_{IL}	Low-level input voltage	VDDIO=3.3V	-0.3	-	VDDIO*0.25	V
		VDDIO=1.8V			VDDIO*0.35	
V_{OH}	High-level output voltage	VDDIO=3.3V	VDDIO-0.4	-	VDDIO+0.3	V
		VDDIO=1.8V	VDDIO-0.2			
V_{OL}	Low-level output voltage	VDDIO=3.3V	-0.3	-	0.4	V
		VDDIO=1.8V			0.2	
R_{PU}	Internal pull-up resistor	VDDIO=3.3V	40	75	190	kΩ
		VDDIO=1.8V	10	50	100	
R_{PD}	Internal pull-down resistor	VDDIO=3.3V	40	75	190	kΩ
		VDDIO=1.8V	10	50	100	

10.3 Reference schematic（参考原理图）





Circuit between the connector to the module distance: 9mm
C1=C2=2pF
L1=L2=L5=L6=NC
CNF1 and CNF3 is IPEX connector for antenna



参考原理图

Matters needing attention:

1. The MAIN is the WIFI-2.4G&5G antenna interface, and the AUX is the BT antenna interface, which needs to be controlled according to 50Ω impedance.
2. Ensure that the GND PIN near the antenna port is properly grounded (direct copper laying is recommended).
3. In order to facilitate the adjustment of RF performance, a π-type matching circuit should be reserved between RF_ANT and the antenna. The π circuit should be placed close to the antenna and the specifications should be selected according to the actual situation. When both the antenna and RF wiring have good performance, attach 0Ω through, and the NC of the devices on both sides is not attached. When the impedance of the antenna is mismatched, it can be matched and debuggable through this circuit.
4. RF wiring should be as short as possible, and avoid right and acute Angle wiring.
5. Try to reserve the UART0&UART1 cable design on the motherboard to facilitate RF performance testing and debugging

11. Mechanical,Environmental and Reliability Tests（机械、环境和可靠性测试）

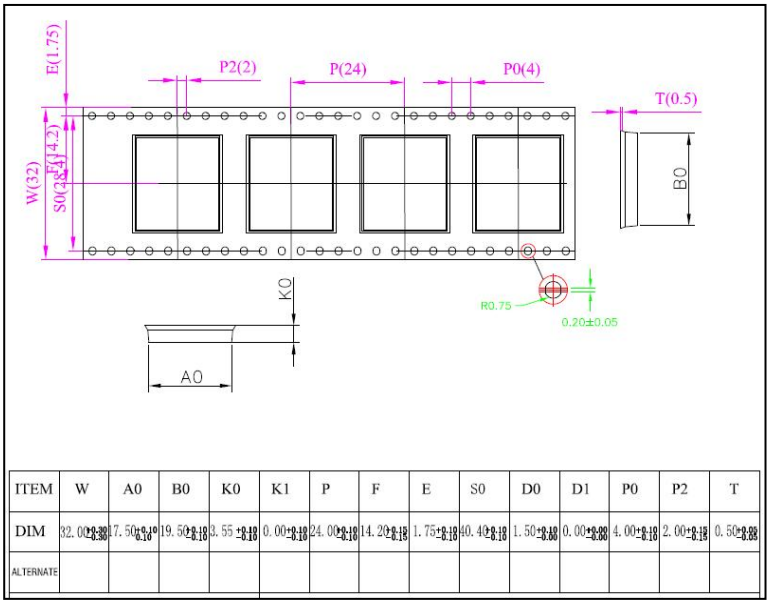
Test Items		Test Conditions	Qty	Criteria Condition
11-1	**Drop test**	The packed samples was tested at below condition: Drop height: 760mm(0.5~9.5kg） 610mm(9.5~18.5kg) Drop time: 1x corner, 3x edge and 6x face.	1xBox	After test, the outer box and inner box will not been broken by appearance visual inspection, and the products should be ok.
11-2	**Vibration test**	X-Y-Z direction, first Frequency changing from 10Hz to 30Hz to 10Hz,amplitude 2.0mm,	1xBox	After test, the outer box and inner box will not been broken by appearance visual inspection and the products should be ok.

		5 times vibrations, 5x times vibration.		
11-3	**Soldering ability test (Only for SKI module)**	Soldering temperature: 245±5℃ Soldering duration: 3±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.
11-4	**High Temperature and Humidity Operation Test**	Leave samples in 60℃, 90% RH @ 24 hours	4	After test, the products appearance, power, EVM and frequency error functional parameter shall be satisfied with the test specification.
11-5	**Low Temperature Operation Test**	Leave samples in -15℃ @24 hours	4	After test, the products appearance, power, EVM and frequency error functional parameter shall be satisfied with the test specification.
11-6	**High Temperature and Humidity Start Test**	Leave samples in 60℃, 90% RH for 4x hours	4	After test, power on and off the samples for 3x tiems, the samples should be able to start normally
11-7	**Low temperature start test**	Leave samples in -15℃ for 4x hours	4	After test, power on and off the samples for 3x tiems, the samples should be able to start normally
11-8	**High Temperature and Humidity Storage Test**	Leave samples in 85℃, 95% RH @ 48 hours	4	After test, the products appearance, power, EVM and frequency error functional parameter shall be satisfied with the test specification.
11-9	**Low Temperature Storage Test**	Leave samples in -40℃, @48 hours	4	After test, the products appearance, power, EVM and frequency error functional parameter shall be satisfied with the test specification.
11-10	**Thermal Shock Test**	-40~85℃，dwell time：30min，50cycles	4	After test, the products appearance, power, EVM and frequency error functional parameter shall be satisfied

				with the test specification.
11-11	**Aging Test**	60℃，120Hrs	10	The products at high temperature for a long time can continuous work normally
11-12	**Salt spray test**	NSS,35℃,PH:6.5~7.2, 24H	2	The Sample shall has no minor or major defects, such as physical damage, crack, corrosion, deformation etc;
11-13	**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.

