



WMX7206

**Wi-Fi 6 802.11ax 2x2 Dual-band
Mini PCIe Module**

Product Datasheet

Version: 0.1.1

2022/11/14



Release Note

[illegible]

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1 Overview

The WMX7206 module is a highly integrated wireless local area network (WLAN) mini PCIe module, the module based-on Realtek RTL8852BE and that is supporting 802.11ax Wi-Fi and Bluetooth (BT).

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 2.4 GHz/5 GHz support
- 20 MHz/40 MHz channel bandwidth for 2.4 GHz
- 20 MHz/40 MHz/80 MHz channel bandwidth for 5 GHz
- Dynamic Frequency Selection (DFS, radar detection)

2.2 Bluetooth

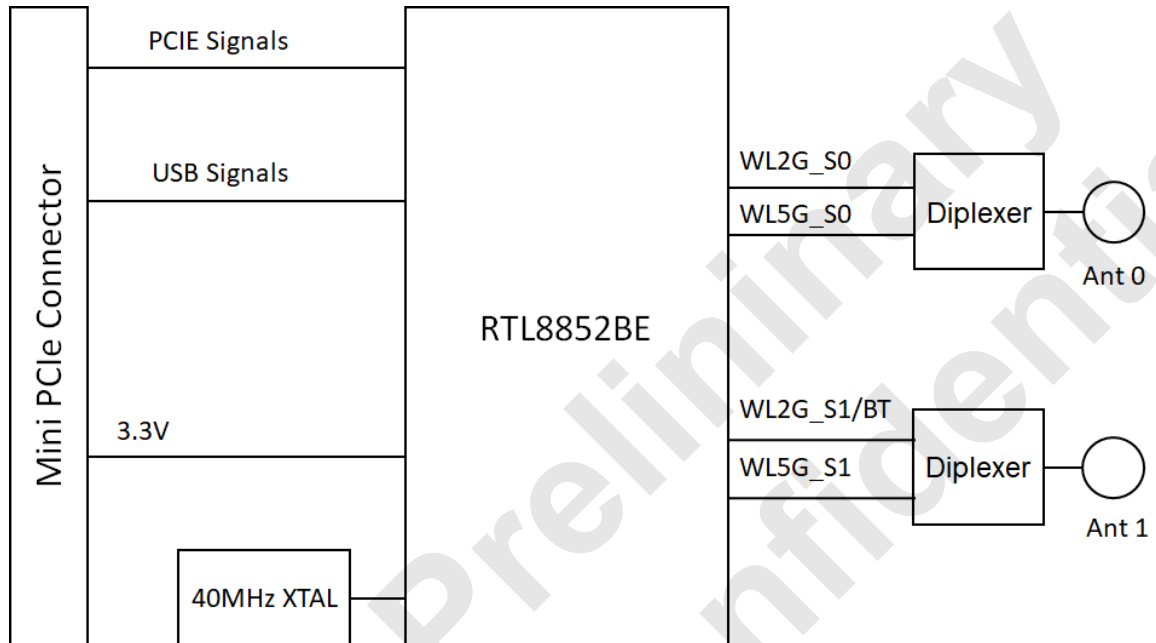
- Bluetooth V5.2, V4.2, V3.0+HS, V2.1+EDR

2.3 Security

- 802.1x, WEP, WPA TKIP and WPA2 AES/Mixed mode for PSK and TLS (Radius)
- WPA3-SAE (Personal)
- WPS - PIN and PBC Methods

3 System Specification

3.1 Block Diagram



3.2 Chip Solution

- Realtek RTL8852BE-CG

3.3 Protocol & Interface

- PCIe v2.1 interface for WLAN
- USB 2.0 interface for Bluetooth
- Antenna Port: U.FL connector x2 for 2T2R

3.4 Temperature

- Operating Temperature: -40°C to +85°C
- Storage Temperature: -40°C to +105°C

3.5 Humidity

- Operating Humidity (non-condensing): 10% ~ 95%
- Storage Humidity (non-condensing): 10% ~ 90%

