



WMX7205

**Wi-Fi 6/6e 802.11ax 2x2 Tri-band
M.2 2230 Module**

Product Datasheet

Version: 1.0.12

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Release Note

Version	Date	Description	Editor
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v0.1.1	2021/6/2	Add RF Tool & Platform support	Eddie Lin
v0.1.2	2021/6/30	Modify M.2 PIN Assign	Eddie Lin
v0.1.3	2021/7/7	Add PIN Define	Eddie Lin
v0.1.4	2021/9/30	Add Tx Power	Eddie Lin
v0.1.5	2021/12/02	Add Picture & Package	Eddie Lin
v0.1.6	2022/2/25	1. Add Qualcomm FastConnect Series chip WCN685x and QCA206x 2. Update Antenna Connector Photo	Eddie Lin
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v0.1.8	2022/3/25	Official release	Eddie Lin
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1 Overview

The WMX7205 module is a highly integrated wireless local area network (WLAN) mini PCIe module, the module based-on Qualcomm FastConnect 6900 series WCN685x/QCA206x and that is supporting 802.11ax Wi-Fi and Bluetooth v5.x.

The WMX7205 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
- Seamless antenna sharing with Bluetooth, LTE, LTE-U, and 5G
- Dynamic Frequency Selection (DFS, radar detection)
- Offloading traffic for minimal host utilization at 802.11ac/ax speeds
- Low-power PCIe (with L1 substate) interface
- Integrated close-loop power detector
- Monitor mode

2.2 Bluetooth

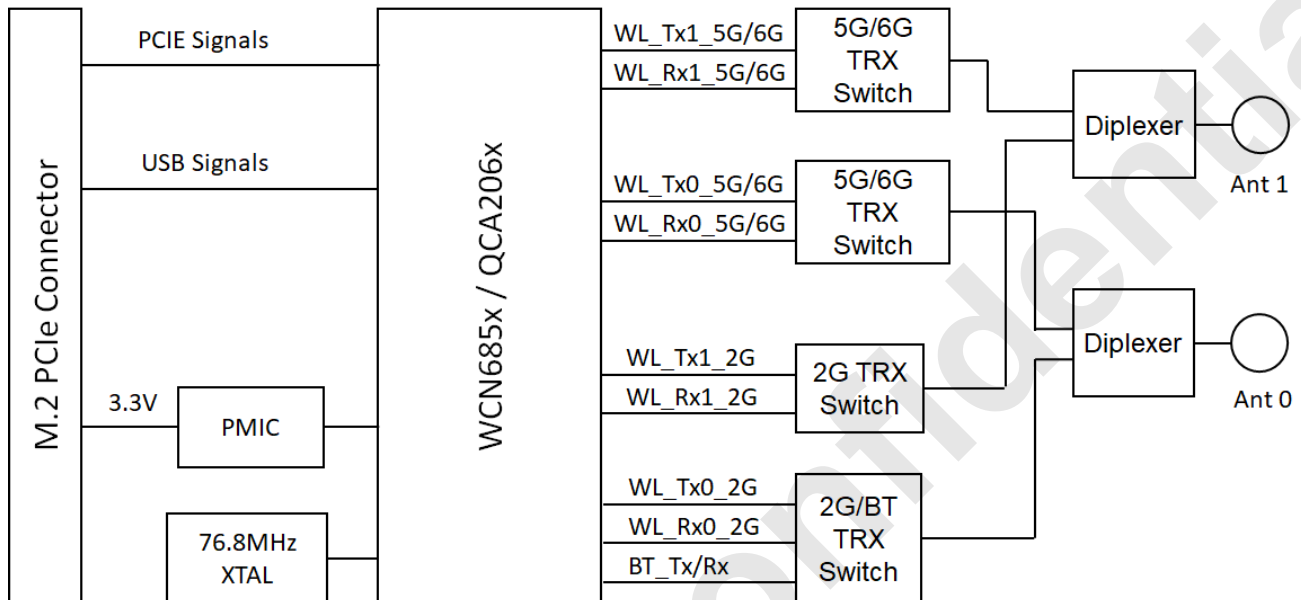
- Bluetooth V5.2, V5.1, V5.0, V4.2, V4.1, V4.0, V3.0, V2.1+EDR
- Compliant with Bluetooth Milan and ANT+

2.3 Security

- AES-CCMP at 128/256 bits
- WEP, TKIP hardware encryption
- WAPI-2 hardware encryption
- WPA/WPA2/WPA3
- FIPS 140-2 support

3 System Specification

3.1 Block Diagram



3.2 Chip Solution

- Qualcomm WCN6856-5/QCA2066-5

3.3 Protocol & Interface

- PCIe Gen 3 interface for WLAN
- USB 1.1 interface for Bluetooth
- Antenna Port: MHF4 connector x2 for 2T2R

3.4 Temperature

- Operating Temperature: -30°C to +85°C
- Storage Temperature: -40°C to +105°C

3.5 Humidity

- Operating Humidity (non-condensing): 5% ~ 95%
- Storage Humidity (non-condensing): 5% ~ 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: 2400MHz ~ 2496MHz
- Support 5GHz frequency range: 4900MHz - 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:
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 Features

Category	Description
Wi-Fi Mode	STA Mode AP Mode (Soft AP) STA + AP Mode Wi-Fi Direct Monitor Mode
Wi-Fi Features	160MHz channel support, MU-MIMO Dual-band simultaneous (DBS) OFDMA Target Wake Time
Encryption/Decryption	WEP TKIP AES
Security Modes	Open WEP/Shared Key WPA/WPA2/WPA3
Security Support (WPA3)	WPA3 Easy Connect 256-bit Encryption WPA3-Enhanced Open WPA3-Enterprise WPA3-Personal
Feature Set	Multi SSID P2P DBS

Noted: these features based on Qualcomm driver WCN6855.LEA.1.0

4.7 Output Power & Sensitivity

2.4GHz

2.4GHz 802.11b		
Data Rate	Tx $\pm$ 2dB	Rx Sensitivity $\pm$ 2dB
1M	18.0dBm	-99dBm
11M	18.0dBm	-88dBm

2.4GHz 802.11g		
Data Rate	Tx $\pm$ 2dB	Rx Sensitivity $\pm$ 2dB
6M	18.0dBm	-93dBm
54M	14.5dBm	-75dBm

2.4GHz 802.11n				
Data Rate		Tx $\pm$ 2dB	Tx $\pm$ 2dB(2TX)	Rx Sensitivity $\pm$ 2dB
HT20	MCS 0	18.0dBm	21.0dBm	-94dBm
	MCS 7	16.0dBm	19.0dBm	-76dBm
HT40	MCS 0	16.0dBm	19.0dBm	-91dBm
	MCS 7	14.0dBm	17.0dBm	-73dBm

2.4GHz 802.11ax				
Data Rate		Tx $\pm$ 2dB	Tx $\pm$ 2dB(2TX)	Rx Sensitivity $\pm$ 2dB
HE20	MCS 0	18.0dBm	21.0dBm	-94dBm
	MCS 7	16.0dBm	19.0dBm	-75dBm
	MCS 9	15.5dBm	18.5dBm	-69dBm
	MCS 11	15.0dBm	18.0dBm	-63dBm
	MCS 13	11.5dBm	14.5dBm	-58dBm
HE40	MCS 0	15.5dBm	18.5dBm	-91dBm
	MCS 7	14.5dBm	17.5dBm	-72dBm
	MCS 9	13.5dBm	16.5dBm	-67dBm
	MCS 11	13.0dBm	16.0dBm	-61dBm
	MCS 13	11.0dBm	14.0dBm	-55dBm

5GHz

2.4GHz 802.11g		
Data Rate	Tx $\pm$ 2dB	Rx Sensitivity $\pm$ 2dB
6M	17.5dBm	-86dBm
54M	14.0dBm	-77dBm

