

WF-M603-UWS2

Wireless Module

Features:

- **Supported WLAN Standard**
IEEE Std. 802.11b
IEEE Std. 802.11g
IEEE Std. 802.11n
- **Chip Solution**
Mediatek MT7603U
- **Size**
40mm*33mm*5.5mm



Model Overview:

Model	Standard	Rate	Band	Ant	Power
WF-M603-UWS2	IEEE 802.11b/g/n	300Mbps	2.4G	Internal Antennas	5V

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Record of Modification

Version	Date of modification	Main content of modification	Reason of modification	Serial number of modification	Confirm
V1.0	2018/11/24	First release			Huang Wei

1. Introduction

WF-M603-UWS2 module design is based on Mediatek MT7603U solution, The MT7603U is a highly integrated single chip which has built in a 2x2 dual-band wireless LAN radio. The Module is a highly integrated MAC/BBP and 2.4 PA/LNA single chip which supports a 300Mbps PHY rate. The Module is designed to support standard-based features in the areas of security, quality of service, and international regulations, giving end users the greatest performance anytime and in any circumstance. This documentation describes the engineering requirements specification.

1.1 RF module Overview

The general HW architecture for the module is shown in Figure 1. This WLAN Module design is based on Mediatek MT7603U. It is a highly integrated single-chip MIMO(Multiple In Multiple Out) Wireless LAN (WLAN) network interface controller complying with the 802.11 specification over USB interface. It combines a MAC, a 2T2R capable baseband, and RF in a single chip. An intelligent Wi-Fi coexistence algorithm is implemented to provide the best harmonized Wi-Fi radio performance.

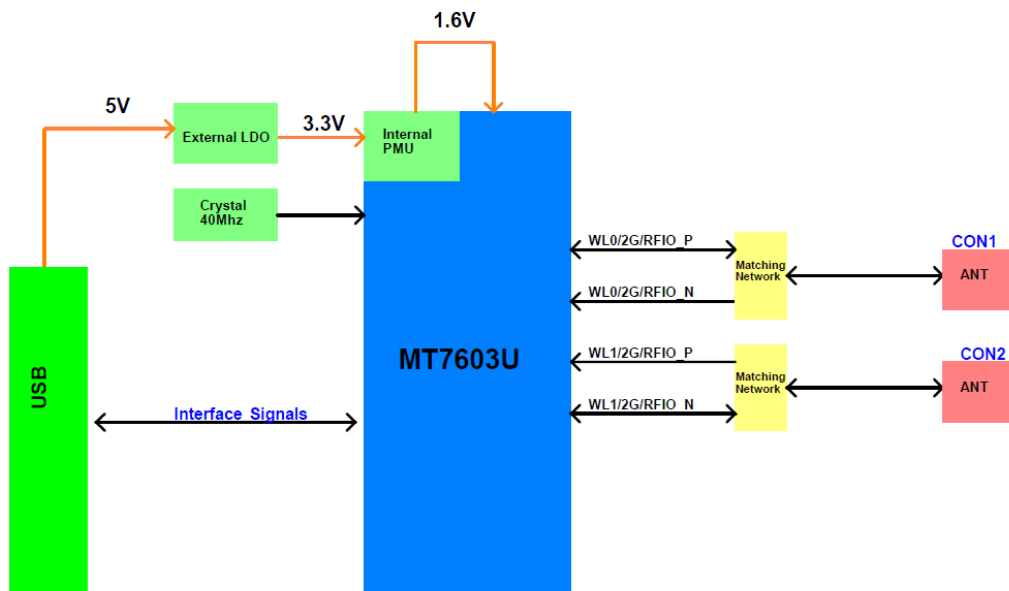


Figure 1 WF-M603-UWS2 Block Diagram

1.2 Specification reference

This specification is based on additional references listed below.

