



# **WMU7214**

**Wi-Fi 6/6e 802.11ax 2x2 Tri-band  
USB Module**

## **Product Datasheet**

Version: 0.1.5

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## 1 Overview

The WMU7214 is a highly integrated wireless local area network (WLAN) USB module, the module based-on Realtek RTL8852CU and that is supporting 802.11ax Wi-Fi and Bluetooth v5.3. The WMU7214 supports simultaneous operation on 2.4 GHz and 5 GHz or 2.4GHz and 6 GHz, also known as Dual Band Simultaneous (DBS).

## 2 Feature

### 2.1 WLAN

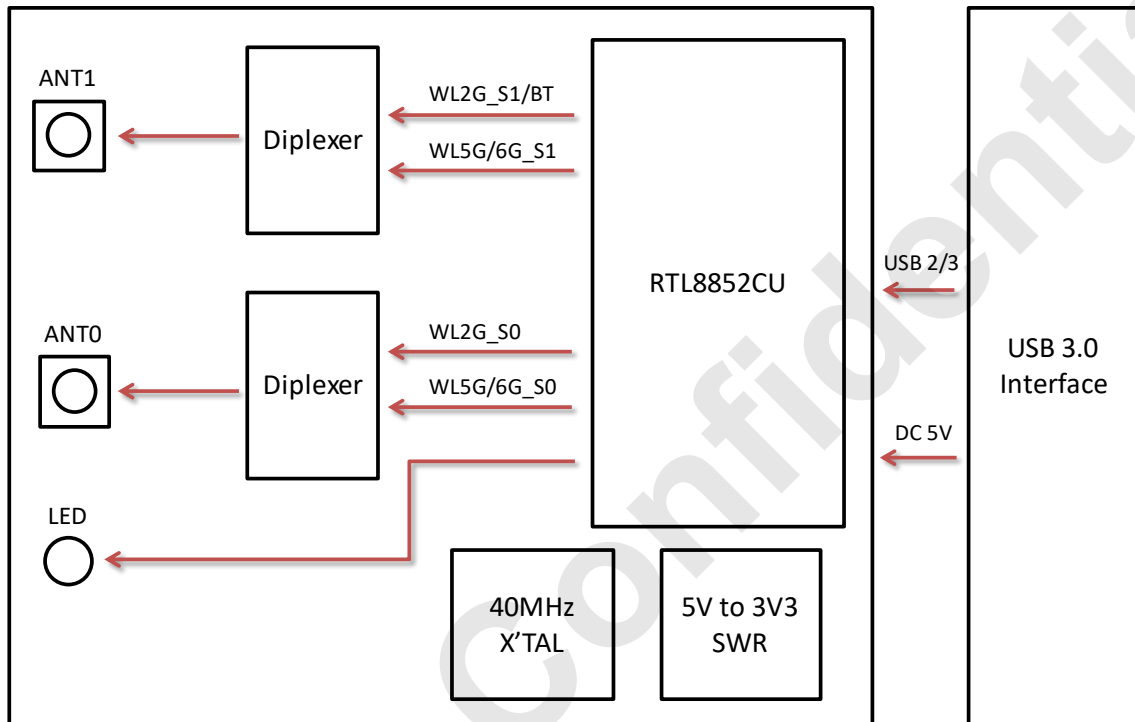
- Compliant with IEEE 802.11a/b/g/n/ac/ax
- Supports 2x2 Multi-User Multiple-Input Multiple-Output (MU-MIMO)
- Dual Band Simultaneous (DBS), up to 3.6 Gbps data rate (2x2+2x2 11ax DBS)
- Tri-band 2.4 GHz/5 GHz/6 GHz support
- 20 MHz/40 MHz channel bandwidth for 2.4 GHz
- 20 MHz/40 MHz/80 MHz/160 MHz channel bandwidth for 5 GHz/6 GHz
- Dynamic Frequency Selection (DFS, radar detection)

### 2.2 Bluetooth

- Support Bluetooth 5 system (BT 5.3 Logo Compliant)
- Compatible with Bluetooth v2.1+EDR
- Enhanced BT/WIFI Coexistence Control to improve transmission quality in different profiles

