

WF-M601-UWS2 Wireless Module

IEEE 802.11b/g/n 1T1R USB WiFi Module

Features:

- **Reserving System**
IEEE Std. 802.11b
IEEE Std. 802.11g
IEEE Std. 802.11n
- **Chip Solution**
WIFI : MTK MT7601UN/B
- **Size**
28.0mm*16.0mm*6.0mm

Model Overview:

Module	Installation	Standard	Rate	Band	Power Supply
WF-M601-UWS2	SMT	IEEE 802.11b/g/n	150Mbps	2.4 GHz	3.3V

Sichuan AI-Link Technology Co.,Ltd

Add: Anzhou,Industrial park,Mianyang,Sichuan

Web: www.changhong.com

Phone: 13881190925

Feedback of customer's Confirmation

We accept the specification after Confirmed

Customer name	Customer signature	Confirmation Date

Please feed back this paper and first paper after your signature by the address,thanks!

ADD: Anzhou,Industrial park,Mianyang,Sichuan

Factory: Sichuan AI-Link Technology Co.,Ltd.

Approved	Checked	Designed	Product	WiFi Module
			Model	WF-M601-UWS2
			Date	2018-03-02

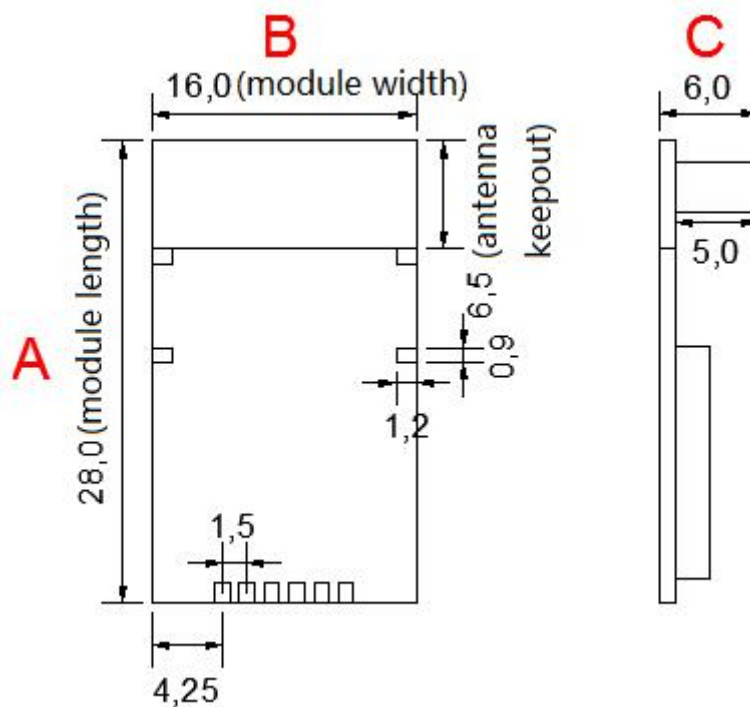
Record of Modification

No	Date of modification	Main content of modification	Reason of modification	Serial number of modification	Confirm
A	20180302	Original Release			Feng Jie

1. Brief description:

WIFI MODULE WF-M601-UWS2 is based on MTK MT7601UN/B complied with IEEE 802.11b/g/n standard from 2.4GHz-2.5GHz. Supported for 150Mbps high speed wireless network connection.

2. Package outline and Mounting:

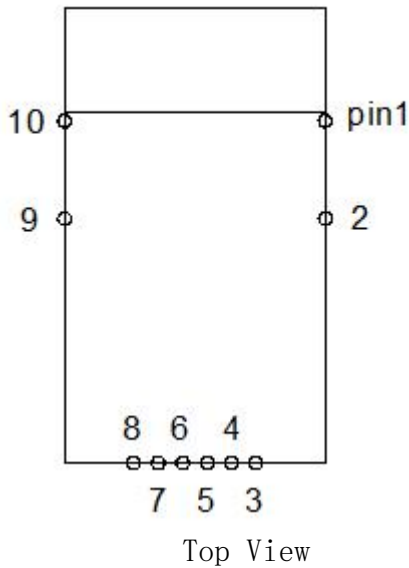


Bottom View

Side View

NOTE1: General tolerance $\pm 0.2\text{mm}$ unless otherwise stated

3. Pin Definition:



Pin	Symbol	Description
1、 2、 5	GND	Connected to Ground
3	WOW	Wake WLAN
4	RST	Reset the WLAN
6	D+	USB Data DP
7	D-	USB Data DN
8	VDD	+3.3V DC Power supply input
9、 10	GND	Connected to Ground

Pin Definition

4. Product Picture



TOP VIEW



BOTTOM VIEW

Silkscreen Description:

- 1.The characters in the red block are PCB P/N;
- 2.The characters in the green block are PCB flame retardant grade;
- 3.The characters in the yellow block are PCB batch number;

