AW-CM276MA-PUR

IEEE 802.11a/b/g/n/ac Wireless LAN 2T2R and Bluetooth 5.0 Combo Module (M.2 2230)

Datasheet

Rev. E

DF

(For Standard)

Features

WLAN

- PCIe M.2 TYPE 2230: 30mm(L) x 22mm(W) x 2.85 mm(H)(Max)
- PCIe interface support for WLAN
- Sub-meter accuracy WiFi indoor locationing(802.11mc)
- Multiple power saving modes for low power consumption
- IEEE 802.11i for advanced security
- Quality of Service (QoS) support for multimedia applications
- Support China WAPI
- Lead-free design

Bluetooth

- UART interface support for Bluetooth
- High speed UART,PCM interfaces
- Audio Codec interface support
- Bluetooth 5.0 complaint with Bluetooth 2.1 + Enhanced Data Rate (EDR)

Revision History

Document NO: R2-2276MA-DST-01

Version	Revision Date	DCN NO.	Description	Initials	Approved
A	2019/12/03	DCN016398	● Initial Version(new format)	Renton Tao	NC Chen
B	2020/05/06	DCN017212	● Modify model name	Renton Tao	NC Chen
C	2020/06/16	DCN017532	● Remove watermark ● Correct typo	Renton Tao	NC Chen
D	2020/11/18	DCN019226	● Add WPA3 supported ● Updated antenna configuration graph	Renton Tao	NC Chen
E	2020/02/25	DCN020664	● Update color of tables ● Update block diagram ● Update pin definition table	Renton Tao	NC Chen

Table of Contents

Features **2**
Revision History **3**
Table of Contents **4**
1. Introduction **5**
1.1 Product Overview **5**
1.2 Block Diagram **6**
1.3 Specifications Table **7**
1.3.1 General 7
1.3.2 WLAN 7
1.3.3 Bluetooth 9
1.3.4 Operating Conditions 9
2. Pin Definition **11**
2.1 Pin Table **11**
3. Electrical Characteristics **13**
3.1 Absolute Maximum Ratings **13**
3.2 Recommended Operating Conditions **13**
3.3 Digital IO Pin DC Characteristics **13**
3.3.1 DC Electricals-1.8V Operation(VIO) 13
3.3.2 DC Electricals-3.3V Operation(VIO) 14
3.4 Host Interface **15**
3.4.1 PCI Express Interface 15
3.4.2 High-Speed UART Interface 16
3.4.3 PCM Interface 18
3.5 Power up Timing Sequence **21**
3.6 Power consumption **22**
3.6.1 WLAN result 22
3.6.2 BT result 22
4. Mechanical Information **23**
4.1 Mechanical Drawing **23**
4.2 Antenna connector drawing **24**
5. Packaging Information **25**

1. Introduction

1.1 Product Overview

AzureWave Technologies, Inc. introduces the IEEE 802.11ac/a/b/g/n 2X2 MU-MIMO WLAN & Bluetooth NGFF module --- **AW-CM276MA-PUR**. The module is targeted to mobile devices including **Notebook, TV, Tablet and Gaming Device** which need small package module, low power consumption, multiple interfaces and OS support. By using AW-CM276MA-PUR, the customers can easily enable the Wi-Fi, and BT embedded applications with the benefits of **high design flexibility, short development cycle, and quick time-to-market.**

Compliance with the IEEE 802.11ac/a/b/g/n standard supporting 802.11ac Wave 2, the AW-CM276MA-PUR uses Direct Sequence Spread Spectrum (**DSSS**), Orthogonal Frequency Division Multiplexing (**OFDM**), **DBPSK**, **DQPSK**, **CCK** and **QAM** baseband modulation technologies. A high level of integration and full implementation of the power management functions specified in the IEEE 802.11 standard minimize the system power requirements by using AW-CM276MA-PUR. In addition to the support of **WPA/WPA2/WPA3** and **WEP** 64-bit and 128-bit encryption, the AW-CM276MA-PUR also supports the **IEEE 802.11i** security standard through the implementation of **Advanced Encryption Standard** (**AES)/Counter Mode CBC-MAC Protocol (CCMP),** Wired Equivalent Privacy (**WEP)** with Temporal Key Integrity Protocol (**TKIP)**, Advanced Encryption Standard (**AES**)/Cipher-Based Message Authentication Code (**CMAC**), and WLAN Authentication and Privacy Infrastructure (**WAPI**) security mechanisms.

For the video, voice and multimedia applications the AW-CM276MA-PUR support **802.11e Quality of Service** (**QoS).** The device also supports **802.11h Dynamic Frequency Selection (DFS)** for detecting radar pulses when operating in the 5GHz range.

For Bluetooth operation, AW-CM276MA-PUR is **Bluetooth 5.0 (supports Low Energy).**

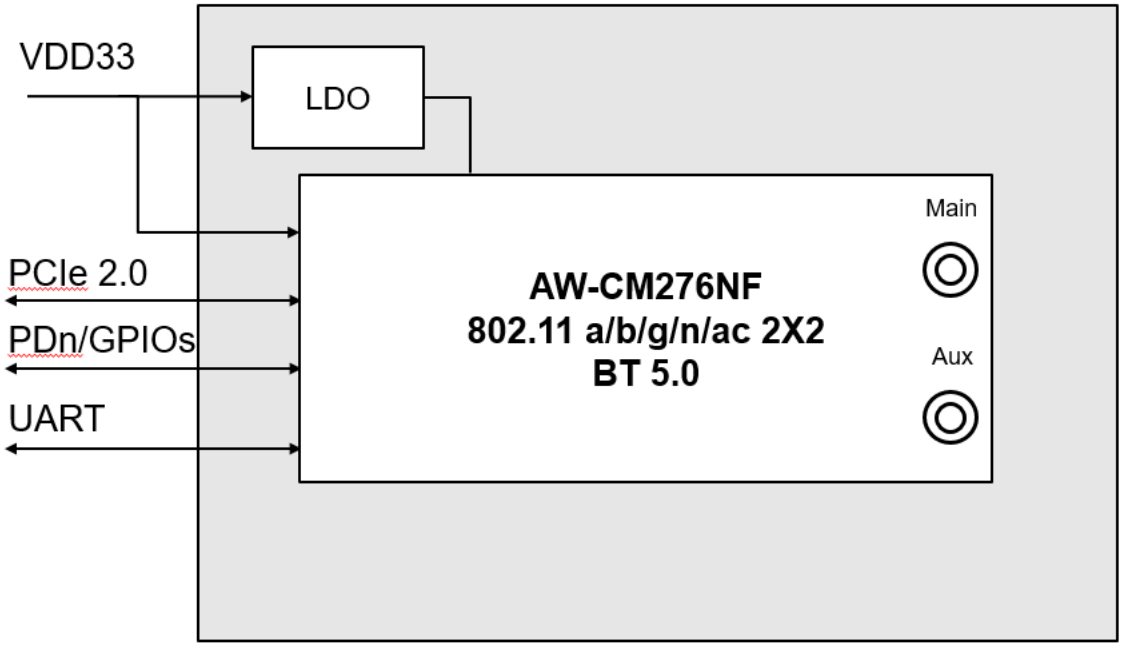
AW-CM276MA-PUR supports **PCIE** and high speed **UART interfaces** for WLAN and Bluetooth to the host processor.

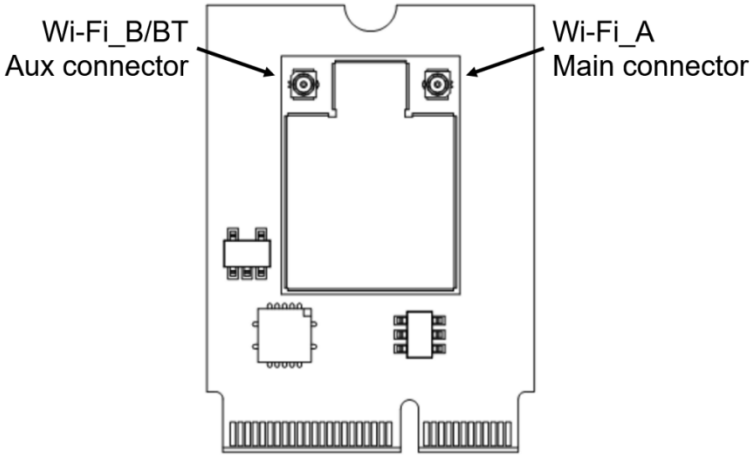
AW-CM276MA-PUR is suitable for multiple mobile processors for different applications with the support cellular phone co-existence.

AW-CM276MA-PUR module adopts NXP's latest highly-integrated dual-band WLAN & Bluetooth SoC---**88W8997**. All the other components are implemented by all means to reach the mechanical specification required.

1.2 Block Diagram

AW-CM276MA-PUR NGFF Module





Module antenna configuration

1.3 Specifications Table

1.3.1 General

Features	Description
Product Description	Wireless LAN 2T2R & Bluetooth Combo M.2 Module
Major Chipset	NXP 88W8997
Host Interface	PCIe for WLAN,UART for Bluetooth
Dimension	22mm(W) x 30mm(L) x 2.85mm(H) (Tolerance remarked in mechanical drawing)
Form factor	M.2 2230
Antenna	I-PEX MHF4 Connector Receptacle (20449) ANTA：WiFi → TX/RX ANTB：WiFi/Bluetooth → TX/RX
Weight	0.5 g

1.3.2 WLAN

Features	Description
WLAN Standard	IEEE 802.11 a/b/g/n/ac
WLAN VID/PID	1B4B/2B42
WLAN SVID/SPID	N/A
Frequency Rage	2.4 GHz：2.412 ~ 2.484 GHz 5 GHz：4.915 ~5.925GHz
Modulation	DSSS, OFDM, DBPSK, DQPSK, CCK, 16-QAM, 64-QAM, 256-QAM
Number of Channels	**2.4GHz** ■ USA, NORTH AMERICA, Canada and Taiwan – 1 ~ 11 ■ China, Australia, Most European Countries, Japan – 1 ~ 13 **5GHz** ■ USA, EUROPE –36,40,44,48,52,56,60,64,100,104,108,112,116,120, 124,128,132,136,140,149,153,157,161,165

Output Power

2.4GHz

	Min	Typ	Max	Unit
11b (11Mbps) @EVM<35%	15.5	17	18.5	dBm
11g (54Mbps) @EVM≦-27 dB	14.5	16	17.5	dBm
11n (HT20 MCS7) @EVM≦-28 dB	14.5	16	17.5	dBm
11n (HT40 MCS7) @EVM≦-28 dB	12.5	14	15.5	dBm

5GHz

	Min	Typ	Max	Unit
11a (54Mbps) @EVM≦-27 dB	11	13	15	dBm
11n (HT20 MCS7) @EVM≦-28 dB	11	13	15	dBm
11n (HT40 MCS7) @EVM≦-28 dB	10	12	14	dBm
11ac (VHT20 MCS8) @EVM≦-30 dB	11	13	15	dBm
11ac (VHT40 MCS9) @EVM≦-32 dB	10	12	14	dBm
11ac (VHT80 MCS9) @EVM≦-32 dB	8	10	12	dBm

Receiver Sensitivity

2.4GHz

	Min	Typ	Max	Unit
11b (11Mbps)	-	-88	-85	dBm
11g (54Mbps)	-	-75	-72	dBm
11n (HT20 MCS7)	-	-72	-70	dBm
11n (HT40 MCS7)	-	-69	-67	dBm

5GHz

	Min	Typ	Max	Unit
11a (54Mbps)	-	-72	-68	dBm
11n (HT20 MCS7)	-	-70	-67	dBm
11n (HT40 MCS7)	-	-68	-65	dBm
11ac(VHT20 MCS8)	-	-65	-62	dBm
11ac(VHT40 MCS9)	-	-63	-60	dBm
11ac(VHT80 MCS9)	-	-60	-57	dBm

Data Rate

- 802.11b: 1, 2, 5.5, 11Mbps
- 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54Mbps
- 802.11n: up to 150Mbps-single

	■ 802.11n: up to 300Mbps-2x2 MIMO ■ 802.11ac:up to 192.6Mbps (20MHz channel) ■ 802.11ac:up to 400Mbps (40MHz channel) 802.11ac:up to 866.7Mbps (80MHz channel)
Security	■ WAPI ■ WEP 64-bit and 128-bit encryption with H/W TKIP processing ■ WPA/WPA2/WPA3 (Wi-Fi Protected Access) AES-CCMP hardware implementation as part of 802.11i security standard

* If you have any certification questions about output power please contact FAE directly.

1.3.3 Bluetooth

<table>
<tr><th>Features</th><th>Description</th></tr>
<tr><td>Bluetooth Standard</td><td>Bluetooth 2.1 and 3.0+Enhanced Data Rate (EDR) + BT 5.0</td></tr>
<tr><td>Bluetooth VID/PID</td><td>1286/204E</td></tr>
<tr><td>Frequency Rage</td><td>2402~2480MHz</td></tr>
<tr><td>Modulation</td><td>GFSK (1Mbps), Π/4 DQPSK (2Mbps) and 8DPSK (3Mbps)</td></tr>
<tr><td>Output Power</td><td>
<table>
<tr><td></td><td>Min</td><td>Typ</td><td>Max</td><td>Unit</td></tr>
<tr><td>BDR</td><td>0</td><td>2</td><td>4</td><td>dBm</td></tr>
<tr><td>EDR</td><td>0</td><td>2</td><td>4</td><td>dBm</td></tr>
<tr><td>BLE</td><td>0</td><td>2</td><td>4</td><td>dBm</td></tr>
</table>
</td></tr>
<tr><td>Receiver Sensitivity</td><td>BER < 0.1%
<table>
<tr><td></td><td>Min</td><td>Typ</td><td>Max</td><td>Unit</td></tr>
<tr><td>BDR</td><td></td><td>-83</td><td></td><td>dBm</td></tr>
</table>
</td></tr>
</table>

1.3.4 Operating Conditions

Features	Description
Operating Conditions	
Voltage	Power supply for host:3.3V

Operating Temperature	-30~85 ℃
Operating Humidity	less than 85% R.H.
Storage Temperature	-40~125 ℃
Storage Humidity	less than 60% R.H.
ESD Protection	
Human Body Model	+-2kV
Changed Device Model	+-500V

2. Pin Definition

2.1 Pin Table

Pin No	Definition	Basic Description	Voltage	Type
1	GND	Ground	GND	
2	3.3V	3.3V power supply.	Power	3.3V
3	NC	No connect to anything	Floating	
4	3.3V	3.3V power supply	Power	3.3V
5	NC	No connect to anything	Floating	
6	LED_WLAN_L	Active low signal. The signal is used to provide status indicators via LED. (in this project is not used, please let it open)	Floating	1.8V
7	GND	Ground	GND	
8	PCM_CLK	PCM clock	I/O	1.8V
9	NC	No connect to anything	Floating	
10	PCM_SYNC	PCM Synchronization control	O	1.8V
11	NC	No connect to anything	Floating	
12	PCM_OUT	PCM data Out	O	1.8V
13	NC	No connect to anything	Floating	
14	PCM_IN	PCM data Input	I	1.8V
15	NC	No connect to anything	Floating	
16	LED_BT_L	Active low signal. The signal is used to provide status indicators via LED. (in this project is not used, please let it open)	Floating	1.8V
17	NC	No connect to anything	Floating	
18	GND	Ground.	GND	
17	NC	No connect to anything	Floating	
20	GPIO[13]/BT IRQ	GPIO[13]/ BT Wake Host(active low)	O	3.3V
21	NC	No connect to anything	Floating	
22	GPIO[8] / UART_SOUT	GPIO[8] / UART_SOUT (output)	O	1.8V
23	NC	No connect to anything	Floating	
32	GPIO[9] / UART_SIN	GPIO[9] / UART_SIN (input)	I	1.8V
33	GND	Ground.	GND	
34	GPIO[11] / UART_RTSn	GPIO[11] / UART_RTSn (output)	O	1.8V
35	PCIE_RXP	PCI Express Lane 0, Receive Pair, Positive Signal 2.5 GHz serial low-voltage interface	I	1.8V
36	GPIO[10] / UART_CTSn	GPIO[10 / UART_CTSn] (input)	I	1.8V
37	PCIE_RXN	PCI Express Lane 0, Receive Pair, Negative Signal 2.5 GHz serial low-voltage interface	I	1.8V
38	JTAG_TDO	JTAG_TDO/GPIO[17]	Floating	
39	GND	Ground	GND	

40	DEV_WLAN_WAKE	DEV_WLAN_WAKE/GPIO[15]	Floating	
41	PCIE_TXP	PCI Express Lane 0, Transmit Pair, Positive Signal 2.5 GHz serial low-voltage interface	O	1.8V
42	DEV_BT_WAKE	DEV_WLAN_WAKE/GPIO[12]	Floating	
43	PCIE_TXN	PCI Express Lane 0, Transmit Pair, Negative Signal 2.5 GHz serial low-voltage interface	O	1.8V
44	JTAG_TDI	JTAG_TDI/GPIO[16]	Floating	
45	GND	Ground	GND	
46	JTAG_TCK	JTAG_TCK/GPIO[14]	Floating	
47	PCIE_CLKP	PCI Express Differential Clock Input—Positive	I	1.8V
48	JTAG_TMS	JTAG_TMS/GPIO[15]	Floating	
49	PCIE_CLKN	PCI Express Differential Clock Input—Negative	I	1.8V
50	CLK_32KHz	External sleep clock input (32.768 kHz).	I	3.3V
51	GND	Ground	GND	
52	GPIO[21]/PCIE_PERSTn	PCIe host indication to reset the device (input) (active low)	I	3.3V
53	PCIE_CLKREQ_N	PCI Express Clock Request (active low)	I/O	3.3V
54	NC	No connect to anything	Floating	
55	PCIE_WAKEUP_N	PCIe wake signal (active low)	I/O	3.3V
56	PDn	Full Power-Down (input) (active low) The module internal pull-up 51kΩ on this pin.	I	3.3V
57	GND	Ground	GND	
58	NC	No connect to anything	Floating	
59	NC	No connect to anything	Floating	
60	NC	No connect to anything	Floating	
61	NC	No connect to anything	Floating	
62	NC	No connect to anything	Floating	
63	GND	Ground	GND	
64	NC	No connect to anything	Floating	
65	NC	No connect to anything	Floating	
66	NC	No connect to anything	Floating	
67	NC	No connect to anything	Floating	
68	NC	No connect to anything	Floating	
69	GND	Ground	GND	
70	NC	No connect to anything	Floating	
71	NC	No connect to anything	Floating	
72	3.3V	3.3V power supply	Power	
73	NC	No connect to anything	Floating	
74	3.3V	3.3V power supply	Power	
75	GND	Ground	GND	

3. Electrical Characteristics

3.1 Absolute Maximum Ratings

Symbol	Parameter	Minimum	Typical	Maximum	Unit
3V3	DC supply for the 3.3V input	-	3.3	3.63	V
VIO	I/O power supply	-	1.8 2.5 3.3	2.2 3.0 4.0	V
Tstorage	Storage Temperature	-40	-	125	℃