- _ IEEE Std. 802.11b
- _ IEEE Std. 802.11g
- _ IEEE Std. 802.11n

1.3 System Functions

Table1: General Specification as below:

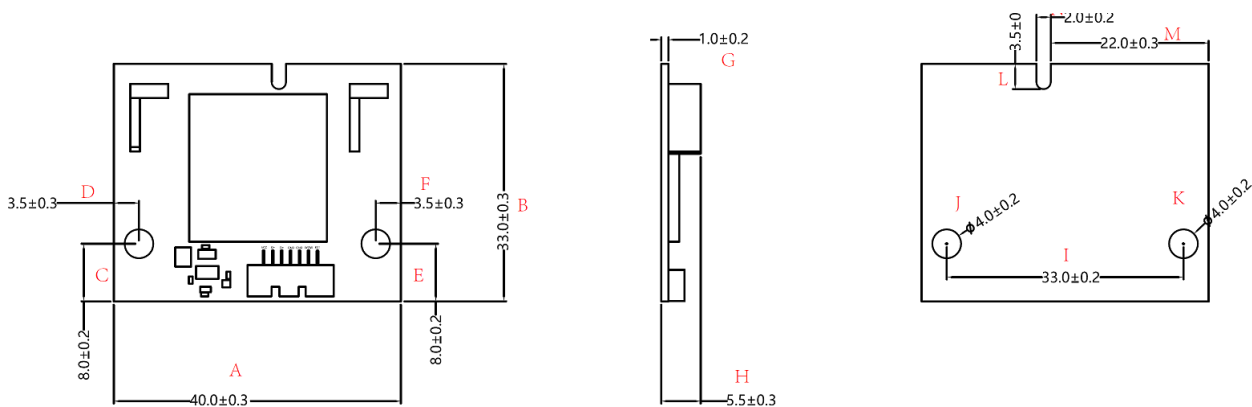
Main Chipset	Mediatek MT7603U
Operating Frequency	2.4G
WiFi Standard	802.11 b/g/n
Modulation	WIFI:11b: DBPSK, DQPSK and CCK and DSSS 11g: BPSK, QPSK, 16QAM, 64QAM and OFDM 11n: BPSK, QPSK, 16QAM, 64QAM and OFDM
Data rates	11b: 1, 2, 5.5 and 11Mbps 11g: 6, 9, 12, 18, 24, 36, 48 and 54 Mbps 11n: MCS0~15, up to 300Mbps
Form factor	7pins
Host Interface	USB 2.0
PCB Stack	2-layers design
Dimension	Typical, 40mm x 33mm x 5.5mm
Antenna	Integral Antennas Design , peak gain: 2dBi
Operation Temperature	-10℃ to +60℃
Storage Temperature	-40℃ to +125℃
Operation Voltage	5V +/-5%
Current Consumption	410mA

2. Mechanical Specification

2.1 Mechanical Outline Drawing

Typical Dimension (W x L): 40.0mmx 33.0mm x 5.5mm

General tolerance: $\pm 0.2\text{mm}$



2.2 Product Picture



Top view



bot view

2.3 Pin define



Pin	Define
1	5V
2	DN
3	DP
4	GND
5	GND
6	WOW
7	RESET

3. Electrical Specification

This Specification is based-on conductive DVT testing result. The extreme condition include overall temperature (0°C,+25°C,+40°C) and overall voltage (4.75V,5V,5.25V).

3. 1 IEEE 802.11g/a Section:

Items	Contents				
Specification	IEEE802.11g				
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH1 to CH13 @ 11g				
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels					
15dBm Target (For Each antenna port) @ 11g/6Mbps~54Mbps	11	13	15	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					
1) IEEE802.11g	-15	-	15	ppm	
2) IEEE802.11a	-15		15	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5. Minimum Input Level Sensitivity(each chain)					
1) 6Mbps (PER ≤ 10%)	-	-	-82	dBm	
2) 9Mbps (PER ≤ 10%)	-	-	-81	dBm	
3) 12Mbps (PER ≤ 10%)	-	-	-79	dBm	
4) 18Mbps (PER ≤ 10%)	-	-	-77	dBm	
5) 24Mbps (PER ≤ 10%)	-	-	-74	dBm	
6) 36Mbps (PER ≤ 10%)	-	-	-70	dBm	
7) 48Mbps (PER ≤ 10%)	-	-	-66	dBm	
8) 54Mbps (PER ≤ 10%)	-	-	-65	dBm	
6. Maximum Input Level (PER ≤ 10%)					
1) IEEE802.11g	-20	-	-	dBm	
2) IEEE802.11a	-30			dBm	

