

1. Introduction (简介)

SKO.W7603.2 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.

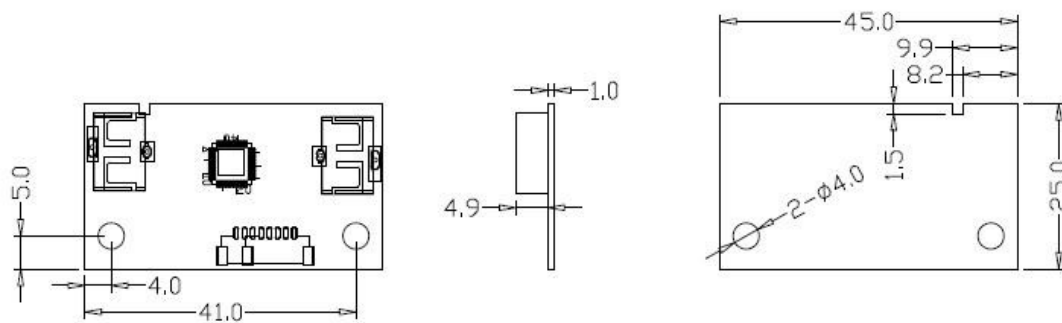
SKO.W7603.2 模块基于 MEDIATEK MT7603U 解决方案。MT7603U 是一款高度集成的 Wi-Fi 芯片，支持 300 Mbps 的物理速率。方案符合 IEEE 802.11n 和 IEEE 802.11 b/g 标准，以高标准提供功能丰富的无线连接，并在远距离提供可靠、经济高效的吞吐量。本文件描述了工程需求规范。

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	45.0mm*25.0mm*5.9mm

型号(model)	安装方式 (installation method)	支持标准 (supporting standards)	频段 (frequency)	天线接口 (antenna port)	备注(remark)
SKO.W7603.2	SMD	IEEE 802.11b/g/n	2.4GHz	邮票孔	45.0mm*25.0mm* 5.9mm

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



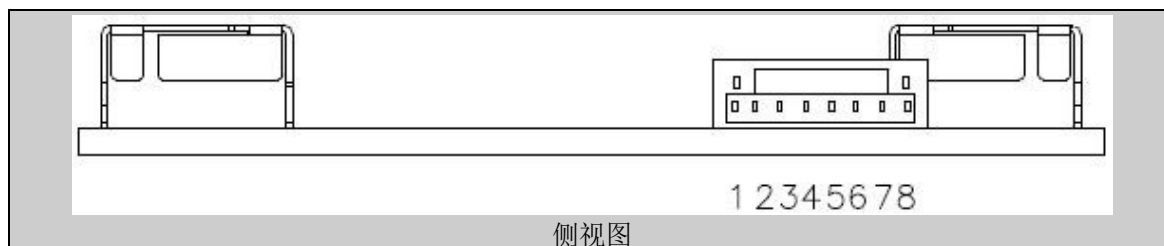
模组主视图

模组侧视图

模组后视图

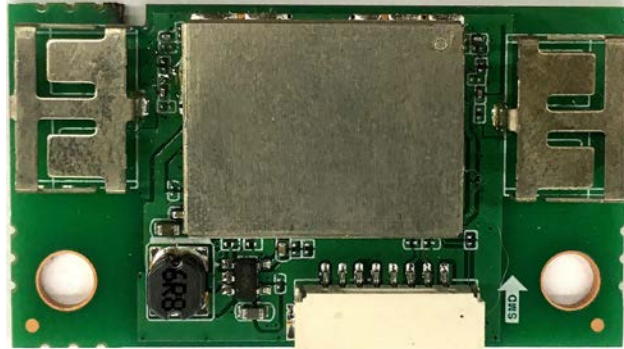
注意: 1单位为mm
2模组外形尺寸公差为0.2mm, 板厚以及未标注公差为0.1mm

4. Pin Definition (引脚定义)



PIN	SYMBOL	DESCRIPTION
1	NC	NC\不使用
2	GND	Connected to Ground\连接到地
3	Wake	WiFi wake host\WiFi 唤醒主机, 模组 10Kohm 上拉到 3.3V
4	RST	RST\复位
5	GND	Connected to Ground\连接到地
6	USB_DP	USB2.0 DP Signal\USB2.0 差分正电压信号
7	USB_DM	USB2.0 DM Signal\USB2.0 差分负电压信号
8	VCC	+5V DC Power supply input\+5V 直流供电输入

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 (order number)	关键件名称 (critical components)	型号 (model number)	规格/材料 (material/sp ec)	生产者 (Manufacturer)	备注 (Remark)
1	集成电路	MT7603U	48-QFN	MEDIATE K	
2	PCB	SKO.W7603.2	FR- 4,4LAY	福昌发	
3	晶体振荡器	2.3.3.400001208	40MHZ	明德亨 (MDH)	

7. General Requirements (一般要求)

No.	Feature	Description
7-1	Operation Voltage 工作电压范围	5V±0.5V
7-2	Current Consumption 最大电流	430mA
7-3	Ripple 纹波	≤100mV
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)

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)					
1) For Each antenna port	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	-25	-	25	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					
1) For Each antenna port	13	15	17	dBm	
2. Spectrum Mask @ target power					
1) at fc +/-11MHz	-	-	-20	dB	
2) at fc +/-20MHz	-	-	-28	dB	
3) at fc > +/-30MHz	-	-	-40	dB	
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	-25	-	25	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

Items	Contents
Specification	IEEE802.11n 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	
2. Power Levels					
1) For Each antenna port	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	-25	-	25	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

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				
	Min.	Typ.	Max.	Unit	Remark
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels (Calibrated)					
1) For Each antenna port	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	

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 Drop time: 1 each Face and edge.	1xBox	After drop test, the outer box and inner box will not be broken by appearance visual inspection.
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	3	After test, the Appearance, Power EVM and Frequency error shall be satisfied with the specification.

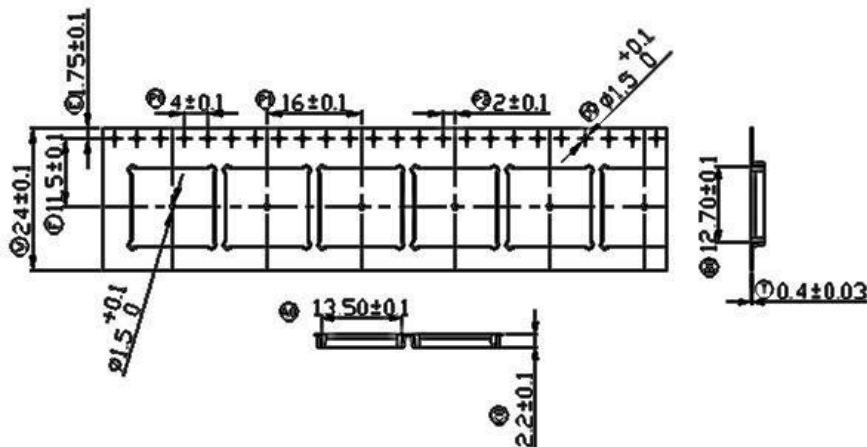
		30Hz to 55 Hz to 30 Hz, amplitude 0.15mm, 5 time vibration.		
10-3	Impact test	Impact acceleration: 50m/sec ² ; Impact duration: 16ms; Impact times: 1000.	3	After test, the Appearance, Power EVM and Frequency error shall be satisfied with the specification.
10-4	Soldering ability test	Soldering temperature: 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.