3.2 Recommended Operating Conditions

Symbol	Parameter	Minimum	Typical	Maximum	Unit
3V3	DC supply for the 3.3V input	2.97	3.3	3.63	V
VIO	I/O power supply	1.62 2.25 2.97	1.8 2.5 3.3	1.98 2.75 3.63	V
T_A	Ambient operating temperature	-30	-	85	℃

3.3 Digital IO Pin DC Characteristics

3.3.1 DC Electricals-1.8V Operation(VIO)

Symbol	Parameter	Minimum	Typical	Maximum	Unit
VIL	Input low voltage	-0.4	-	0.3*V18	V
VIH	Input high voltage	0.7*V18	-	V18+0.4	V
V_{HYS}	Input hysteresis	100	-	-	mV
VOL	Output low voltage	-	-	0.4	V
VOH	Output high voltage	V18-0.4	-	-	V

3.3.2 DC Electricals-3.3V Operation(VIO)

Symbol	Parameter	Minimum	Typical	Maximum	Unit
VIL	Input low voltage	-0.4	-	0.3*V33	V
VIH	Input high voltage	0.7*V33	-	V33+0.4	V
V_{HYS}	Input hysteresis	100	-	-	mV
VOL	Output low voltage	-	-	0.4	V
VOH	Output high voltage	V33-0.4	-	-	V

3.4 Host Interface

3.4.1 PCI Express Interface

3.4.1.1 Differential Tx Output Electricals

Symbol	Parameter	Min	Typ	Max	Units
UI	Unit interval Each UI is 400 ps ±300 PPM. UI does not account for SSC dictated variations.	399.98	400	400.12	ps
V_{Tx_DIFFpp}	Differential peak-to-peak output voltage $V_{Tx\_DIFFpp} = 2*\|V_{TX-D+} - V_{TX-D-}\|$	0.800	--	1.2	V
$V_{Tx\_DE\_RATIO}$	De-emphasized differential output voltage (ratio)	-3.0	-3.5	-4.0	db
T_{Rx_EYE}	Minimum Tx eye width	0.75	--	--	UI
$T_{Rx\_EYE\_MEDIAN\_MAX\_JIT}$	Maximum time between jitter median and maximum deviation from median	--	--	0.125	UI
T_{Tx_RISE}, T_{Tx_FALL}	D+/D- Tx output rise/fall time	0.125	--	--	UI
$V_{Tx\_CM\_DC\_ACTIVE\_IDLE\_DELTA}$	Absolute delta of DC common mode voltage during L0 and electrical idle	0-	-	100	mV
$V_{Tx\_CM\_DC\_LINE\_DELTA}$	Absolute delta of DC common mode voltage between D+ and D-	0-	-	25	mV
$V_{Tx\_IDLE\_DIFFp}$	Electrical idle differential peak output voltage	0	--	20	mV
$V_{Tx\_RCV\_DETECT}$	Voltage change allowed during receiver detection	--	--	600	mV
$V_{Tx\_DC\_CM}$	Tx DC common mode voltage	--	--	3.6	V
I_{Tx_SHORT}	Tx short circuit current limit	--	--	90	mA
$T_{Tx\_IDLE\_MIN}$	Minimum time spent in electrical idle	50	--	--	UI
$T_{Tx\_IDLE\_SET\_TO\_IDLE}$	Maximum time to transition to a valid electrical idle after sending an electrical idle ordered set	--	--	20	UI
$T_{Tx\_IDLE\_TO\_DIFF\_DATA}$	Maximum time to transition to valid Tx specifications after leaving an electrical idle condition	--	--	20	UI
RL_{Tx_DIFF}	Differential return loss	10	--	--	dB
RL_{Tx_CM}	Common mode return loss	6	--	--	dB
C_{Tx}	AC coupling capacitor	75	--	200	nF
$T_{Crosstalk}$	Crosstalk random timeout	0	--	1	ms

3.4.1.2 Differential Rx Input Electricals

Symbol	Parameter	Min	Typ	Max	Units
UI	Unit interval Each UI is 400 ps ±300 ppm. UI does not account for SSC dictated variations.	399.98	400	400.12	ps
V_{Rx_DIFFpp}	Differential peak-to-peak voltage $V_{Rx\_DIFFpp} = 2*\|V_{RX-D+} - V_{RX-D-}\|$	0.175	--	1.2	V
T_{Rx_EYE}	Minimum receiver eye width	0.4	--	--	UI
$T_{Rx\_EYE\_MEDIAN\_MAX\_JIT}$	Maximum time between jitter median and maximum deviation from median	--	--	0.3	UI
$V_{Rx\_CM\_ACp}$	AC peak common mode input voltage	--	--	150	mV
RL_{Rx_DIFF}	Differential return loss	10	--	--	dB
RL_{Rx_CM}	Common mode return loss	6	--	--	dB
$Z_{Rx\_DIFF\_DC}$	DC differential input impedance	80	100	120	Ω
Z_{Rx_DC}	DC input impedance	40	50	60	Ω
$Z_{Rx\_HIGH\_IMP\_DC\_POS}$	Powered down DC input impedance positive	50	--	--	k
$Z_{Rx\_HIGH\_IMP\_DC\_NEG}$	Powered down DC input impedance negative	1	--	--	kΩ
$V_{Rx\_IDLE\_DET\_DIFFpp}$	Electrical idle detect threshold	65	--	175	mV
$T_{Rx\_IDLE\_DET\_DIFF\_ENTERTIME}$	Unexpected electrical idle enter detect threshold integration time	--	--	10	ms
L_{Rx_SKEW}	Total skew	---	-2	0	ns

3.4.2 High-Speed UART Interface

The AW-CM276MA-PUR supports a high-speed Universal Asynchronous Receiver/Transmitter (UART) interface, compliant to the industry standard 16550 specification. High-speed baud rates are supported to provide the physical transport between the device and the host for exchanging Bluetooth data. Table shows the rates supported.

The UART interface features include:

FIFO mode permanently selected for transmit and receive operations

Two pins for transmit and receive operations

Two flow control pins

Interrupt triggers for low-power, high throughput operation

The UART interface operation includes:

Upload boot code to the internal CPU (for debug purposes)

Support diagnostic tests

Support data input/output operations for peripheral devices connected through a standard UART interface

UART Baud Rates Supported

Baud Rate				
1200	38400	460800	1500000	3000000
2400	57600	500000	1843200	3250000
4800	76800	921600	2000000	3692300
9600	115200	1000000	2100000	4000000
19200	230400	1382400	2764800	--

3.4.2.1 UART Interface Signal Description

Table shows the standard UART signal names on the device.

Signal Name	16550 Standard Pin Name	Description
Data Bus		
UART_SIN	SIN	Serial data input from modem, data set, or peripheral device
UART_SOUT	SOUT	Serial data output from modem, data set, or peripheral device
Modem Control		
UART_RTSN	RTS	Request To Send output to modem, data set, or peripheral device (active low)
UART_CTSN	CTS	Clear To Send input from modem, data set, or peripheral device (active low)

3.4.2.2 UART Interface Functional Description

3.4.2.2.1 Booting from UART

When booting from the UART, the AW-CM276MA-PUR device has the following requirements:

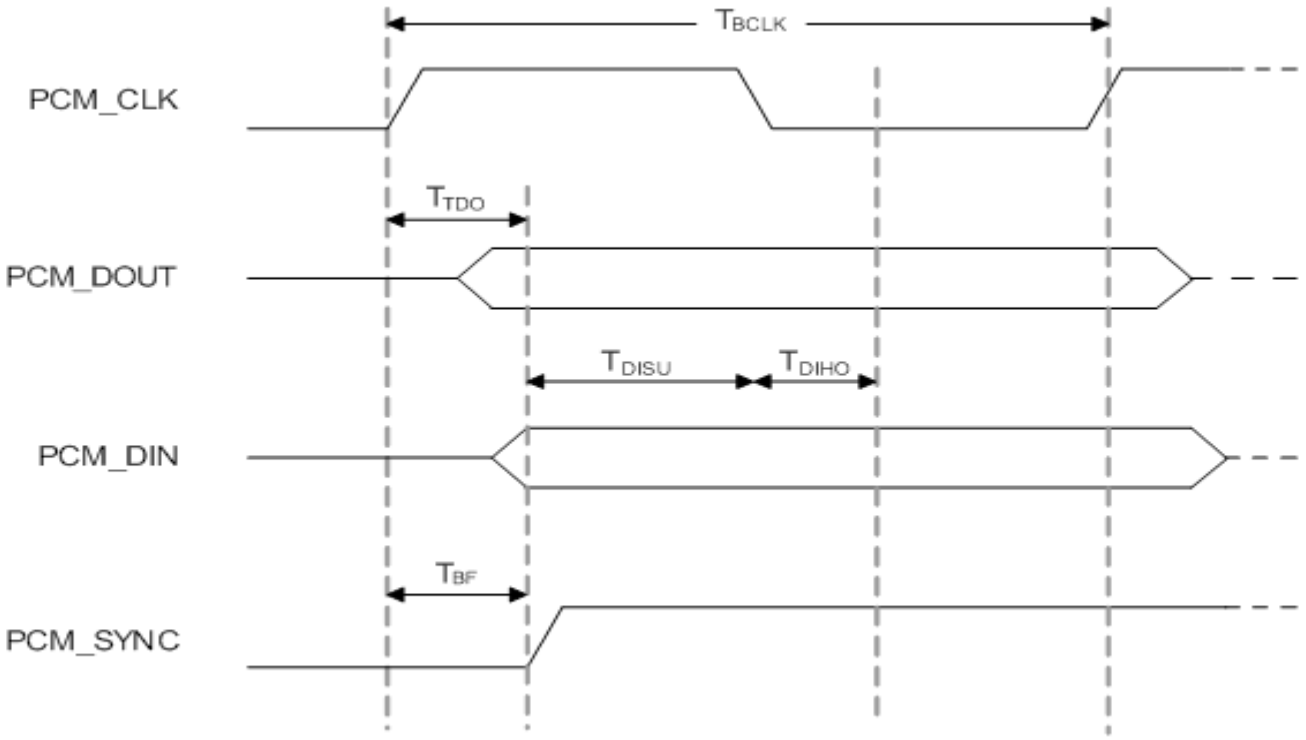
System Requirement	Description
Number of data bits	8 bits
Stop bits	1 bit
Parity	No parity
Baud Rate	115200

3.4.4.2.2 UART as Test Port

Test diagnostic programs may be uploaded to the CPU through the UART interface. During execution, the diagnostic program transmits performance and status information through the UART by performing a write to the PBU address space designated to the UART.

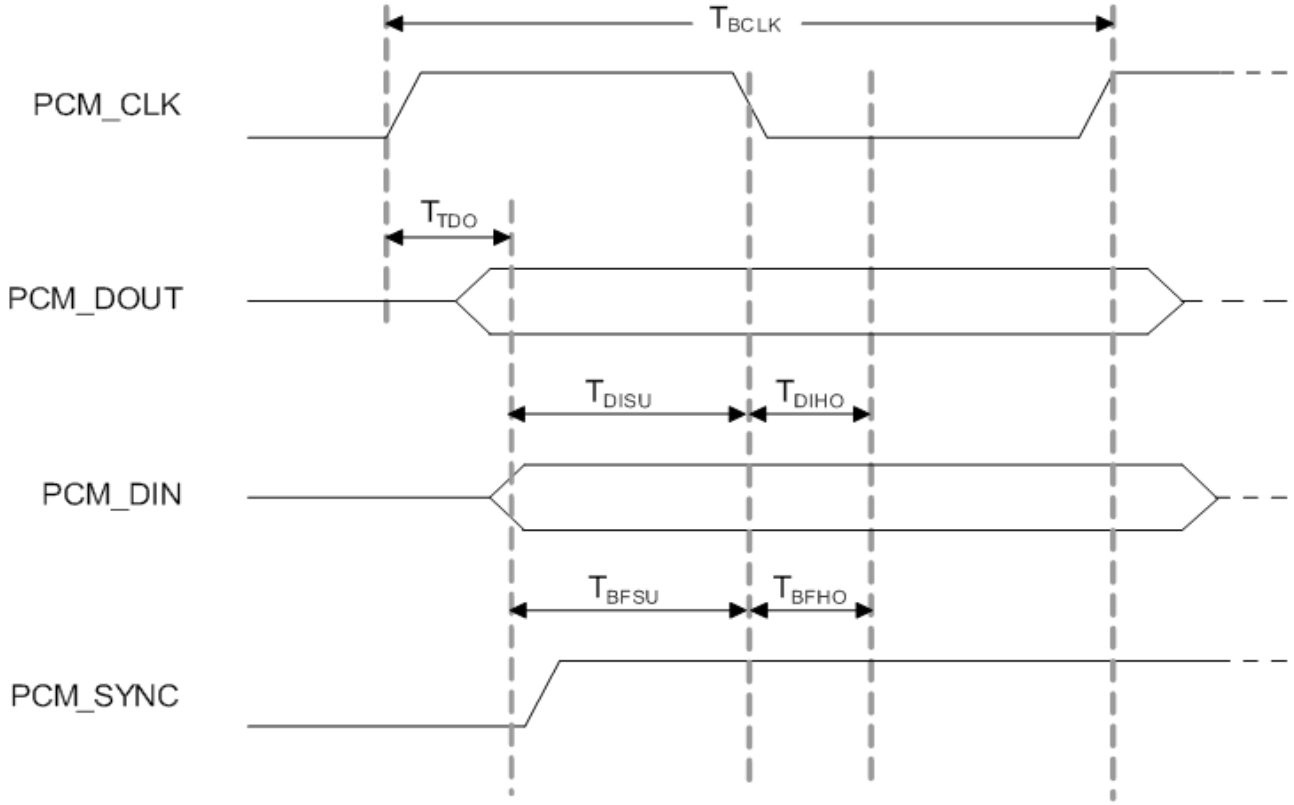
3.4.3 PCM Interface

3.4.3.1 PCM Timing Specification – Master Mode



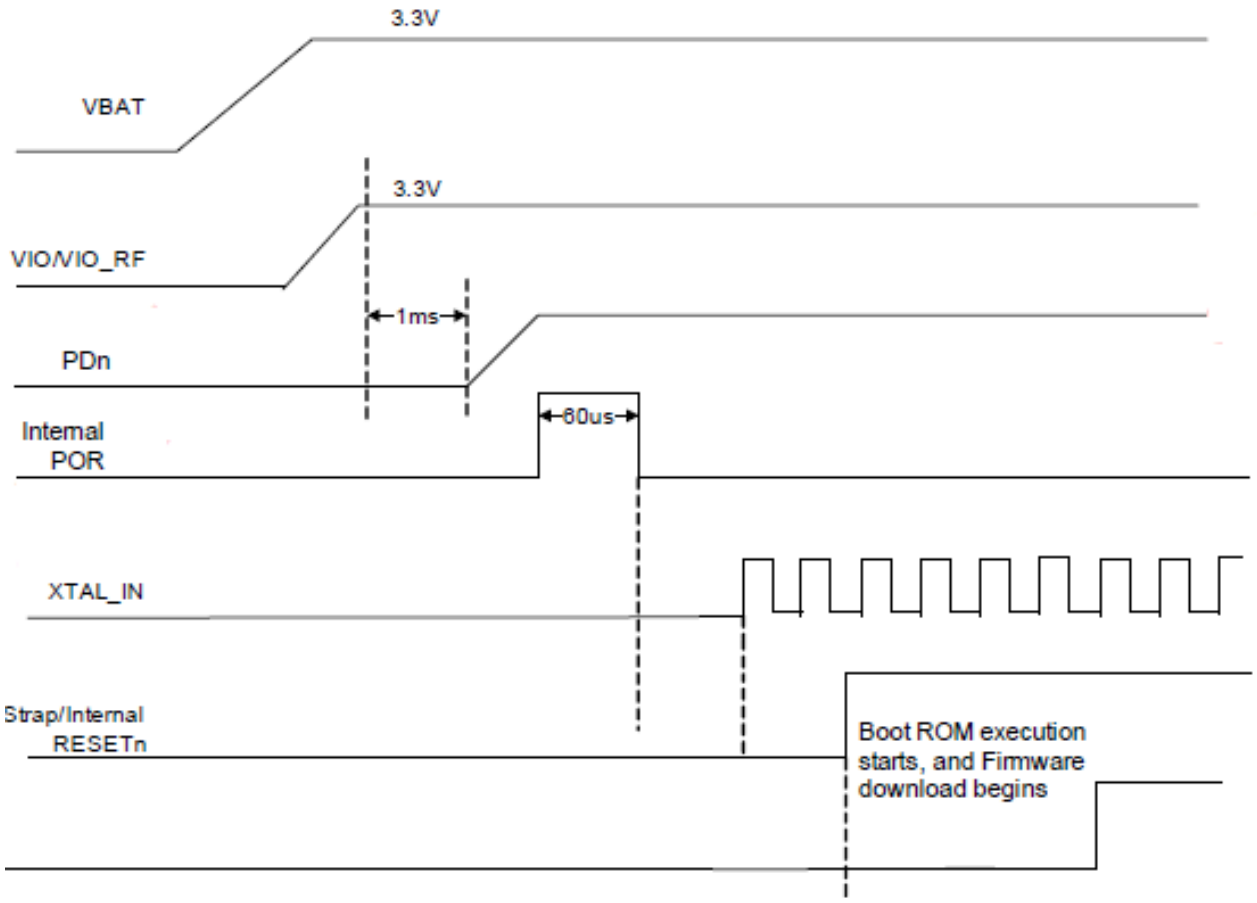
Symbol	Parameter	Condition	Min	Typ	Max	Units
F_{BCLK}	--	--	--	2/2.048	--	MHz
Duty $Cycle_{BCLK}$	--	--	0.4	0.5	0.6	--
$T_{BCLK\ rise/fall}$	--	--	--	3	--	ns
T_{DO}	--	--	--	--	15	ns
T_{DISU}	--	--	20	--	--	ns
T_{DIHO}	--	--	15	--	--	ns
T_{BF}	--	--	--	--	15	ns

3.4.3.2 PCM Timing Specification – Slave Mode



Symbol	Parameter	Condition	Min	Typ	Max	Units
F_{BCLK}	--	--	--	2/2.048	--	MHz
Duty $Cycle_{BCLK}$	--	--	0.4	0.5	0.6	--
$T_{BCLK\ rise/fall}$	--	--	--	3	--	ns
T_{DO}	--	--	--	--	30	ns
T_{DISU}	--	--	15	--	--	ns
T_{DIHO}	--	--	10	--	--	ns
T_{BFSU}	--	--	15	--	--	ns
T_{BFHO}	--	--	10	--	--	ns

3.5 Power up Timing Sequence



3.5.1 Reset Configuration

The AW-CM276MA-PUR is reset to its default operating state under the following conditions:

- Power-on reset (POR)
- Software/Firmware reset
- External pin for power down (PDn)