3.2 IEEE 802.11b Section:

Items	Contents				
Specification	IEEE802.11b				
Mode	DBPSK, DQPSK and CCK and DSSS				
Channel	CH1 to CH13				
Data rate	1, 2, 5.5, 11Mbps				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels(Calibrated)					
1) 17dBm Target (For Each antenna port) @1Mbps~11Mbps	13	15	17	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	-	-20	-10	dB	
4. Frequency Error	-15	-	15	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5. Minimum Input Level Sensitivity(each chain)					
1) 1Mbps (FER $\leq$ 8%)	-	-83	-76	dBm	
2) 2Mbps (FER $\leq$ 8%)	-	-80	-76	dBm	
3) 5.5Mbps (FER $\leq$ 8%)	-	-79	-76	dBm	
4) 11Mbps (FER $\leq$ 8%)	-	-76	-76	dBm	
6. Maximum Input Level (FER $\leq$ 8%)	-10	-	-	dBm	

3.3 IEEE 802.11n HT20 Section:

Items	Contents				
Specification	IEEE802.11n HT20 @ 2.4G				
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH1 to CH13 @ 2.4G				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels					
1) 15dBm Target (For Each antenna port) @ 2.4G/MCS0~MCS7	10	12	14	dBm	
2. Spectrum Mask @ Target Power					
1) at fc +/-11MHz	-	-	-20	dB	
2) at fc +/-20MHz	-	-	-28	dB	
3) at fc > +/-30MHz	-	-	-45	dB	
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					
1) IEEE802.11n HT20 @ 2.4G	-15	-	15	ppm	
2) IEEE802.11n HT20 @ 5G	-15	-	15	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%)					
1) IEEE802.11n HT20 @ 2.4G	-20	-	-	dBm	
2) IEEE802.11n HT20 @ 5G	-30	-	-	dBm	

3.4 IEEE 802.11n HT40 Section:

Items	Contents				
Specification	IEEE802.11n HT20 @ 2.4G				
Mode	BPSK, QPSK, 16QAM, 64QAM and OFDM				
Channel	CH3 to CH11 @ 2.4G				
Data rate (MCS index)	MCS0/1/2/3/4/5/6/7/8/9/10/11/12/13/14/15				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels (Calibrated)					
1) 14dBm Target (For Each antenna port) @ 2.4G/MCS0~MCS7	10	12	14	dBm	
2. Spectrum Mask @ Target Power					
1) at fc +/-21MHz	-	-	-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					
1) IEEE802.11n HT20 @ 2.4G	-15	-	15	ppm	
2) IEEE802.11n HT20 @ 5G	-15	-	15	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%)					
1) IEEE802.11n HT20 @ 2.4G	-20	-	-	dBm	
2) IEEE802.11n HT20 @ 5G	-30	-	-	dBm	

4. Software Requirements

The driver supports the following operating systems: Linux, Microsoft Windows XP, Vista and Win7.
Mfg. software tool is MT7603U_QA_Tool.

CE statement

Herby, Sichuan AI-Link Technology Co., Ltd. declares that this Wireless Module, WF-M603-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.

Use the WF-M638-UWP1 in the environment with the temperature between 0℃ and 60℃

Operation Frequency range: 2412MHz~2472MHz (802.11b/802.11g/802.11n(HT20))

2422MHz~2462MHz (802.11n(HT40))

Max RF Output Power: 0.0356W

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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.

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

FCC Radiation Exposure Statement

The modular can be installed or integrated in mobile or fix devices only. This modular be installed in any portable device, for example, USB dongle like transmitters is forbidden. This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be collocated or operating in conjunction with antenna or transmitter. If the FCC identification 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 label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: 2AOKI-WFM603UWS2 Or Contains FCC ID: 2AOKI-WFM603UWS2 when the module is installed inside another

device, the user manual of this device must contain below warning statements; 1. 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. (2) This device must accept any interference received, including interference that may undesired operation. 2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product. This device is intended only for OEM integrators under the following conditions: 1) The antenna must be installed such that 20 cm is maintained between the antenna and user. 2) The transmitter module may not be co-located with any other transmitter or antenna. Module Antenna Type: Integral Antenna, ANT Gain: 2dBi

IC Statement

This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

The term "IC: " before the certification/registration number only signifies that the Industry Canada technical specifications were met. This product meets the applicable Industry Canada technical specifications.

Le présent appareil est conforme aux CNR d'Industrie Canada applicable aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement