

保密等级：机密

SPECIFICATION

产品规格书

SKO.W603.6

IEEE 802.11b/g/n 2T2R USB Wi-Fi Module

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	2020.07.10	SKO.W603.6 A20233		First Issued.	Lee
V1	2020.08.26	SKO.W603.6 B20332	1\2\3\ 4	Modify the product pictures, dimensions and package outline.	Lee
V2	2020.09.25	SKO.W603.6 B20332	3\4 \11	Modify the product pictures and package. Delete software requirements.	Lee
V3	2020.11.17	SKO.W603.6 B20332	13\14\ 15\16	Add warning information.	Lee

Content

1. Introduction (简介)	1
2. FEATURES (特性)	1
3. Block Diagram (结构框图)	2
4. Package Outline and Mounting (外形及安装尺寸)	2
5. Product Pictures (实物图片)	3
6. Key Materials (关键物料)	4
7. General Requirements (一般要求)	4
8. Electrical Characteristics (电气特性)	4
8.1 IEEE 802.11b Section	5
8.2 IEEE 802.11g Section	5
8.3 IEEE 802.11n HT20 Section(2.4GHz)	6
8.4 IEEE 802.11n HT40 Section(2.4GHz)	7
9. Mechanical,Environmental and Reliability Tests (机械、环境和可靠性测试)	9
10. Package (包装)	11
11. Socket Specification (插座规格)	12
12. FCC Statement	13
13. Canada Statement	14
14. Notice to OEM integrator	16

1. Introduction (简介)

SKO.W603.6 module is based on MEDIATEK MT7603U solution. The MT7603U is a highly integrated Wi-Fi single chip which supports 300 Mbps PHY rate. It fully complies with IEEE 802.11n and IEEE 802.11 b/g standards, offering feature-rich wireless connectivity at high standards, and delivering reliable, cost-effective throughput from an extended distance. This documentation describes the engineering requirements specification.

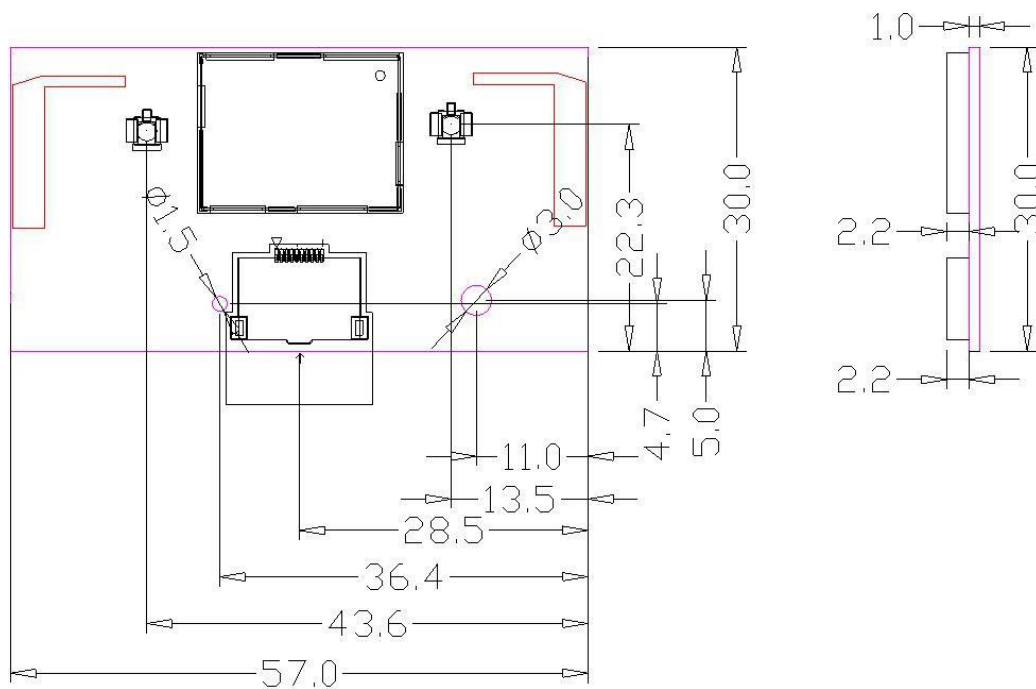
SKO.W603.6 模块基于MEDIATEK MT7603U 解决方案。MT7603U 是一款高度集成的Wi-Fi 芯片，支持 300 Mbps 的物理速率。方案符合 IEEE 802.11n 和 IEEE 802.11 b/g 标准，以高标准提供功能丰富的无线连接，并在远距离提供可靠、经济高效的吞吐量。本文件描述了工程需求规范。