3.6 Power consumption

3.6.1 WLAN result

No.	Item	3.3V_VBAT=3.3V	
		Max.	Avg.
1.	Power down *(1)	0.61	0.59
2.	Deep sleep*(2) (Not enable usb_suspend.sh)	21.8	21.7
	Deep sleep *(2)(3)	2.6	2.6
3.	PS Mode 2.4g band *(3)(4)	96.0	7.2
4.	PS Mode 5g band *(3)(4)	163.7	8.3

No.	Item			3.3V_VBAT=3.3V				
				Transmit			Receive	
Band (GHz)	Mode	BW (MHz)	RF Power (dBm)	Max.	Avg.	DUTY %	Max.	Avg.
2.4	11b@1M	20	17	421.1	417.5	99	116.6	115.3
	11g@6M	20	16	380.5	377.4	99	118.4	117.8
	11n@MCS8 MIMO	20	16	729.3	721.5	98	141.1	140.8
	11n@MCS15 MIMO	20	16	652.1	647.1	78	139.2	139.0
	11n@MCS8 MIMO	40	14	602.4	597.6	89	159.2	158.9
	11n@MCS15 MIMO	40	14	520.4	516.6	70	153.6	153.5
5	11a@6M	20	13	402.2	401.3	98	141.9	139.2
	11n@MCS8 MIMO	20	13	794.5	791.2	95	174.3	174.2
	11n@MCS8 MIMO	40	12	737.9	734.6	88	201.5	201.3
	11ac@MCS0 NSS2	20	13	789.9	784.3	95	175.2	175.2
	11ac@MCS0 NSS2	80	10	656.2	654.7	86	216.3	214.3
	11ac@MCS9 NSS2	80	10	578.2	577.8	76	212.7	210.6

*Current Unit: mA

Note: DUT set Tx with Adjust Packet Gap with Sifs. Ext: Enter option: 35 1 1

(1) J14 power down pull low.

(2) The deep sleep current is too high, we using NXP reference board to measuring is same and highlighted to NXP this.

(3) Put the usb_suspend.sh file into the same folder with mlan.ko and run ./usb_suspend.sh 1

(4) Associate AP RT-AC66U, DTIM=1, Beacon Interval=100ms

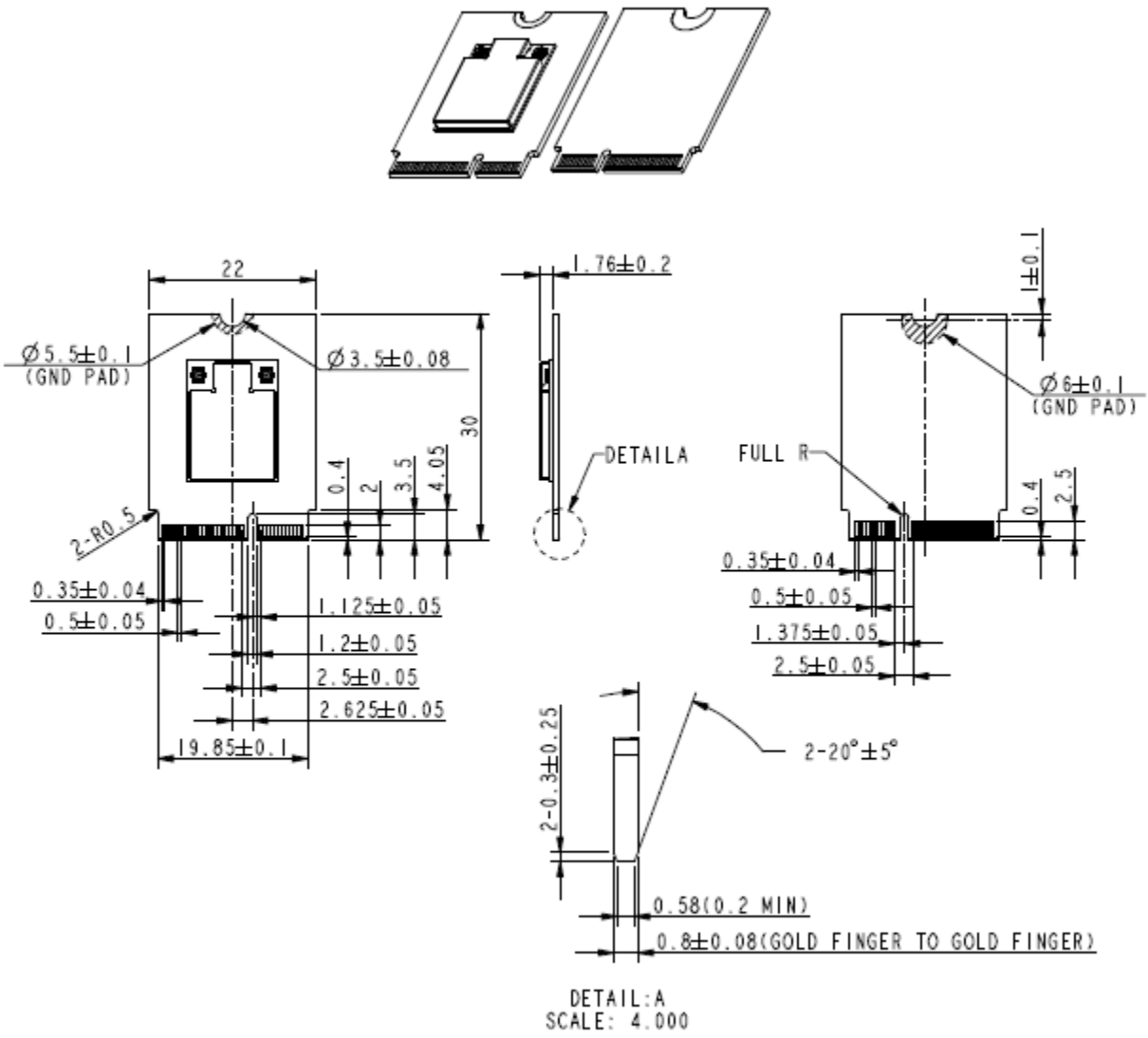
3.6.2 BT result

No.	Mode	3.3V_VBAT=3.3V	
		Max.	Avg.
1	Connect BT device	35.7	21.4
2	A2DP (send audio)	47.9	29.8