4 WLAN Specification

4.1 WLAN Standard

- IEEE 802.11a/b/g/n/ac/ax

4.2 Frequency Range

- Support 2.4GHz frequency range: 2412MHz ~ 2483MHz
- Support 5GHz frequency range: 5150MHz - 5835MHz

4.3 Band Width

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

4.4 Data Rate

- 2.4GHz
802.11n HT40 2SS: 300Mbps (Maximum)
802.11ax HE40 2SS: 573Mbps (Maximum)
- 5GHz/6GHz
802.11n HT40 2SS: 300Mbps (Maximum)
802.11ac VHT80 2SS: 866.7Mbps (Maximum)
802.11ax HE80 2SS: 1201Mbps (Maximum)

4.5 Modulation

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

4.6 Software Features

(on Linux based platform)

- IEEE 802.11 b/g/n/ac/ax WiFi compliant
- 802.1x, WEP, WPA TKIP and WPA2 AES/Mixed mode for PSK and TLS (Radius)
- WPA3-SAE (Personal)
- WPS - PIN and PBC Methods
- IEEE 802.11b/g/n/ac/ax Client mode
 - Support wireless security for WEP, WPA TKIP and WPA2 AES PSK
 - Support site survey scan and manual connect
 - Support WPA/WPA2 TLS client
- Soft AP mode
- WiFi-Direct
- Miracast
- BT-COEXIST

4.7 Output Power & Sensitivity

2.4GHz

2.4GHz 802.11b		
Data Rate	Tx $\pm$ 2dB	Rx Sensitivity $\pm$ 2dB
1M	18.0dBm	-94dBm
11M	18.0dBm	-87dBm

2.4GHz 802.11g		
Data Rate	Tx $\pm$ 2dB	Rx Sensitivity $\pm$ 2dB
6M	18.0dBm	-92dBm
54M	17.0dBm	-74dBm

2.4GHz 802.11n				
Data Rate		Tx $\pm$ 2dB	Tx $\pm$ 2dB(2TX)	Rx Sensitivity $\pm$ 2dB
HT20	MCS 0	18dBm	21dBm	-92dBm
	MCS 7	17dBm	20dBm	-72dBm
HT40	MCS 0	17dBm	20dBm	-89dBm
	MCS 7	16dBm	19dBm	-69dBm

2.4GHz 802.11ax				
Data Rate		Tx $\pm$ 2dB	Tx $\pm$ 2dB(2TX)	Rx Sensitivity $\pm$ 2dB
HE20	MCS 0	16dBm	19dBm	-81dBm
	MCS 11	15dBm	18dBm	-61dBm
HE40	MCS 0	16dBm	19dBm	-88dBm
	MCS 11	15dBm	18dBm	-58dBm

5GHz

2.4GHz 802.11g		
Data Rate		Rx Sensitivity $\pm$ 2dB
6M		-92dBm
54M		-74dBm

5GHz 802.11n				
Data Rate		Tx $\pm$ 2dB	Tx $\pm$ 2dB(2TX)	Rx Sensitivity $\pm$ 2dB
HT20	MCS 0	17dBm	20dBm	-92dBm
	MCS 7	16dBm	19dBm	-72dBm
HT40	MCS 0	17dBm	20dBm	-89dBm
	MCS 7	16dBm	19dBm	-69dBm

5GHz 802.11ac				
Data Rate		Tx $\pm$ 2dB	Tx $\pm$ 2dB(2TX)	Rx Sensitivity $\pm$ 2dB
VHT20	MCS 0	17dBm	20dBm	-92dBm
	MCS 8	16dBm	19dBm	-65dBm
VHT80	MCS 0	17dBm	20dBm	-85dBm
	MCS 9	16dBm	19dBm	-59dBm

5GHz 802.11ax				
Data Rate		Tx $\pm$ 2dB	Tx $\pm$ 2dB(2TX)	Rx Sensitivity $\pm$ 2dB
HE20	MCS 0	16dBm	19dBm	-92dBm
	MCS 11	15dBm	18dBm	-61dBm
HE80	MCS 0	16dBm	19dBm	-86dBm
	MCS 11	15dBm	18dBm	-56dBm