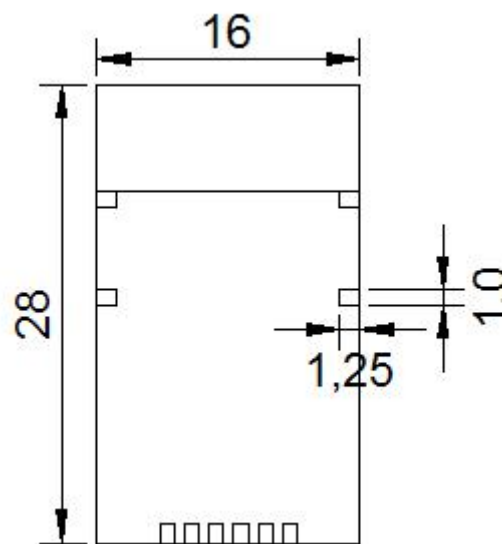
5. Key Materials:

Item	Sorts	MPN	Description	MFR	Notes
1	IC	MT7601UN/B	40-QFN	MTK	
2	PCB	JUI7.820.0295	FR-4,2LAY	Sunlodrd IQPCB SHPCB	
3	Crystal	E3SB40E00001BE	40M	JWT Hosonic H.ELE.	

6. General Requirements:

No.	Feature	Description
7-1	Operation Voltage	3.3V+/-0.3
7-2	Current Consumption	Total 3.3V@Max 410mA BW 40 MHZ@13dbm
7-3	Operation Temperature	0°C to +60°C
7-4	Antenna Type	Integral antenna
7-5	USB	High Speed USB 2.0 Interface
7-6	Storage Temperature	-25°C to +85°C

7. Recommend Layout: (unit: mm)



8. Electrical Characteristics:

8-1 IEEE 802.11b Section:

Items	Contents				
Specification	IEEE802.11b				
Mode	CCK				
Channel	CH1 to CH13				
Data rate	1, 2, 5.5, 11Mbps				
	Min.	Typ.	Max.	Unit	Remark
TX Characteristics					
1. Power Levels(Calibrated)					
1) For Each antenna port	15.5	17	18.5	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	-5	10	ppm	
RX Characteristics					
5 Minimum Input Level Sensitivity(each chain)					
1) 1Mbps (FER $\leq$ 8%)	-		-83	dBm	
2) 2Mbps (FER $\leq$ 8%)	-		-80	dBm	
3) 5.5Mbps (FER $\leq$ 8%)	-		-79	dBm	
4) 11Mbps (FER $\leq$ 8%)	-		-76	dBm	
6 Maximum Input Level (FER $\leq$ 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				
	Min.	Typ.	Max.	Unit	Remark
TX Characteristics					
1. Power Levels					
1) For Each antenna port	13.5	15	16.5	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	-5	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:

Items	Contents				
Specification	IEEE802.11n HT20 @ 2.4GHz				
Mode	OFDM				
Channel	CH1 to CH13				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15				
	Min.	Typ.	Max.	Unit	Remark
TX Characteristics	Min.	Typ.	Max.	Unit	
2. Power Levels					
1) For Each antenna port	13.5	15	16.5	dBm	
3. Spectrum Mask @14.5dBm					
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 $\leq$ 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	

