AW-CM421HA

IEEE 802.11a/b/g/n/ac Wireless LAN 2T2R and Bluetooth 5.0 Combo HMC

Datasheet

Rev. C

DF

(For STD)

FORM NO.: FR2-015_ A Responsible Department：WBU Expiry Date: Forever
The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

Features

WLAN

General

- Support 802.11ac 2x2,Wave-2 compliant with MU-MIMO
- Complete 802.11n MIMO solution for 2.4GHz and 5Ghz band
- Maximum PHY data rate up to 173.3 Mbps using 20MHz bandwidth, 400Mbps using 40MHz bandwidth, and 866.7Mbps using 80MHz bandwidth.
- Backward compatible with 802.11a/b/g devices while operating at 802.11n data rates
- Backward compatible with 802.11a/n devices while operating at 802.11ac data rates.

Host interface

- Complies with PCI Express Base Specification Revision 2.1.
- Complies with USB2.0 FS-mode Specification for Bluetooth.
- PCIe LTR/L1.Off state supported.
- USB Selective Suspend supported.

Standards Supported

- IEEE 802.11a/b/g/n/ac compatible WLAN
- IEEE 802.11e QoS Enhancement (WMM)
- IEEE 802.11i (WPA, WPA2). Open, shared key, and pair-wise key authentication services
- IEEE 802.11h DFS, TPC, Spectrum Measurement
- WAPI (Wireless Authentication Privacy Infrastructure) certified.

MAC Features

- Frame aggregation for increased MAC efficiency (A-MSDU, A-MPDU)
- Low latency immediate Block Acknowledgement (BA)
- Channel management and co-existence
- MIMO power saving mechanism
- PHY-level spoofing to enhance legacy compatibility
- Multiple BSSID feature allows the RTL8822CE-CG to assume multiple MAC identities when used as a wireless bridge
- Transmit Opportunity (TXOP) Short Inter-Frame Space (SIFS) bursting for higher multimedia bandwidth
- WiFi Direct supports wireless peer to peer applications

Other Features

- Supports Wake-On-WLAN via Magic Packet and Wake-up frame
- Transmit Beamforming
- Support S3/S4 AES/TKIP group key update
- Support Network List Offload
- CCA on secondary through RTS/CTS handshake.
- Support TCP/UDP/IP checksum offload

Peripheral Interfaces

- Up to 15 General Purpose Input/Output pins.
- Two configurable LED pins.
- Generates 40MHz clock for peripheral chip.
- Single external power source 3.3V only.

PHY Features

- IEEE 802.11ac MIMO OFDM
- IEEE 802.11n MIMO OFDM

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

- Two Transmit and Two Receive paths
- 20MHz / 40MHz/ 80MHz bandwidth transmission
- Support 2.4GHz and 5GHz band channels
- Short Guard Interval (400ns)
- Sounding packet
- DSSS with DBPSK and DQPSK, CCK modulation with long and short preamble
- OFDM with BPSK, QPSK, 16QAM, 64QAM and 256QAM modulation. Convolutional Coding Rate: 1/2, 2/3, 3/4, and5/6.
- Maximum data rate 54Mbps in 802.11g, 300Mbps in 11n and 866.7Mbps in 802.11ac.
- OFDM / DSSS receive diversity with MRC using up to 2 receive paths. Switch diversity used for CCK.
- Support STBC.
- Support LDPC.
- Hardware antenna diversity.
- Maximum-Likelihod Detection (MLD)
- Fast receiver Automatic Gain Control (AGC)
- On-chip ADC and DAC.
- Build-in both 2.4GHz and 5GHz PA.
- Build-in both 2.4GHz and 5GHz LNA.