2. FEATURES (特性)

Reserving System 接收制式	IEEE Std. 802.11b
	IEEE Std. 802.11g
	IEEE Std. 802.11n
Chip Solution 芯片方案	MT7603U
Band 波段	2.4GHz
Dimensions 尺寸	57.0mm×30.0mm×3.2mm

型号 model	安装方式 Installation method	支持标准 Support standard	频段 Band	天线接口 Antenna interface	备注 Remarks
SKO.W603.6	外挂 Ext-WIFI	IEEE 802.11b/g/n	2.4GHz	板载天线 On-board Antenna	57.0mm×30.0mm×3.2mm

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



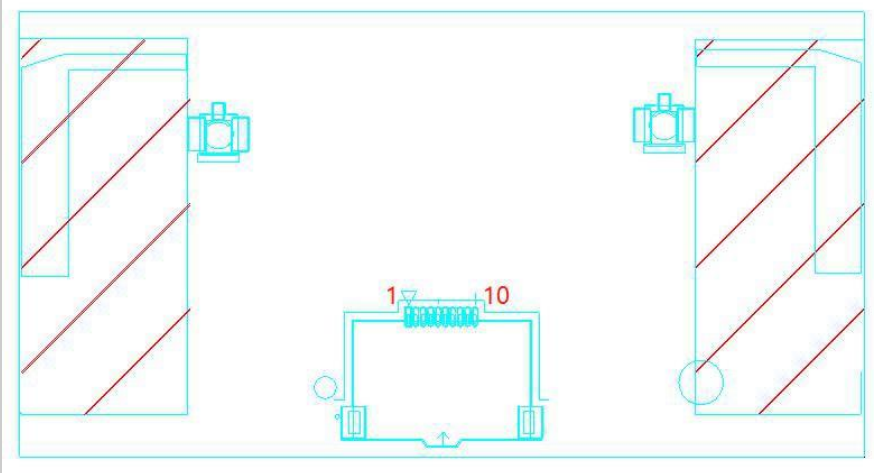
Note: 1. The unit is mm.

2. The tolerance of the external dimensions of the module is $\pm 0.2\text{mm}$, and the tolerance of the board thickness and unmarked is $\pm 0.2\text{mm}$.

注意：1. 单位为 mm。

2. 模组外形尺寸公差为 $\pm 0.2\text{mm}$ ，板厚及未标注公差为 $\pm 0.2\text{mm}$ 。

Pin Definition (引脚定义)



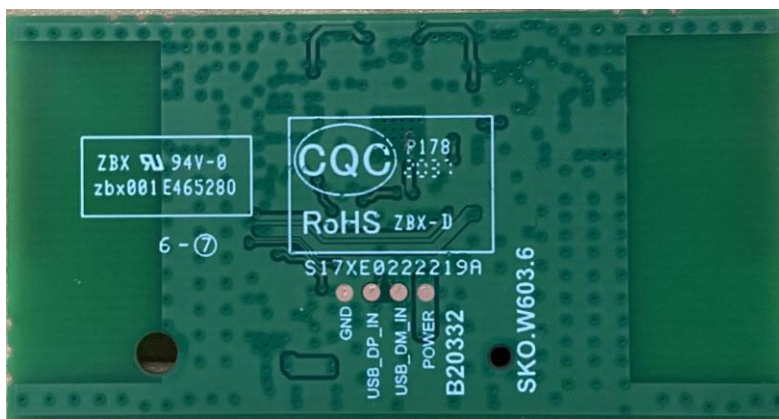
The diagram shows a top-down view of a 10-pin connector. Pins 1 and 2 are labeled 'VDD_5V'. Pin 3 is labeled 'NC'. Pins 4 and 5 are labeled 'GND'. Pins 6 and 7 are labeled 'USB_DM' and 'USB_DP' respectively. Pin 8 is labeled 'GND'. Pin 9 is labeled 'WoW'. Pin 10 is labeled 'RESET'. A 10K resistor is shown connected between pins 1 and 10.

PIN	SYMBOL	DESCRIPTION
1	VDD_5V	VDD 5.0V\+5.0V 直流供电输入
2	VDD_5V	VDD 5.0V\+5.0V 直流供电输入
3	NC	NC\悬空
4	GND	Connected to Ground\连接到地
5	GND	Connected to Ground\连接到地
6	USB_DM	USB2.0 DM Signal\USB2.0 差分负电压信号
7	USB_DP	USB2.0 DP Signal\USB2.0 差分正电压信号
8	GND	Connected to Ground\连接到地
9	WoW	Wake on Wireless LAN\唤醒引脚 (低电平有效, 内有 10K 电阻到 3.3V 上拉)
10	RESET	RESET\复位引脚 (低电平有效, 内部没有上拉电阻, 整机端需要加 10K 电阻到 3.3V 上拉)

5. Product Pictures (实物图片)



正视图 (top view)



背视图 (bottom view)

6. Key Materials (关键物料)

序号	关键件名称	型号	规格/材料	备注
1	集成电路	MT7603U	48-QFN	
2	PCB	SKO.W603.6	FR-4,2LAY	
3	晶体振荡器	无源晶振,SPXO,±10ppm,12pF,SMD3225	40MHz	

7. General Requirements (一般要求)

No.	Feature	Description
7-1	Operation Voltage 工作电压范围	5.0V+/-0.5
7-2	Current Consumption 最大电流	800mA
7-3	Ripple 纹波	≤250Vp-p
7-4	Operation Temperature 工作温度范围	0°C to +40°C
7-5	Antenna Type 天线类型	Internal antenna
7-6	USB	High Speed USB 2.0 Interface
7-7	Storage Temperature 存储温度	-40°C to +85°C

8. Electrical Characteristics (电气特性)

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

Ambient condition Temperature :25°C ± 5°C;

Power supply voltages: 5.0V (±10%) input power at the Module.

除非另有说明，电气规范试验是在下列条件下进行的。

环境条件温度：25°C ± 5°C；

电源电压：模块上输入电压 5.0V (±10%)

8.1 IEEE 802.11b Section

Items	Contents				
Specification	IEEE802.11b				
Mode	DBPSK, DQPSK and CCK and DSSS				
Channel	CH1 to CH13				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels(Calibrated)					
1) For Each antenna port	14	16	18	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	-20	-	20	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	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH1 to CH13				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels					
1) For Each antenna port	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	-20	-	20	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	

8.3 IEEE 802.11n HT20 Section(2.4GHz)

Items	Contents				
Specification	IEEE802.11n HT20 @ 2.4GHz				
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH1 to CH13				
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels					
1) For Each antenna port	11	13	15	dBm	
2. Spectrum Mask @ target power					
1) at fc +/-11MHz	-	-	-20	dBm	
2) at fc +/-20MHz	-	-	-28	dBm	
3) at fc > +/-30MHz	-	-	-45	dBm	
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	-20	-	20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5. 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	
6. Maximum Input Level (PER \leq 10%)	-20	-	-	dBm	

8.4 IEEE 802.11n HT40 Section(2.4GHz)

Items	Contents				
Specification	IEEE802.11n HT40 @ 2.4GHz				
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH3 to CH11				
	Min.	Typ.	Max.	Unit	Remark
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels (Calibrated)					
1) For Each antenna port	11	13	15	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	-20	-	20	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	

9. Mechanical, Environmental and Reliability Tests

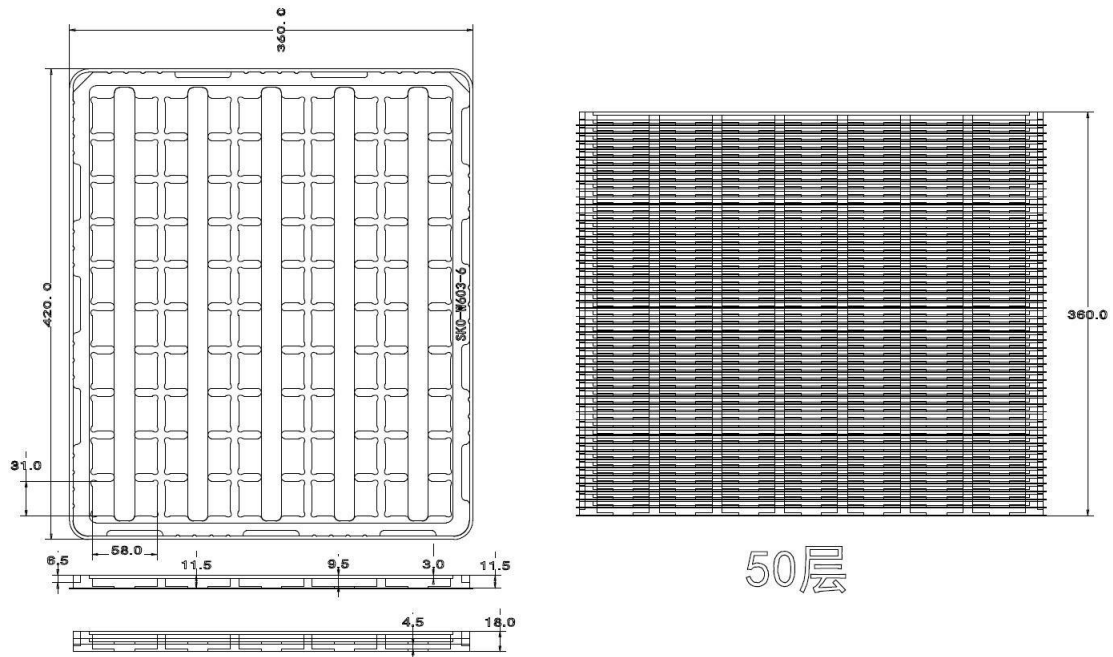
(机械、环境和可靠性测试)

Test Items		Test Conditions	Qty	Criteria Condition
9-1	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 be broken by appearance visual inspection, and the products should be ok.
9-2	Vibration test	X-Y-Z direction, first Frequency changing from 10Hz to 30Hz to 10Hz, amplitude 2.0mm, 5 times vibrations, 5x times vibration.	1xBox	After test, the outer box and inner box will not be broken by appearance visual inspection and the products should be ok.
9-3	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.
9-4	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.
9-5	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.
9-6	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

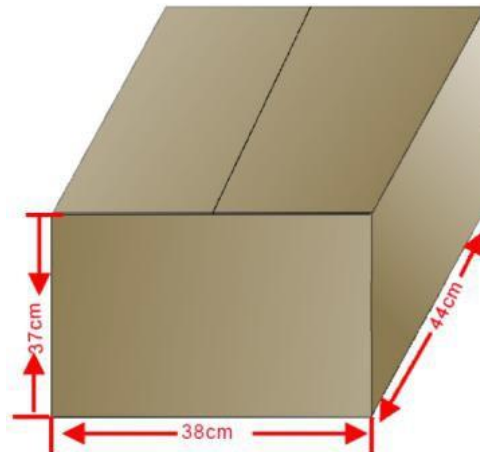
9-7	Low temperature start test	Leave samples in -15℃ for 4x hours	4	After test, power on and off the samples for 3x tiems, the samples should be able to start normally
9-8	High Temperature and Humidity Storage Test	Leave samples in 85℃, 95% RH @ 48 hours	4	After test, the products appearance, power, EVM and frequency error functional parameter shall be satisfied with the test specification.
9-9	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.
9-10	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.
9-11	Aging Test	60℃, 120Hrs	10	The products at high temperature for a long time can continuous work normally
9-12	Salt spray test	NSS,35℃,PH:6.5~7.2,	2	The Sample shall has no minor or major defects, such as physical damage, crack, corrosion, deformation etc;
9-13	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.

10. Package (包装)

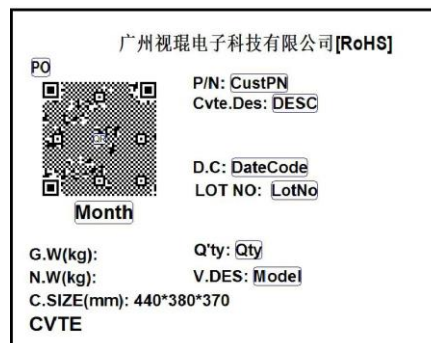
(1) 吸塑盘图纸:



(2) 外箱示意图:

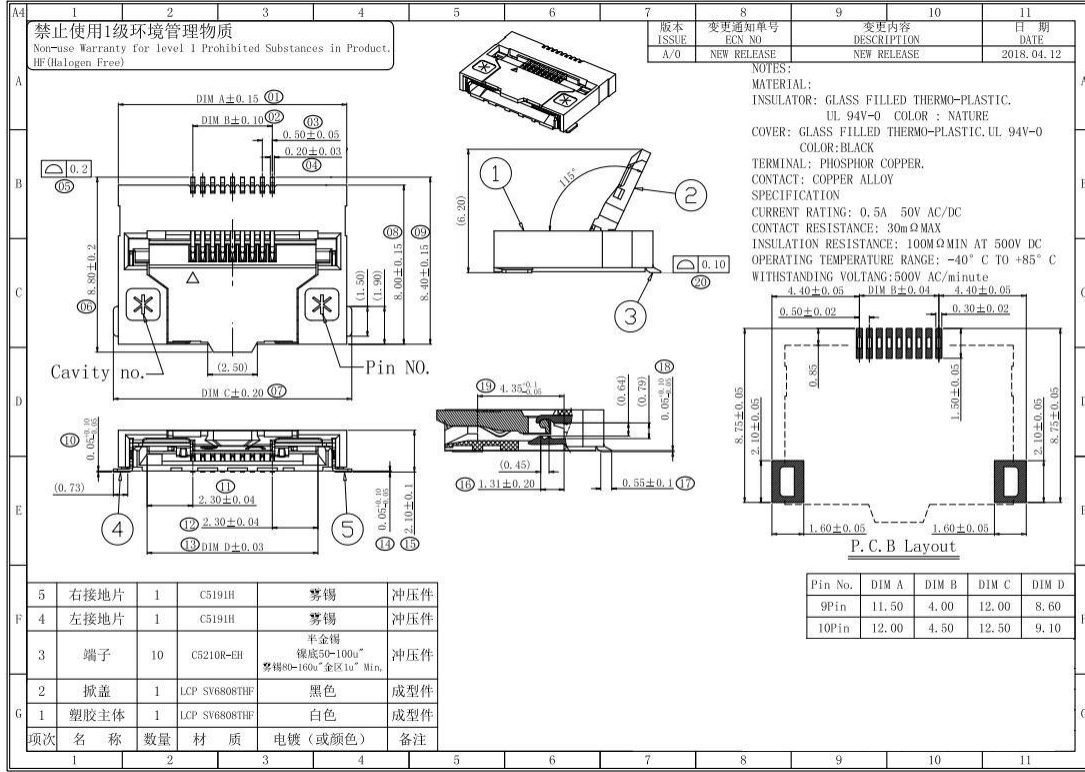


(3) 标签样式:



外箱标签示例【具体内容根据系统打印为准】

11. Socket Specification (插座规格)



12. 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.

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

CFR 47 FCC Part 15 Subpart C (15.247, DTS) has been investigated. It is applicable to the modular transmitter

This radio transmitter 2AR82-SKOW603601 has been approved by Federal Communications Commission 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.

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2412-2462	PCBA Antenna	1.54
2	2412-2462	PCBA Antenna	1.72

13. 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-SKOW603601 ” 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-SKOW603601 » 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 et la conformité à l'exposition de RSS-102 rf, utilisateurs peut obtenir l'information canadienne sur l'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 ou émetteur. Cet équipement devrait être installé et actionné avec une distance minimum de 20 centimètres entre le radiateur et votre corps.

the required impedance for each antenna type : 50 ohm

l'impédance requise pour chaque type d'antenne : 50ohm

Frequency (MHz) fréquences	Antenna Type types d'antenne	Antenna Gain (dBi) Gain maximal d'antenne
2412-2472	Metal Antenna	1.54
2412-2472	Metal Antenna	1.72

4. 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, ICES003.

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

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

This modular transmitter is only FCC authorized for the specific rule parts (47CFR Part 15.247)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.

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-SKOW603601, IC: 24728-SKOW603601

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-SKOW603601, IC: 24728-SKOW603601