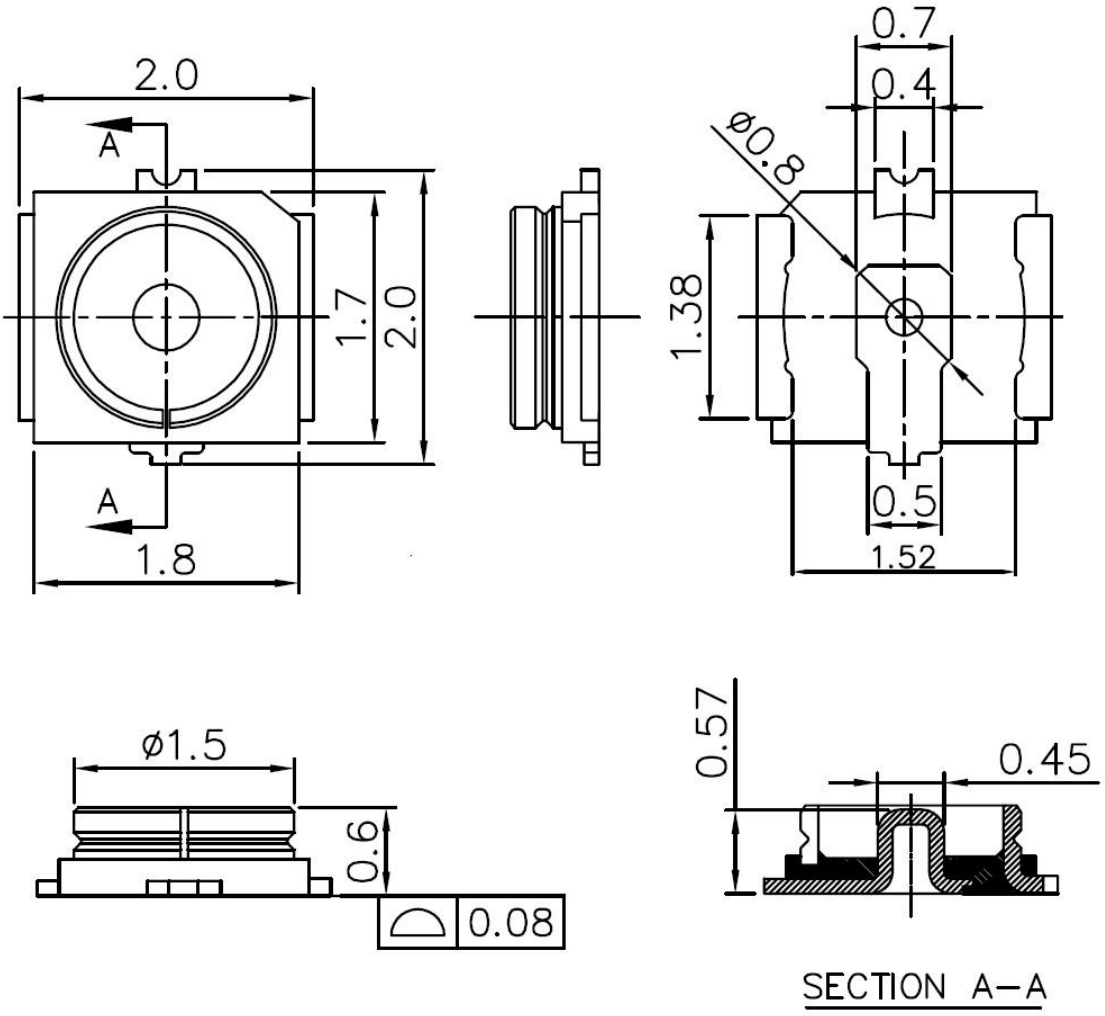
*Current Unit: mA

4. Mechanical Information

4.1 Mechanical Drawing



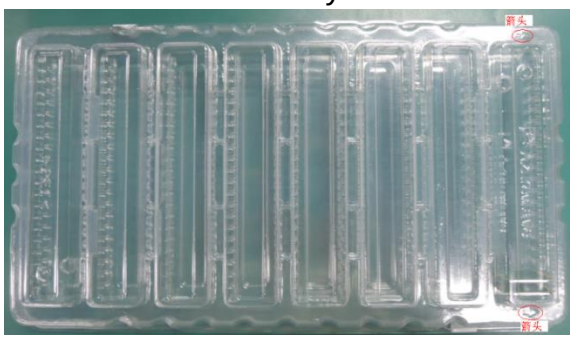
4.2 Antenna connector drawing



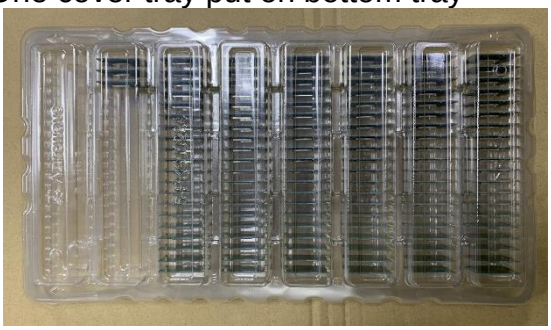
UNITS: mm

5. Packaging Information

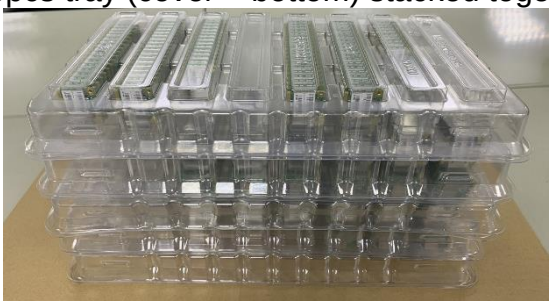
1. 160pcs M.2 2230 modules put in the one bottom tray



2. One cover tray put on bottom tray



3. 5pcs tray (cover + bottom) stacked together



4. Use P.P Strap to pack 5 trays

5. Put packed trays into inner box

6. Seal the inner box by AzureWave tape

7. One package label pasted in side of inner box

Example:

8. Two inner boxes put into one carton; If only one inner box has modules, “Empty” label pasted on the other one inner box



Example:

9. Seal the carton by AzureWave tape

10. One carton label and box label pasted on the carton. If the carton is not full, one balance label pasted on the carton

Example of carton label	AzureWave P/N: Customer: 由業務提供 Customer P/N: 由業務提供 Customer PO: 由業務提供 Description: AW-XXXXXX QTY: 1200 pcs C/N: N.W.: G.W. RoHS COMPLIANT
Example of box label	
Example of production label	
Example of balance label