### 3 System Specification

#### 3.1 Block Diagram



#### 3.2 Chip Solution

- Realtek RTL8852CU-CG

#### 3.3 Protocol & Interface

- USB 3.0 Type-A interface for WLAN
- USB 2.0 Type-A interface for Bluetooth
- Antenna Port:  
MHF1 connector x2 for 2T2R(WMU7214-U)  
PCB Antenna x2 for 2T2R(WMU7214-P)

#### 3.4 Temperature

- Operating Temperature: -20°C to +70°C
- Storage Temperature: -40°C to +105°C

### 3.5 Humidity

- Operating Humidity (non-condensing): 5% ~ 90%
- Storage Humidity (non-condensing): 5% ~ 90%

## 4 WLAN Specification

### 4.1 WLAN Standard

- IEEE 802.11a/b/g/n/ac/ax compatible WLAN
- Support 802.11ac 2x2, Wave-2 compatible with MU-MIMO
- Support 802.11ax 2x2, with OFDMA and MU-MIMO, by 4 types PPDU format, such as HE-SU-PPDU, HE-ER-SU-PPDU, HEMU-PPDU, and HE-TB-PPDU
- Complete 802.11n MIMO solution for 2.4GHz, 5GHz and 6GHz band
- IEEE 802.11e QoS Enhancement (WMM)
- IEEE 802.11i (WPA, WPA2, WPA3). Open, shared key, and pair-wise key authentication services
- IEEE 802.11h DFS, TPC, Spectrum Measurement
- IEEE 802.11k Radio Resource Measurement
- WAPI (Wireless Authentication Privacy Infrastructure) certified.

### 4.2 Frequency Range

- Support 2.4GHz frequency range: 2412MHz ~ 2484MHz
- Support 5GHz frequency range: 5180MHz - 5850MHz
- Support 6GHz frequency range: 5925MHz - 7125MHz

### 4.3 Band Width

- 20 MHz/40 MHz channel bandwidth for 2.4 GHz
- 20 MHz/40 MHz/80 MHz/160 MHz channel bandwidth for 5 GHz/6 GHz

### 4.4 Data Rate

- 2.4GHz  
802.11n HT40 2SS: 300Mbps  
802.11ax HE40 2SS: 573Mbps
- 5GHz/6GHz  
802.11n HT40 2SS: 300Mbps  
802.11ac VHT160 2SS: 1733Mbps  
802.11ax HE160 2SS: 2402Mbps

## 4.5 Modulation

- 802.11n:  
BPSK, QPSK, 16-QAM, 64-QAM
- 802.11ac:  
BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
- 802.11ax:  
BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM

## 4.6 Software Features

Category	Description
Wi-Fi Mode	STA Mode AP Mode (Soft AP) STA + AP Mode Wi-Fi Direct Monitor Mode
Concurrent Mode	Station mode + Station mode Station mode + AP mode Station mode + P2P mode
Encryption/Decryption	WEP TKIP AES
Security Modes	Open WEP/Shared Key WPA/WPA2/WPA3

Noted: these features based on Realtek Linux driver

## 4.7 Output Power & Sensitivity

### 2.4GHz

2.4GHz 802.11b(dBm)		
Data Rate	Tx $\pm$ 2dB	Rx Sensitivity $\pm$ 2dB
1M	20.0	-98.0
11M	20.0	-89.5

2.4GHz 802.11g(dBm)		
Data Rate	Tx $\pm$ 2dB	Rx Sensitivity $\pm$ 2dB
6M	20.0	-94.5
54M	18.0	-77.0

2.4GHz 802.11n(dBm)				
Data Rate		Tx $\pm$ 2dB	Tx $\pm$ 2dB(2TX)	Rx Sensitivity $\pm$ 2dB
HT20	MCS 0	20.0	23.0	-94.5
	MCS 7	17.0	20.0	-75.0
HT40	MCS 0	20.0	23.0	-91.5
	MCS 7	17.0	20.0	-72.0

2.4GHz 802.11ax(dBm)				
Data Rate		Tx $\pm$ 2dB	Tx $\pm$ 2dB(2TX)	Rx Sensitivity $\pm$ 2dB
HE20	MCS 0	20.0	23.0	-95.5
	MCS 11	13.0	16.0	-67.5
HE40	MCS 0	20.0	23.0	-92.5
	MCS 11	13.0	16.0	-63.0