5 Bluetooth Specification

5.1 WLAN Standard

- Bluetooth v2.1+EDR/3.0+HS/4.2/5.2

5.2 Frequency Range

- 2.4~2.4835GHz(2.4GHz ISM Band)

5.3 Power Classes

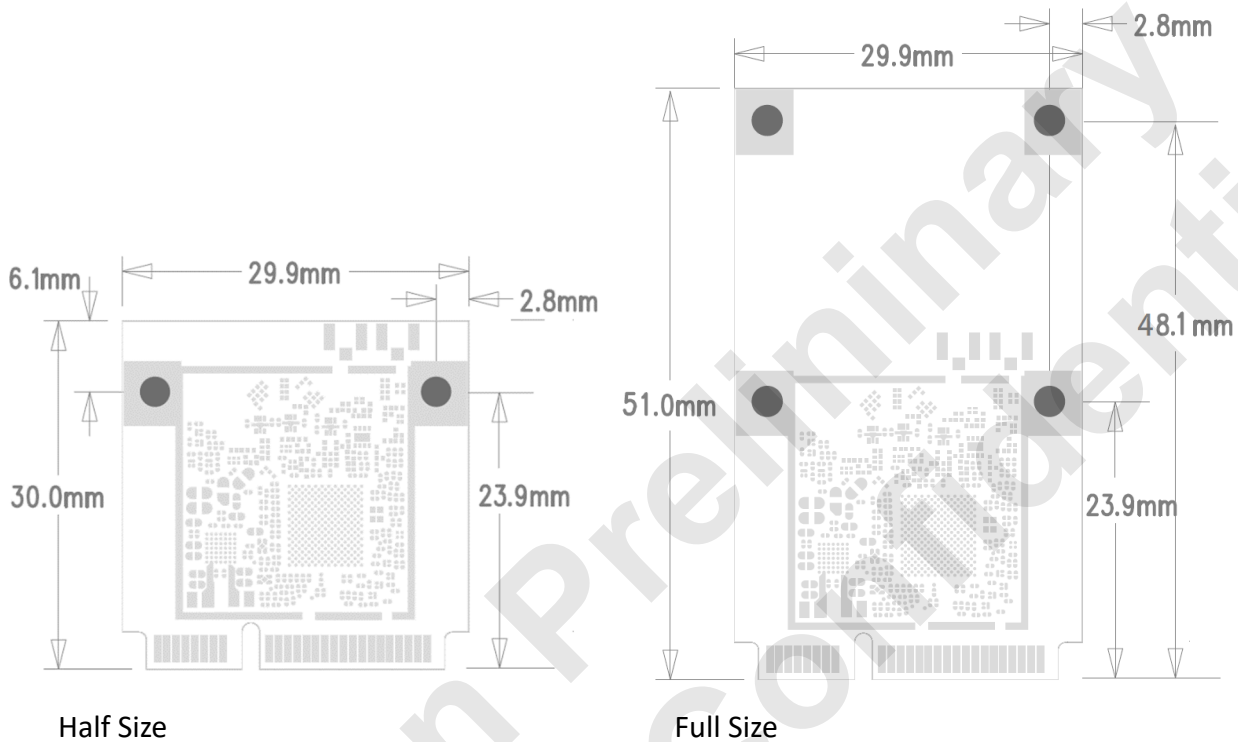
- Bluetooth Classic: Class1
- Bluetooth Low Energy: Class1.5

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)