5GHz 802.11n			
Data Rate		Tx $\pm$ 2dB	Rx Sensitivity $\pm$ 2dB
HT20	MCS 0	16.0dBm	-94dBm
	MCS 7	13.5dBm	-75dBm
HT40	MCS 0	15.5dBm	-91dBm
	MCS 7	13.0dBm	-72dBm

5GHz 802.11ac			
Data Rate		Tx $\pm$ 2dB	Rx Sensitivity $\pm$ 2dB
VHT20	MCS 0	16.0dBm	-93dBm
	MCS 7	13.5dBm	-75dBm
	MCS 11	13.5dBm	-70dBm
VHT40	MCS 0	15.5dBm	-91dBm
	MCS 7	13.0dBm	-73dBm
	MCS 11	13.0dBm	-68dBm
VHT80	MCS 0	15.5dBm	-87dBm
	MCS 7	12.5dBm	-70dBm
	MCS 11	12.5dBm	-64dBm
VHT160	MCS 0	14.5dBm	-84dBm
	MCS 7	11.0dBm	-66dBm
	MCS 11	11.0dBm	-61dBm

5GHz

5GHz/6GHz 802.11ax			
Data Rate		Tx $\pm$ 2dB	Rx Sensitivity $\pm$ 2dB
HE20	MCS 0	16.0dBm	-93dBm
	MCS 7	13.5dBm	-74dBm
	MCS 9	13.5dBm	-68dBm
	MCS 11	13.0dBm	-64dBm
	MCS 13	9.0dBm	-57dBm

HE40	MCS 0	15.0dBm	18.0dBm	-90dBm
	MCS 7	13.0dBm	16.0dBm	-72dBm
	MCS 9	13.0dBm	16.0dBm	-66dBm
	MCS 11	12.5dBm	15.5dBm	-61dBm
	MCS 13	8.5dBm	11.5dBm	-55dBm
HE80	MCS 0	15.0dBm	18.0dBm	-87dBm
	MCS 7	13.0dBm	16.0dBm	-68dBm
	MCS 9	13.0dBm	16.0dBm	-63dBm
	MCS 11	12.0dBm	15.0dBm	-58dBm
	MCS 13	8.0dBm	11.0dBm	-52dBm
HE160	MCS 0	14.5dBm	17.5dBm	-84dBm
	MCS 7	11.0dBm	14.0dBm	-66dBm
	MCS 9	11.0dBm	14.0dBm	-60dBm
	MCS 11	10.0dBm	13.0dBm	-54dBm
	MCS 13	8.0dBm	11.0dBm	-49dBm

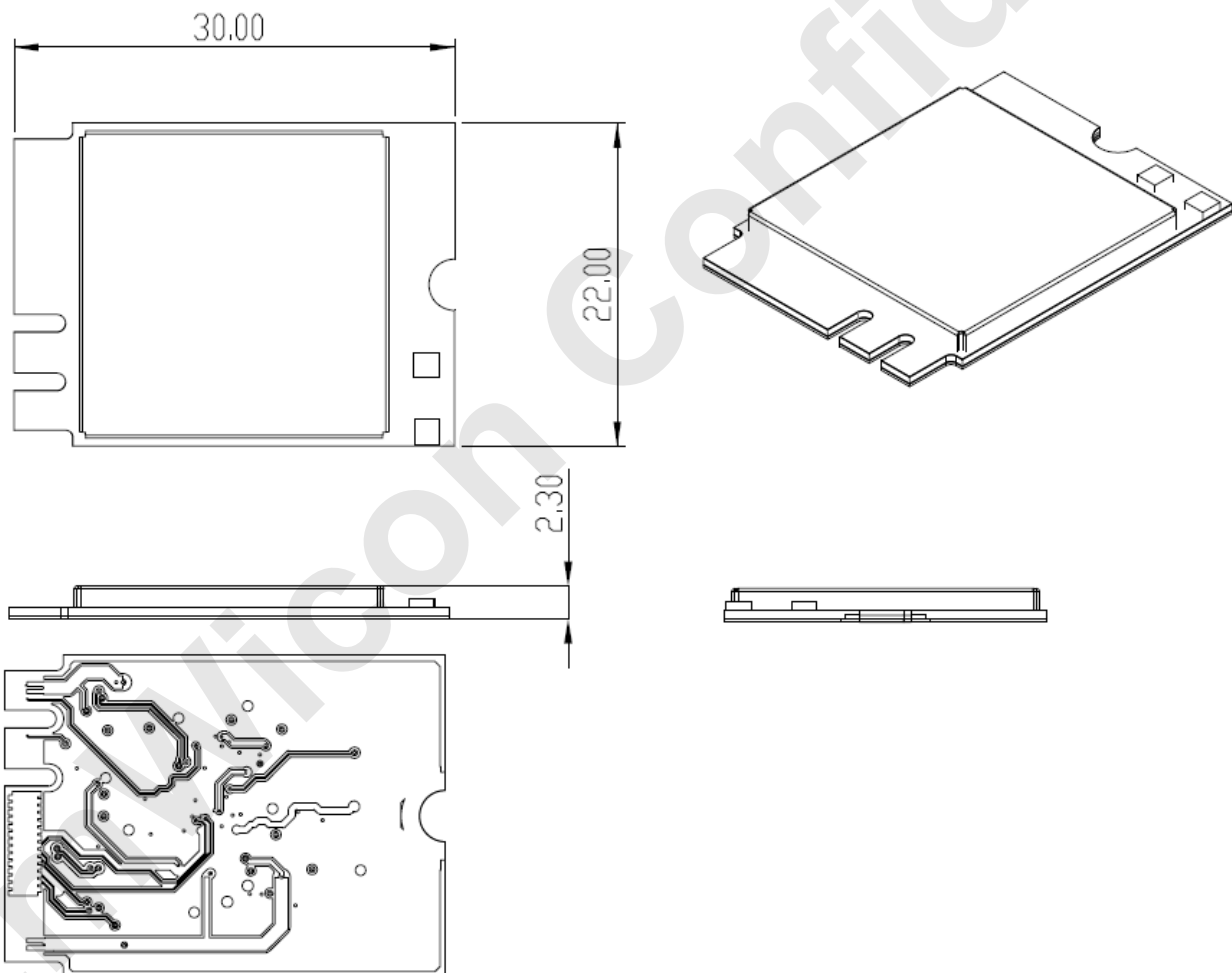
6GHz

5GHz/6GHz 802.11ax				
Data Rate		Tx $\pm$ 2dB	Tx $\pm$ 2dB(2TX)	Rx Sensitivity $\pm$ 2dB
HE20	MCS 0	14.0dBm	17.0dBm	-93dBm
	MCS 7	11.5dBm	14.5dBm	-74dBm
	MCS 9	10.5dBm	13.5dBm	-68dBm
	MCS 11	10.0dBm	13.0dBm	-64dBm
	MCS 13	9.0dBm	11.0dBm	-57dBm
HE40	MCS 0	13.0dBm	16.0dBm	-90dBm
	MCS 7	10.0dBm	13.0dBm	-72dBm
	MCS 9	9.5dBm	12.5dBm	-66dBm
	MCS 11	9.0dBm	12.0dBm	-61dBm
	MCS 13	8.0dBm	11.0dBm	-55dBm
HE80	MCS 0	13.0dBm	16.0dBm	-87dBm
	MCS 7	10.5dBm	13.5dBm	-68dBm
	MCS 9	10.0dBm	13.0dBm	-63dBm
	MCS 11	9.0dBm	12.0dBm	-54dBm
	MCS 13	8.0dBm	11.0dBm	-52dBm

HE160	MCS 0	12.5dBm	15.5dBm	-84dBm
	MCS 7	10.5dBm	10.5dBm	-66dBm
	MCS 9	10.0dBm	13.0dBm	-60dBm
	MCS 11	8.5dBm	11.5dBm	-54dBm
	MCS 13	8.0dBm	11.0dBm	-49dBm

5 Mechanical Specification

5.1 Mechanical Outline Drawing

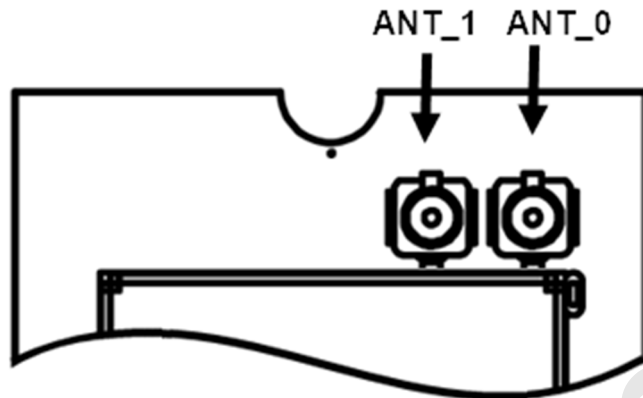


General tolerance: $\pm 0.2\text{mm}$

5.2 Interface & Dimension

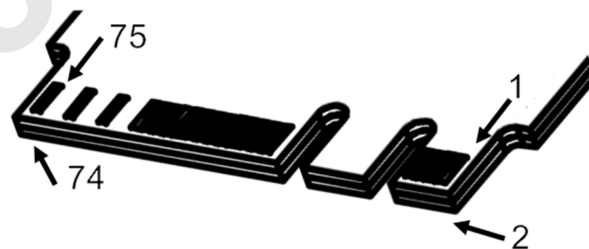
- Interface: M.2 2230 A+E Key
- Typical Dimension: (W)22.0mm x (L)30mm x (H)2.3mm

5.3 Antenna Connector



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

5.4 Pin Assignment



PIN	Pin Name	Design Status	PIN	Pin Name	Design Status
1	GND	GND			
3	USB_D+	BT_USB_DP	2	3.3V	3V3
5	USB_D-	BT_USB_DM	4	3.3V	3V3
7	GND	GND	6	LED_1#	WL_LED

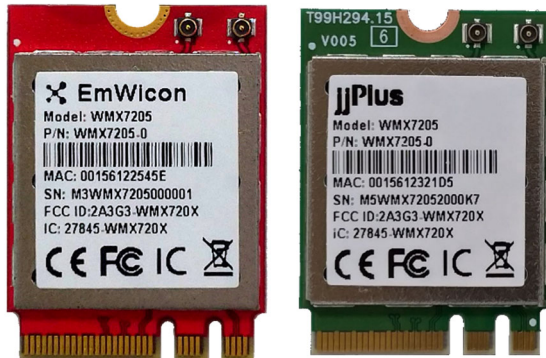
9	Module Key A		8	Module Key A	
11	Module Key A		10	Module Key A	
13	Module Key A		12	Module Key A	
15	Module Key A		14	Module Key A	
17	NC	NC	16	LED_2#	BT_LED
19	NC	NC	18	GND	GND
21	NC	NC	20	UART WAKE	NC
23	NC	NC	22	UART TX	NC
25	Module Key E		24	Module Key E	
27	Module Key E		26	Module Key E	
29	Module Key E		28	Module Key E	
31	Module Key E		30	Module Key E	
33	GND	GND	32	UART RX	NC
35	PERp0	WL_PCIE_RXP	34	UART RTS	NC
37	PERn0	WL_PCIE_RXN	36	UART CTS	NC
39	GND	GND	38	VENDOR DEFINED	NC
41	PETp0	WL_PCIE_TXP	40	VENDOR DEFINED	NC
43	PETn0	WL_PCIE_TXN	42	VENDOR DEFINED	NC
45	GND	GND	44	COEX3(I/O)	NC
47	REFCLKp0	WL_PCIE_REFCLKP	46	COEX2(I/O)	NC
49	REFCLKn0	WL_PCIE_REFCLKN	48	COEX1(I/O)	NC
51	GND	GND	50	SUSCLK(32kHz)	SUSCLK
53	CLKREQ0#(I/O)	WL_PCIE_CLKREQ	52	PERST0#(I)	WL_PCIE_RST
55	PEWAKE0#(I/O)	WL_PCIE_WAKE	54	W_DISABLE2#(I)	BT_EN
57	GND	GND	56	W_DISABLE1#(I)	WL_EN
59	PERp1	NC	58	I2C DATA(I)	NC
61	PERn1	NC	60	I2C CLK(I)	NC
63	GND	GND	62	ALERT#(O)	NC
65	PETp1	NC	64	RESERVED	NC
67	PETn1	NC	66	RESERVED	NC
69	GND	GND	68	RESERVED	NC
71	REFCLKp1	NC	70	RESERVED	NC
73	REFCLKn1	NC	72	3.3Vaux	3V3
75	GND	GND	74	3.3Vaux	3V3

