

SPECIFICATION

## 产品规格书

# **SKO.W603.5<002.029.0000260>**

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

CVTE 型号	TCL 料号	认证类型	认证编号	认证到期时间	备注
SKO.W603.5	待确认	待补充	暂无	暂无	

<b>Approved by Shikun</b>		
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。

<b>Approved by customer</b>		
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	2020.08.14	SKO.W603.5 B20161	All	First Issued.	

## Content

1. Introduction (简介) .....	1
2. FEATURES (特性) .....	1
3. Block Diagram (结构框图) .....	1
4. Package Outline and Mounting (外形及安装尺寸) .....	2
5. Pin Definition (引脚定义) .....	2
6. Product Pictures (示意图片) .....	3
7. Materials BOM (物料 BOM) .....	4
8. General Requirements (一般要求) .....	4
9. Electrical Characteristics (电气特性) .....	4
9.1 IEEE 802.11b Section .....	5
9.2 IEEE 802.11g Section .....	5
9.3 IEEE 802.11n HT20 Section .....	6
9.4 IEEE 802.11n HT40 Section .....	7
10. Software Requirements (软件要求) .....	8

## 1. Introduction (简介)

SKO.W603.5 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.W603.5 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。

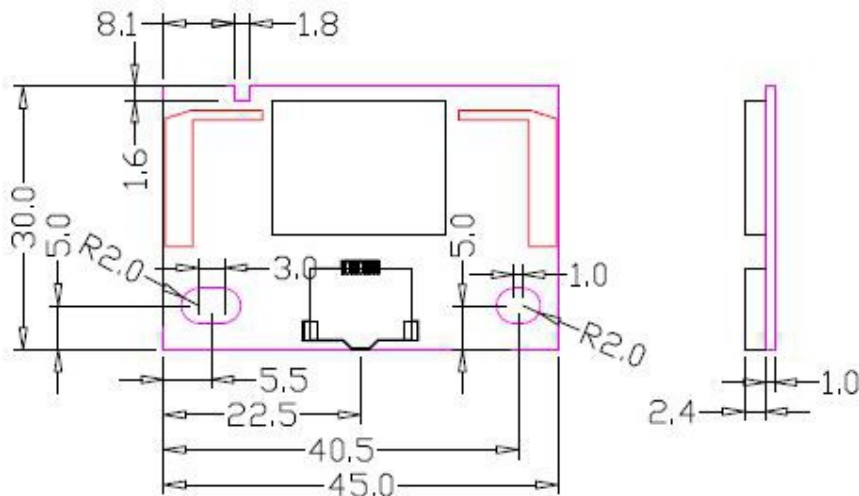
## 2. FEATURES (特性)

<b>Reserving System</b> 接收制式	IEEE Std. 802.11b
	IEEE Std. 802.11g
	IEEE Std. 802.11n
<b>Chip Solution</b> 芯片方案	MT7603U
<b>Band</b> 波段	2.4GHz
<b>Dimensions</b> 尺寸	45.0mm*30.0mm*3.4mm

<b>Model</b> 型号	<b>Installation Mode</b> 安装方式	<b>Radio Technology</b> 支持标准	<b>Operation Frequency</b> 频段	<b>Antenna Port</b> 天线接口	<b>Remark</b> 备注
SKO.W603.5	外挂 Ext-WIFI	IEEE 802.11b/g/n	2.4GHz	板载PCB 天线 On-board PCB Antenna	45.0mm*30.0m m*3.4mm

## 3. Block Diagram (结构框图)

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



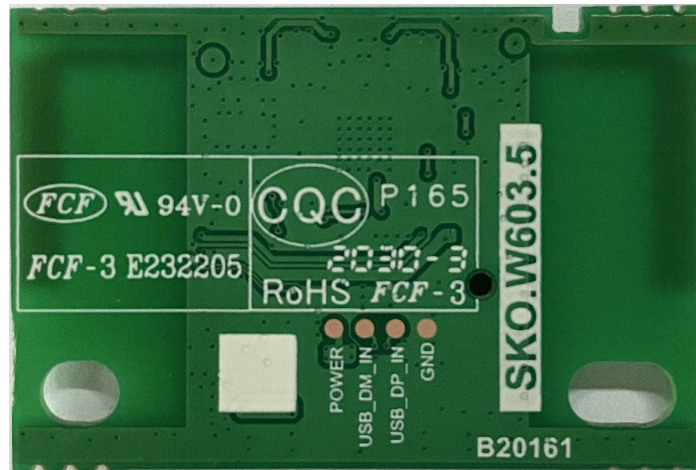
## 5. Pin Definition (引脚定义)

PIN	SYMBOL	DESCRIPTION
1	GND	Connected to Ground\连接到地
2	USB_DP	USB2.0 DP Signal\USB2.0 差分正电压信号
3	USB_DM	USB2.0 DM Signal\USB2.0 差分负电压信号
4/5/6	3.3V	VDD 3.3V\+3.3V 直流供电输入
7	WoWLAN	Wake on Wireless LAN (内有 10K 电阻到 3.3V 上拉, 低电平有效)
8	RESET	RESET\复位脚 (内有 10K 电阻到 3.3V 上拉, 低电平有效)
9	GND	Connected to Ground\连接到地

## 6. Product Pictures (示意图片)



正视图 (top view)



背视图 (bottom view)



铭牌内容 (Nameplate content)

## 7. Materials BOM (物料BOM)

Número	Componentes clave	Modelo	Especificaciones	Observación
1	Circuito integrado	MT7603U	48-QFN	--
2	PCB	SKO.W603.5	FR-4,2LAY	--
3	Oscilador de cristal	2.3.3.400001208	40MHz	--

## 8. General Requirements (一般要求)

No.	Feature	Description
8-1	Operation Voltage 工作电压范围	3.3V±0.3V
8-2	Current Consumption 最大电流	430mA
8-3	Ripple 纹波	≤100mV
8-4	Operation Temperature 工作温度范围	0°C to +40°C
8-5	Antenna Type 天线类型	Internal 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)

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

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

Power supply voltages: 3.3V (±0.3V) 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℃±5℃；

电源电压：模块上输入电压 3.3V（±0.3V）

## 9.1 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	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	

## 9.2 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	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 ≤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	

### 9.3 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	11	13	15	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	-20	-	20	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	

## 9.4 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	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	

## 10. 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 Window

## 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.

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.

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-SKOW603501 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	1.38
2	2412-2462	PCBA Antenna	1.43

## 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-SKOW603501” 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-SKOW603501 » 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

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2412-2462	PCBA Antenna	1.38
2	2412-2462	PCBA Antenna	1.43

## 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. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The end user manual shall include FCC Part 15/ISED RSS GEN compliance statements related to the transmitter as show in this manual. (FCC/ Canada Statement).

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.

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-SKOW603501 and Contains IC: 24728-SKOW603501

The use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual.

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

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-SKOW603501, d'émission IC: 24728-SKOW603501