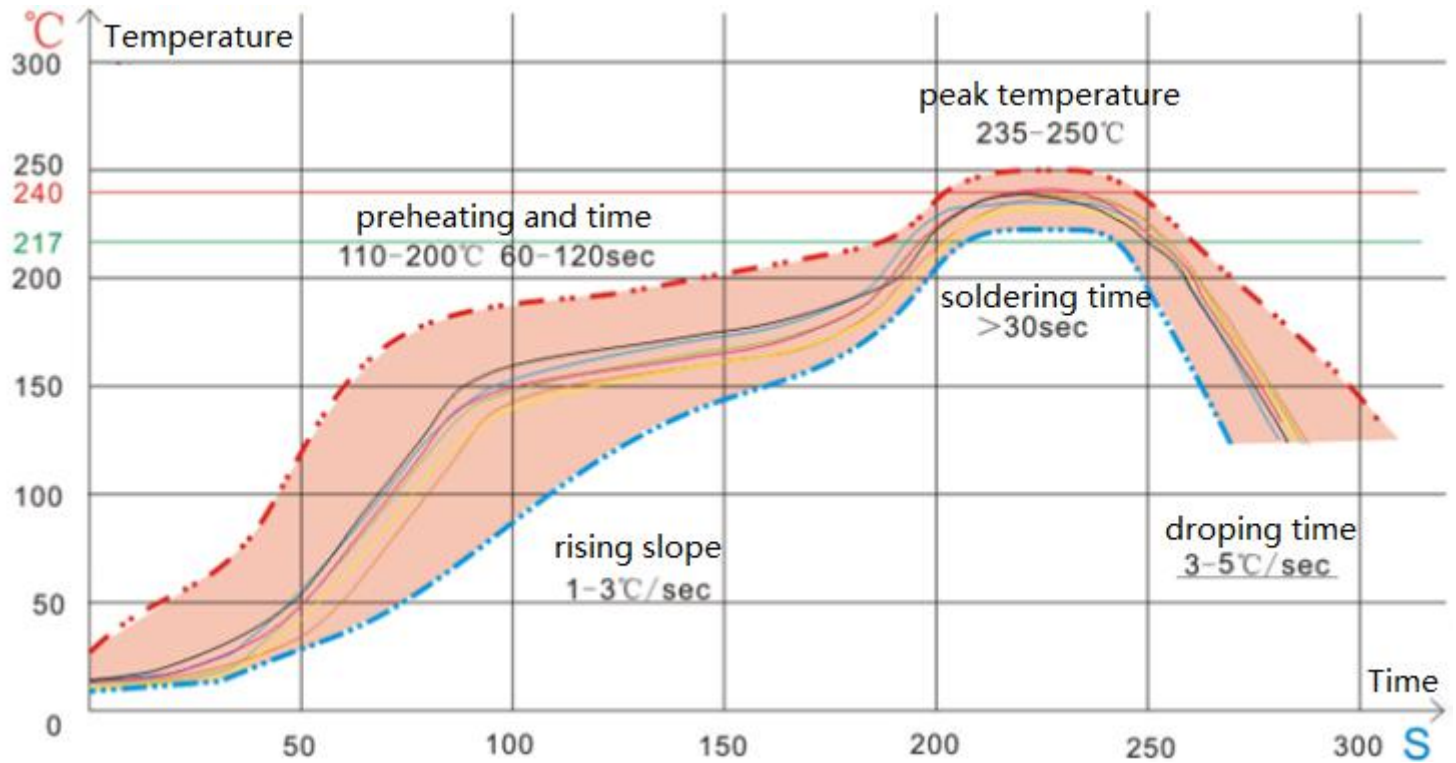
8-4 IEEE 802.11n HT40 Section:

Items	Contents				
Specification	IEEE802.11n HT40 @ 2.4GHz				
Mode	OFDM				
Channel	CH3 to CH11				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15				
	Min.	Typ.	Max.	Unit	Remark
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels (Calibrated)					
1) For Each antenna port	13.5	15	16.5	dBm	
2. Spectrum Mask @13dBm					
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	-10	-5	10	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. Software Requirements

The driver supports the following operating systems: Linux, Microsoft Windows XP, Vista and Win7.
Mfg. software tool version is MT7601 USB QA V1.0.9.0 or later.

10. Refelow Standard Condition



11. Mechanical, Environmental and Reliability Tests

Test Items		Test Conditions	Qty	Criteria Condition
4-1	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 been broken by appearance visual inspection.
4-2	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.
4-3	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.

4-4	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.
4-5	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.
4-6	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.
4-7	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.
4-8	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.
4-9	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.
4-10	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.
4-11	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.
4-12	ESD	Discharge voltage: 2kV C: 150pF Discharge resistance: 330Ω Positive 10 times 1 time for each second	3	The products can recoverable smoothly after ESD test.

12、Statement

12.1 CE Radiation Exposure Statement

Herby,Sichuan AI-Link Technology CO.,Ltd declares that this Wireless Module, WF-M601-UWS2 is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

In accordance with Article 10(2) and Article 10(10), this product allowed to be used in all EU member states.

Operation temperature:Use the WF-M601-UWS2 in the environment with the temperature between 0℃ and 60℃.

Operation Frequency:2412~2472MHz.

MAX RF Output Power:20dBm.

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12.2 FCC Statement

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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

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.

FCC 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 minimum distance 20cm between the radiator & your body.

OEM INTEGRATION INSTRUCTIONS:

This device is intended only for OEM integrators under the following conditions:

The module must be installed in the host equipment such that 20 cm is maintained between the antenna and users, and the transmitter module may not be co-located with any other transmitter or antenna. The module shall be only used with the internal on-board antenna that has been originally tested and certified with this module. External antennas are not supported. As long as these 3 conditions above are met, further transmitter test will not be required.

However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.). The end-product may need Verification testing, Declaration of Conformity testing, a Permissive Class II Change or new Certification. Please involve a FCC certification specialist in order to determine what will be exactly applicable for the end-product.

Validity of using the module certification:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization. In such cases, please involve a FCC certification specialist in order to determine if a Permissive Class II Change or new Certification is required.

Upgrade Firmware:

The software provided for firmware upgrade will not be capable to affect any RF parameters as certified for the FCC for this module, in order to prevent compliance issues.

End product labeling:

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: 2AOKI-WFM601UWS2".

Information that must be placed in the end user manual:

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.