6 Mechanical Specification

6.1 Mechanical Outline Drawing

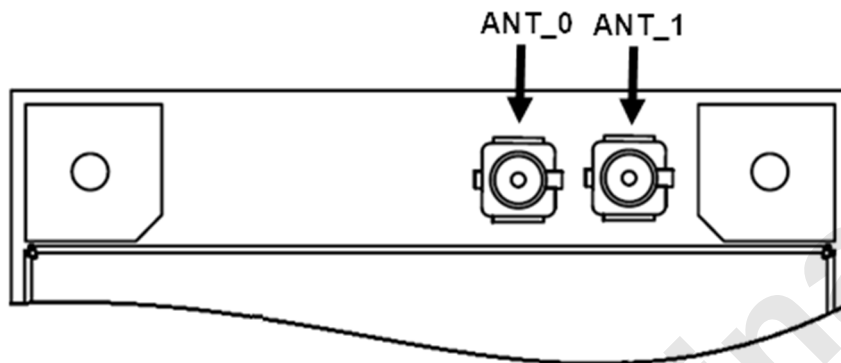


General tolerance: $\pm 0.2\text{mm}$

6.2 Interface & Dimension

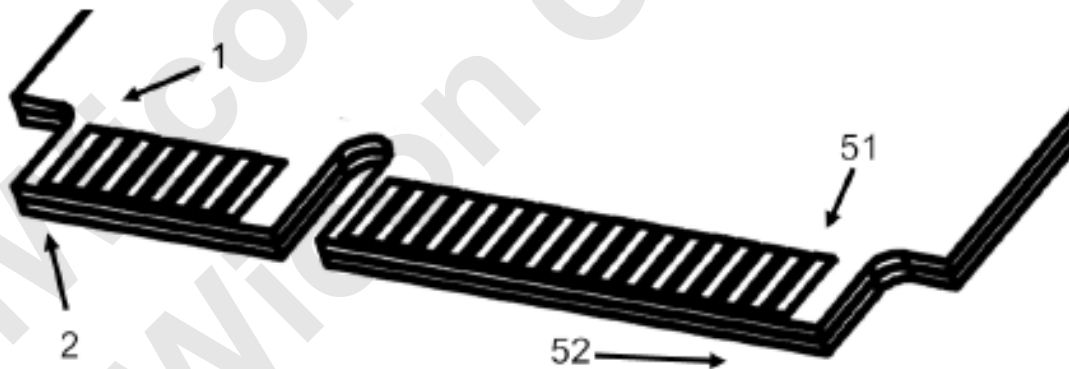
- Interface: Mini PCIe half-size/full-size
- Typical Dimension:
 - Half size: (W)29.9mm x (L)30.0mm x (H)2.8mm
 - Full size: (W)29.9mm x (L)51.0mm x (H)2.8mm

6.3 Antenna Connector



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

6.4 Pin Assignment



PIN #	Pin Name	Design Status	PIN #	Pin Name	Design Status
1	WAKE#	WL_PCIE_WAKE	2	+3.3Vaux	3V3
3	COEX1	NC	4	GND	GND
5	COEX2	NC	6	+1.5V	NC
7	CLKREQ#	WL_PCIE_CLKREQ	8	UIM_PWR	NC
9	GND	GND	10	UIM_DATA	NC
11	REFCLK-	WL_PCIE_REFCLKN	12	UIM_CLK	NC
13	REFCLK+	WL_PCIE_REFCLKP	14	UIM_RESET	NC
15	GND	GND	16	UIM_VPP	NC
17	Reserved	NC	18	GND	GND
19	Reserved	NC	20	W_DISABLE#	WL_DISABLE
21	GND	GND	22	PERST#	WL_PCIE_RST
23	PERn0	WL_PCIE_RXN	24	+3.3Vaux	3V3
25	PERp0	WL_PCIE_RXP	26	GND	GND
27	GND	GND	28	+1.5V	NC
29	GND	GND	30	SMB_CLK	NC
31	PETn0	WL_PCIE_TXN	32	SMB_DATA	NC
33	PETp0	WL_PCIE_TXP	34	GND	GND
35	GND	GND	36	USB_D-	BT_USB_DM
37	GND	GND	38	USB_D+	BT_USB_DP
39	+3.3Vaux	3V3	40	GND	GND
41	+3.3Vaux	3V3	42	LED_WWAN	BT_LED
43	GND	GND	44	LED_WLAN	WL_LED
45	RESERVED	NC	46	LED_WPAN	NC
47	RESERVED	NC	48	+1.5V	NC
49	RESERVED	NC	50	GND	GND
51	RESERVED	NC	52	+3.3Vaux	3V3

6.5 Pin Define

Design Name	I/O	Description
BT_USB_DP	I/O	High-Speed USB D+ Signal
BT_USB_DM	I/O	High-Speed USB D- Signal
PCIE_RST	I	PCI Express Reset Signal: active low. When the PERST# is asserted at power-on state, the RTL8852BE returns to a pre-defined reset state and is ready for initialization and configuration after the de-assertion of the PERST#.
PCIE_WAKE	O/D	Power Management Event: Open drain, active low. Used to reactivate the PCI Express slot's main power rails and reference clocks. This WAKE# can be shared with BT wake up host function via sideband signals.
PCIE_CLKREQ	I/O/D	Reference Clock Request Signal. Also used by L1 PM substates. This signal is used by the RTL8852BE to request for the PCI Express reference clock.
PCIE_REFCLKP	I	PCI Express Differential Reference Clock Source: 100MHz $\pm$ 300ppm
PCIE_REFCLKN	I	
PCIE_RXP	I	PCI Express Receive Differential Pair
PCIE_RXN	I	
PCIE_TXP	O	PCI Express Transmit Differential Pair
PCIE_TXN	O	
BT_LED	O	Bluetooth LED (Active Low)
WL_LED	O	WLAN LED (Active Low)
WL_DISABLE	I	This pin can be defined as the WLAN Radio-off function with host interface remaining connected. When this pin is pulled low, WLAN function will be Radio-off. When this function is not required, external pull high is not required.

7 Product Appearance

7.1 Product Picture



7.2 Label Define



Item	Description
Model	Product Model Name
P/N	Product Part Number
Barcode	CODE 128, Value: Mac Address
S/N	Product Serial Number

8 Electrical characteristics

8.1 Power Consumption

- Max power consumption 3.5W (25°C)

8.2 Operating Voltage

- Mini PCIe Interface DC 3.3V $\pm 5\%$

9 Software & Driver

9.1 Driver Support

- Windows:
Windows 10/11 (32/64bit)
- Linux:
Linux kernel 3.11 ~ 5.11
- Android:
Android 4.4, 6x, 7.0, 8.0, 9.x and 10, 11

9.2 Platform Support List

- Intel x86(Verified)
- ARM/MIPS

9.3 RF Tool

- RF test tool consultant service available

10 Certification

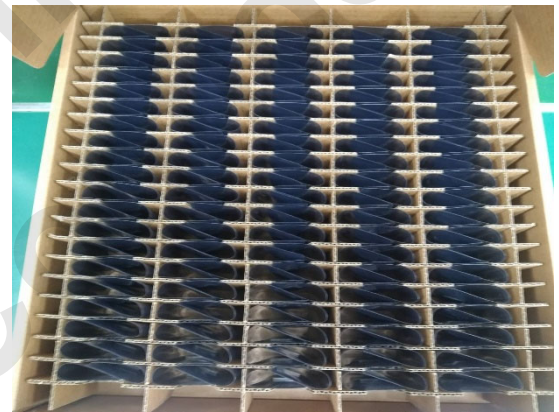
CE/FCC/IC(TBD)

11 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



12 Ordering Information

12.1 Main Parts

Part Number	Description
WMX7206-0	802.11ax, 2x2, Wi-Fi 6 Dual -band, Mini PCIe, (Half Size)
WMX7206-F	802.11ax, 2x2, Wi-Fi 6 Dual -band, Mini PCIe, (Full Size)

12.1 Accessories

Part Number	Description
ATD6251	Dipole 2dBi 2.4GHz & 5GHz Antenna
ATD6551	Dipole 5dBi 2.4GHz & 5dBi 5GHz Antenna
AC12001	Cable U.FL to SMA, 200mm