12. Package（包装）

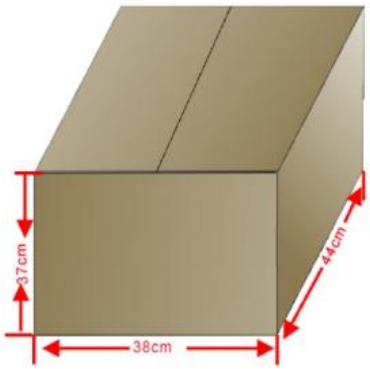
（1）编带包装



ITEM	W	A0	B0	K0	K1	P	F	E	S0	D0	D1	P0	P2	T
DIM	32.0	17.50	19.50	3.55	0.00	24.00	14.20	1.75	40.40	1.50	0.00	4.00	2.00	0.50
ALTERNATE														

（2）编带方向

（3）外箱尺寸



（4）包装数量

每盘包装 700pcs，每箱装 7 盘，每箱数量=700*7=4900pcs

13. Storage and Production（存储、生产）

13.1 Storage requirements（存储要求）

本产品的湿敏特性为 4 级（MSL4），出厂时以真空密封袋包装。产品搬运、存储、加工过程必须遵循 IPC/JEDEC J-STD-033。在环境温度低于 40 摄氏度，空气湿度小于 90%的情况下，真空包装下产品可存放 12 个月。在产品存放有效期内，如发现真空包装有漏气、湿敏卡变色达到烘烤标准、开封暴露时间超过 72H，需要烘烤后使用。

13.2 Production parameters（生产参数）

炉温最高不能超过 250℃，推荐是 240℃。

推荐 SMT 焊炉温曲线如下图所示。

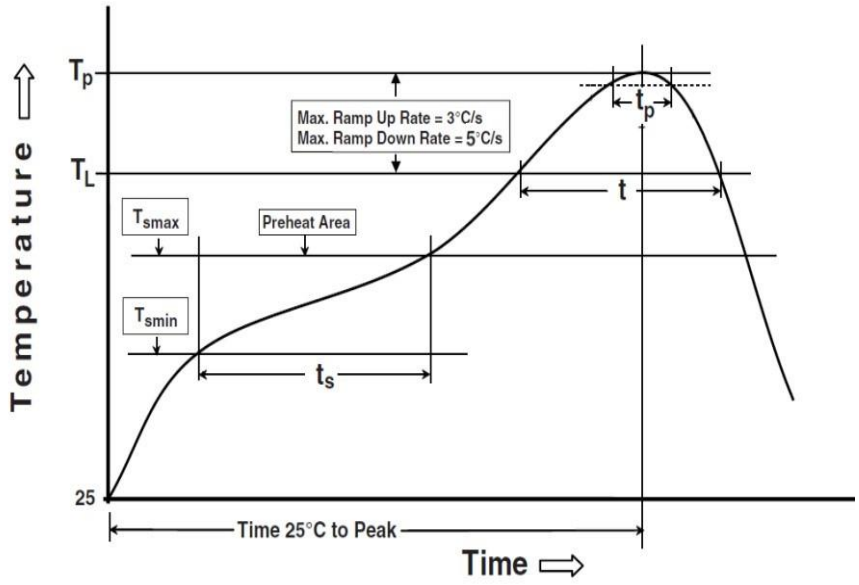


图 13-1 炉温曲线推荐图

表 13-2 炉温曲线参数

炉温参数	最小值	典型值	最大值	单位
预热区最低温度 Tsmin	150			℃
预热区最高温度 Tsmax			200	℃
预热上升时间 ts	60		120	s
回流焊区升温速率(TL 到 Tp）			3	℃/s
回流焊区低温 TL		220		℃
回流焊区峰值温度 Tp	235	240	250	℃
回流焊峰值温度时间 tp（Tp 波动 5℃范围）			30	s
回流焊区冷却降温速率（Tp 到 TL）	-5	-3	-1	℃/s
回流时间 t	40		60	s

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.

If power exceeds the limit and the distance (Over 20cm distance in actual use between the device and user) is compliant with the requirement

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.

The device must be professionally installed

The intended use is generally not for the general public. It is generally for industry/commercial use.
The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not normally required. the user has no access to the connector.
Installation must be controlled. Installation requires special training

The concrete contents to check are the following three points.
1) Must use a ROD antenna with gain not exceeding 4.64dBi.
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
ANT Manufacturer: Shenzhen One Chuang Shang Display Technology Co., LTD; Model Name: L108

Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
2400-2500	ROD Antenna	Antenna MAX: 2dBi
2400-2500	ROD Antenna	Antenna MAX: 4.64dBi

Notice to OEM integrator

Must use the device only in host devices that meet the FCC 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 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.

Host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host.

Must have on the host device a label showing Contains FCC ID: 2BOF8-SKIWB800D3