5.5 Pin Define

Design Name	I/O	Description
WL_PCIE_RST	I	WLAN PCIe reset signal is an input signal
WL_PCIE_WAKE	O	WLAN PCIe wake-up signal is an output signal
WL_PCIE_CLKREQ	B	WLAN PCIe clock request signal is a bidirection signal
WL_PCIE_REFCLKP	I	WLAN PCIe reference clock input differential signals
WL_PCIE_REFCLKN	I	
WL_PCIE_RXP	I	WLAN PCIe receive input differential signals
WL_PCIE_RXN	I	
WL_PCIE_TXP	O	WLAN PCIe transmit output differential signals
WL_PCIE_TXN	O	
SUSCLK	I	32KHz
BT_USB_DP	A	USB1.1 interface to support full-speed only (no low-speed mode) and peripheral device mode only (no master mode).
BT_USB_DM	A	
BT_EN	I	Bluetooth enable signal. It is an input, active high to enable Bluetooth operation
WL_EN	I	WLAN enable signal. It is an input, active high to enable WLAN operation
BT_LED	O	Bluetooth LED (QCA driver not supported)
WLAN_LED	O	WLAN LED (QCA driver not supported)

6 Product Appearance

6.1 Product Picture



6.2 Label Define



Item	Description
Size	17x18mm
Model	Product Model Name
P/N	Product Part Number
Barcode	CODE 128, Value: Mac Address
S/N	Product Serial Number

7 Electrical characteristics

7.1 Power Consumption

- Max power consumption 3W (25°C, DBDC)

7.2 Operating Voltage

- M.2 Interface DC 3.3V $\pm 5\%$

8 Software & Driver

8.1 Driver Support

- Windows:
Windows 10 / Windows 11 (32bit/64bit)
- Linux:
QCA Standard LEA Linux Driver support kernel 4.9.11 & 5.4.0 ~ 5.10.x
Open Driver: ATH11K

8.2 Platform Support List

- Intel x86(Verified)
- ARM/MIPS

8.3 RF Tool

- RF test tool consultant service available

9 Certification

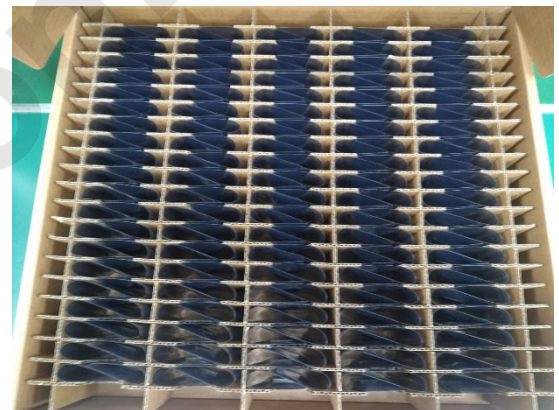
CE/FCC/IC/TELEC/KCC...

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
WMX7205-0	802.11ax, 2x2, Wi-Fi 6/6e Tri-band, M.2 2230 (WCN6856-5)
WMX7205-1	802.11ax, 2x2, Wi-Fi 6/6e Tri-band, M.2 2230 (QCA2066-5)

11.2 Accessories

Part Number	Description
ATD7251	Monopole 2dBi Antenna for 2.4GHz/5GHz/6GHz
AC42001	Cable MHF4 to SMA, 200mm