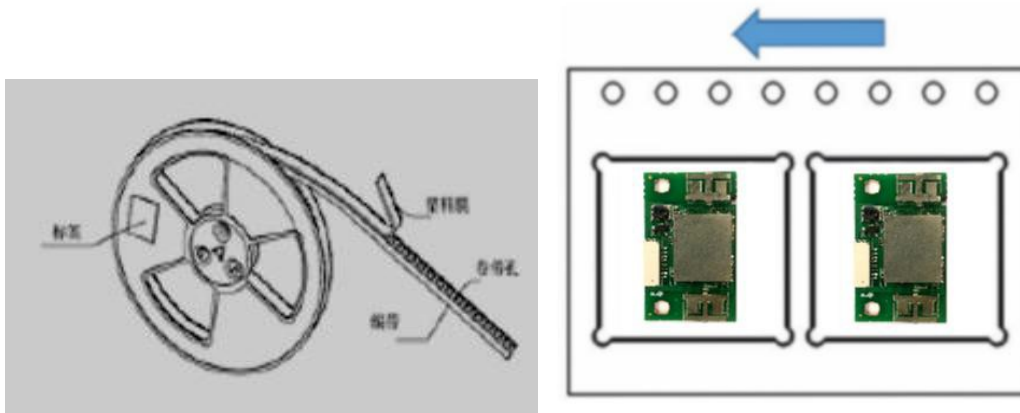
10-10	Temperature circle test	One cycle duration -10±3℃@3H 40±3℃ @3H Total cycle: 10x	3	After test, leave the samples in standard condition and tested Power EVM and Frequency error shall be qualified and all the characters shall be satisfied with the test specification.
10-11	Continuous TP test	Twice 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 Positive 10 times 1 time for each second	3	The products can recoverable smoothly after ESD test.

10. Package (包装)

(1) Dimensions:



(2) Direction: (Arrows represent the direction of the ribbon)



(3) Diagram:



Note: The red arrow is the label position of the carton

(4) Carton label:



11. Software Requirements (软件要求)

The driver supports the following operating systems: Microsoft Windows XP, Vista and Win7.
驱动程序支持以下操作系统：微软 Windows XP, Vista 和 win7。

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.

OEM instructions for Installation of Module FCC KDB 996369 D04

This module is for installation by OEM and system integrator only, it must not be sold for end-user integration.

This module complies with CFR 47 FCC PART 15 SUBPART C 15.247 rules as a modular transmitter.

This radio transmitter 2AR82-SKOW7603201 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.

Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
2412-2462	PIFA metal antenna	2.24
2412-2462	PIFA metal antenna	2.24

The module may only be installed 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 information the host product manufacturer must provide to end users in their end-product manual includes the FCC Part 15 compliance statements related to the transmitter as show in this manual.

The modular transmitter is only FCC authorized for the transmitter-specific rule parts. 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

Must have on the host device a label showing *Contains FCC ID:2AR82-SKOW7603201*

This module is approved as a stand-alone module. If the end product will include multiple, simultaneously transmitting transmitters or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer must consult with module manufacturer for the installation method in end system.

It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emission limits or band edge limit. If the host product manufacturer finds during these investigative measurements that the transmitter emissions from their product are high and likely to exceed the limit, it may be necessary for the host product manufacturer to work with the module manufacturer to consider more thorough investigation and mitigation measures.

If the host product manufacturer does find the composite system (host product and modular transmitter) does exceed the spurious emission or output power limit. It is the responsibility of the host product manufacturer not to market the product in the U.S.

Please check for KDB Publication 996369 D04 Module Integration Guide for detail.

l'hôte doit utiliser l'instrument uniquement dans des appareils qui répondent à la fac de l'exposition aux rf catégorie de 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 et les déclarations de conformité doit inclure la partie 15 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

accueillir le fabricant est fortement recommandé de confirmer la conformité avec les exigences de l'émetteur de fac quand le module est installé dans l'hôte.

le dispositif d'accueil doivent avoir une étiquette indiquant contient 2AR82-skow7603201 fac id:

l'emploi condition limitations s'étendent aux utilisateurs professionnels, des instructions doivent préciser que cette information s'étend également aux instructions du manuel du fabricant de d'accueil.

ce module est autonome modulaire.si le produit final comprendra les multiples simultanément transmettant ou différentes conditions opérationnelles pour un émetteur autonome un modulaire hôte, fabricant à consulter fabricant du module pour la méthode d'installation en fin.