## 5GHz

5GHz 802.11a(dBm)		
Data Rate	Tx $\pm$ 2dB	Rx Sensitivity $\pm$ 2dB
6M	20.0	-93.0
54M	16.0	-76.0

5GHz 802.11n(dBm)				
Data Rate	Tx $\pm$ 2dB	Tx $\pm$ 2dB(2TX)	Rx Sensitivity $\pm$ 2dB	
HT20	MCS 0	20.0	23.0	-93.0
	MCS 7	15.0	18.0	-74.0
HT40	MCS 0	19.0	22.0	-90.0
	MCS 7	15.0	18.0	-71.5

5GHz 802.11ac(dBm)				
Data Rate	Tx $\pm$ 2dB	Tx $\pm$ 2dB(2TX)	Rx Sensitivity $\pm$ 2dB	
VHT20	MCS 0	20.0	23.0	-92.5
	MCS 8	14.0	17.0	-70.0
VHT40	MCS 0	19.0	22.0	-90.5
	MCS 9	13.0	16.0	-66.0
VHT80	MCS 0	18.0	21.0	-87.5
	MCS 9	13.0	16.0	-62.5

5GHz 802.11ax(dBm)				
Data Rate	Tx $\pm$ 2dB	Tx $\pm$ 2dB(2TX)	Rx Sensitivity $\pm$ 2dB	
HE20	MCS 0	19.0	22.0	-93.5
	MCS 11	11.0	14.0	-66.0
HE40	MCS 0	18.0	21.0	-91.0
	MCS 11	11.0	14.0	-62.0
HE80	MCS 0	17.0	20.0	-88.5
	MCS 11	11.0	14.0	-60.5
HE160	MCS 0	14.0	17.0	-86.0
	MCS 11	11.0	14.0	-56.5

## 6GHz

6GHz 802.11ax(dBm)				
Data Rate		Tx ± 2dB	Tx ± 2dB(2TX)	Rx Sensitivity ± 2dB
HE20	MCS 0	18.0	21.0	-91.0
	MCS 11	9.0	12.0	-62.0
HE40	MCS 0	17.0	20.0	-88.5
	MCS 11	9.0	12.0	-59.0
HE80	MCS 0	15.0	18.0	-86.5
	MCS 11	9.0	12.0	-58.0
HE160	MCS 0	12.0	15.0	-83.0
	MCS 11	9.0	12.0	-54.5

## 5 Bluetooth Specification

### 5.1 Bluetooth Standard

- Support Bluetooth 5system (BT 5.3 Logo Compliant)
- Compatible with Bluetooth v2.1+EDR

### 5.2 Frequency Range

- 2.4~2.4835GHz (2.4GHz ISM Band)

### 5.3 Channels

- Bluetooth Classic: Ch0~Ch78 (For 1MHz Channels)
- Bluetooth Low Energy: Ch0~Ch39 (For 2MHz Channels)

### 5.4 Data Rate & Modulation

- BR\_1Mbps: GFSK
- EDR\_2Mbps:  $\pi/4$ -DQPSK
- EDR\_3Mbps: 8DPSK
- LE\_125Kbps: GFSK (Coded\_S=8)
- LE\_500Kbps: GFSK (Coded\_S=2)
- LE\_1Mbps: GFSK (Uncoded)
- LE\_2Mbps: GFSK (Uncoded)

## 5.5 Tx Power

Items	Min (dBm)	Typ (dBm)	Max (dBm)
BR_1M	2	5	8
EDR_2/3M	2	5	8
LE_125K/500K/1M/2M 11	2	5	8

## 5.6 Rx Sensitivity

Items	Typ (dBm)	EBR
BR_1M (DH1)	-92	$\leq 0.1\%$
EDR_2M (DH1)	-90	$\leq 0.01\%$
EDR_3M (3DH5)	-80	$\leq 0.01\%$
LE_125/500K	-92	$\leq 5\%$
LE_1M	-90	$\leq 5\%$
LE_2M	-88	$\leq 5\%$

## 6 Electrical characteristics

### 6.1 Power Consumption

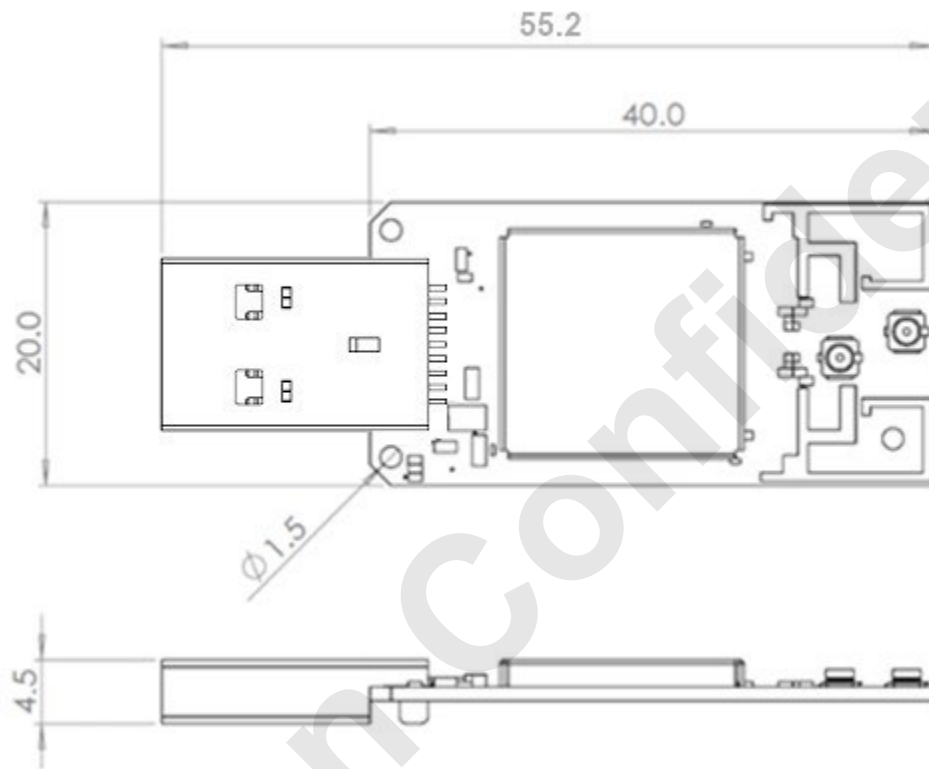
- Max Power Consumption: 5W

### 6.2 Operating Voltage

- USB 3.0 Type-A: DC 5V  $\pm 5\%$

## 7 Mechanical Specification

### 7.1 Mechanical Outline Drawing



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

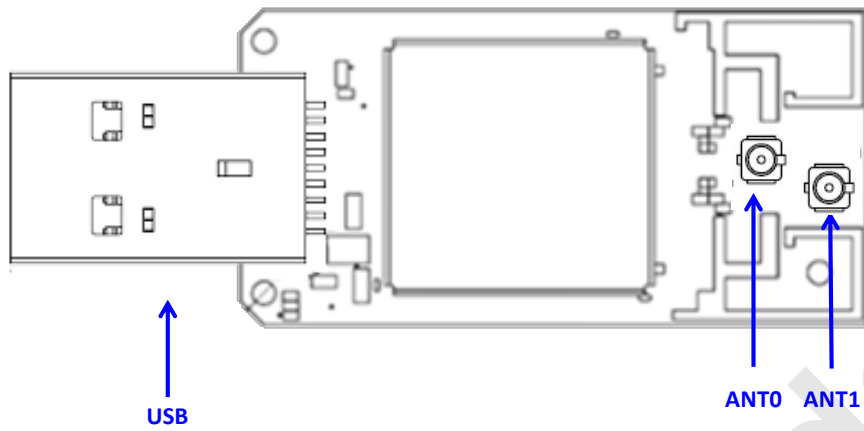
### 7.2 Interface & Dimension

- Interface: USB 3.0 Type-A
- Typical Dimension: (W)20.0mm x (L)55.2mm x (H)4.5mm

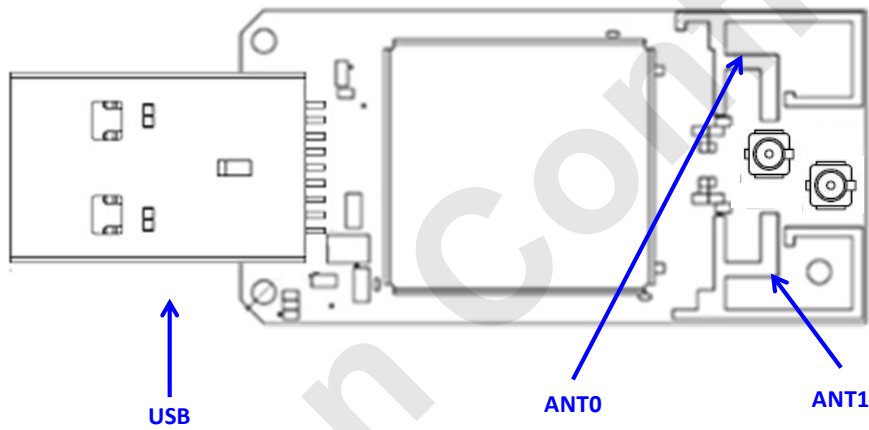
### 7.3 Weight

- Weight: 5.0g ( $\pm 0.3\text{g}$ )

## 7.4 Antenna Connector



WMU7214-U



WMU7214-P

Pin Name	Description
Ant_0	RF Antenna for WiFi 2.4GHz/5GHz/6GHz
Ant_1	RF Antenna for WiFi 2.4GHz/5GHz/6GHz and Bluetooth

## 8 Software & Driver

### 8.1 Driver Support

- Windows:  
Support Windows 10 / Windows 11 (32bit/64bit)
- Linux:  
Support kernel 3.13 ~ 6.6
- Android:  
Support Android 8 ~ 14

### 8.2 RF Tool

- RF test tool consultant service available

### 8.3 Platform Support List

- Intel x86(Verified)
- ARM/MIPS

## 9 Certification

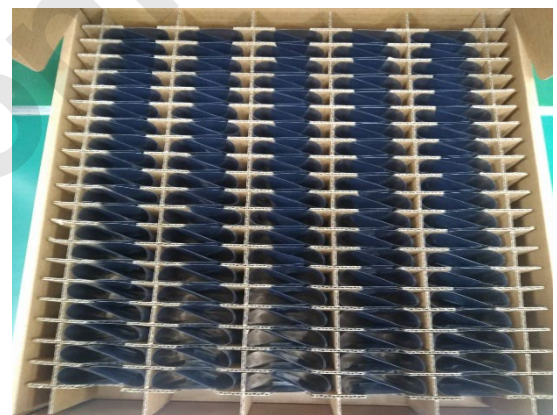
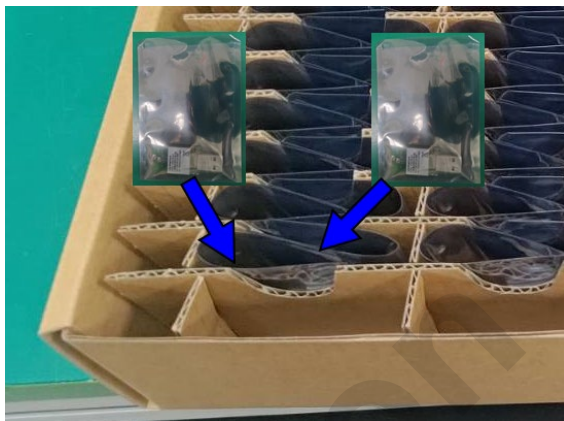
CE/FCC/IC/TELEC/NCC

## 10 Package

- One module per one static bag



- Two static bags in one lattice and 200pcs per inner box



- 5 inner boxes per 1 carton and 1000pcs per carton



## 11 Ordering Information

### 11.1 Main Parts

Part Number	Description
WMU7214-U	Wi-Fi 6/6e 802.11ax 2x2 Tri-band USB Module with MHF 1 connector
WMU7214-P	Wi-Fi 6/6e 802.11ax 2x2 Tri-band USB Module with PCB Antenna

### 11.2 Accessories

Part Number	Description
ATD7351	Monopole 3dBi Antenna for 2.4GHz/5GHz/6GHz
AC12001	Cable MHF1 to SMA, 200mm