Bluetooth

Bluetooth Controller

- Support Bluetooth 5.0 system
- Compatible with Bluetooth v2.1 and v3.0+EDR
- Integrated MCU to execute Bluetooth protocol stack
- Supports all packet types in basic rate and enhanced data rate
- Supports Secure Simple Pairing
- Enhanced BT/WIFI Coexistence Control to improve transmission quality in different profiles
- Dual Mode support: Simultaneous LE and BR/EDR
- Supports multiple Low Energy states

Bluetooth Transceiver

- Fast AGC control to improve receiving dynamic range
- Integrated internal Class 1, Class 2, and Class 3 PA
- Supports Enhanced Power Control
- Supports Bluetooth Low Energy
- Integrated 32K oscillator for power management

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

Revision History

Document NO: R2-2421HA-DST-01

Version	Revision Date	DCN NO.	Description	Initials	Approved
A	2020/4/21	DCN017136	● Initial Version	Shihhua Huang	NC Chen
B	2021/3/15	DCN020909	*Changed to new format ● Modify typo for chapter 2.2 pin table	Shihhua Huang	NC Chen
C	2021/7/9	DCN022455	● Modify chapter 2.2 pin description	Shihhua Huang	NC Chen

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

Table of Contents

Revision History **4**
Table of Contents **5**
1. Introduction **6**
1.1 Product Overview **6**
1.2 Block Diagram **8**
1.3 Specifications Table **9**
1.3.1 General 9
1.3.2 WLAN 9
1.3.3 Bluetooth 11
1.3.4 Operating Conditions 11
2. Pin Definition **12**
2.1 Pin Map **12**
2.2 Pin Table **13**
3. Electrical Characteristics **16**
3.1 Recommended Operating Conditions **16**
3.2 Digital IO Pin DC Characteristics **16**
3.3 PCIE Interface **17**
3.3.1 Power up Timing Sequence 17
3.3.2 PCIE PERST# Timing Sequence 19
3.3.3 PCIE Power Off Sequence 20
3.3.4 BT_DIS Timing Sequence 21
3.3.5 Platform State Transitions 21
3.4 Power Consumption* **22**
3.4.1 WLAN 22
3.4.2 Bluetooth 22
4. Mechanical Information **23**
4.1 Mechanical Drawing **23**
5. Packaging Information **24**

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

1. Introduction

1.1 Product Overview

AzureWave Technologies, Inc. introduces the pioneer of the IEEE 802.11 a/b/g/n/ac WIFI with Bluetooth 5.0 combo HMC --- AW-CM421HA. The AW-CM421HA is a highly integrated single-chip that support 2-stream 802.11ac solutions with Multi-user MIMO (Multiple-Input, Multiple-Output) with Wireless LAN (WLAN) PCI Express network interface controller with integrated Bluetooth 5 USB interface controller. It combines a WLAN MAC, a 2T2R capable WLAN baseband, and RF in single chip.

The AW-CM421HA baseband implements Multi-user Multiple Input, Multiple Output (MU-MIMO)Orthogonal Frequency Division Multiplexing (OFDM) with two transmit and two receive paths (2T2R).Features include two spatial stream transmissions, short Guard Interval (GI) of 400ns, spatial spreading, and support for variant channel bandwidth. Moreover, AW-CM421HA provides one spatial stream space-time block code (STBC), Transmit Beamforming (TxBF) and Low Density Parity Check (LDPC) to extend the range of transmission. At the receiver, extended range and good minimum sensitivity is achieved by having receiver diversity up to 2 antennas. As the recipient, the AW-CM421HA also supports explicit sounding packet feedback that helps senders with beamforming capability.

For legacy compatibility, Direct Sequence Spread Spectrum (DSSS), Complementary Code Keying (CCK) and OFDM baseband processing are included to support all IEEE 802.11b, 802.11g and 802.11a data rates. Differential phase shift keying modulation schemes, DBPSK and DQPSK with data scrambling capability are available, and CCK provides support for legacy data rates, with long or short preamble. The high speed FFT/IFFT paths, combined with BPSK, QPSK, 16QAM, 64QAM and 256QAM modulation of the individual subcarriers, and rate compatible coding rate of 1/2, 2/3, 3/4, and 5/6, provide up to 866.7Mbps for IEEE 802.11ac MIMO OFDM.

The RTL8822CE-CG builds in an enhanced signal detector, an adaptive frequency domain equalizer, and a soft-decision Viterbi decoder to alleviate severe multi-path effects and mutual interference in the reception of multiple streams. For better detection quality, receive diversity with Maximal-Ratio-Combine (MRC) applying up to two receive paths, and Maximum-Likelihood Detection (MLD) are implemented. Robust interference detection and suppression are provided to protect against Bluetooth, cordless phone, and microwave oven interference. Receive vector diversity for multi-

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

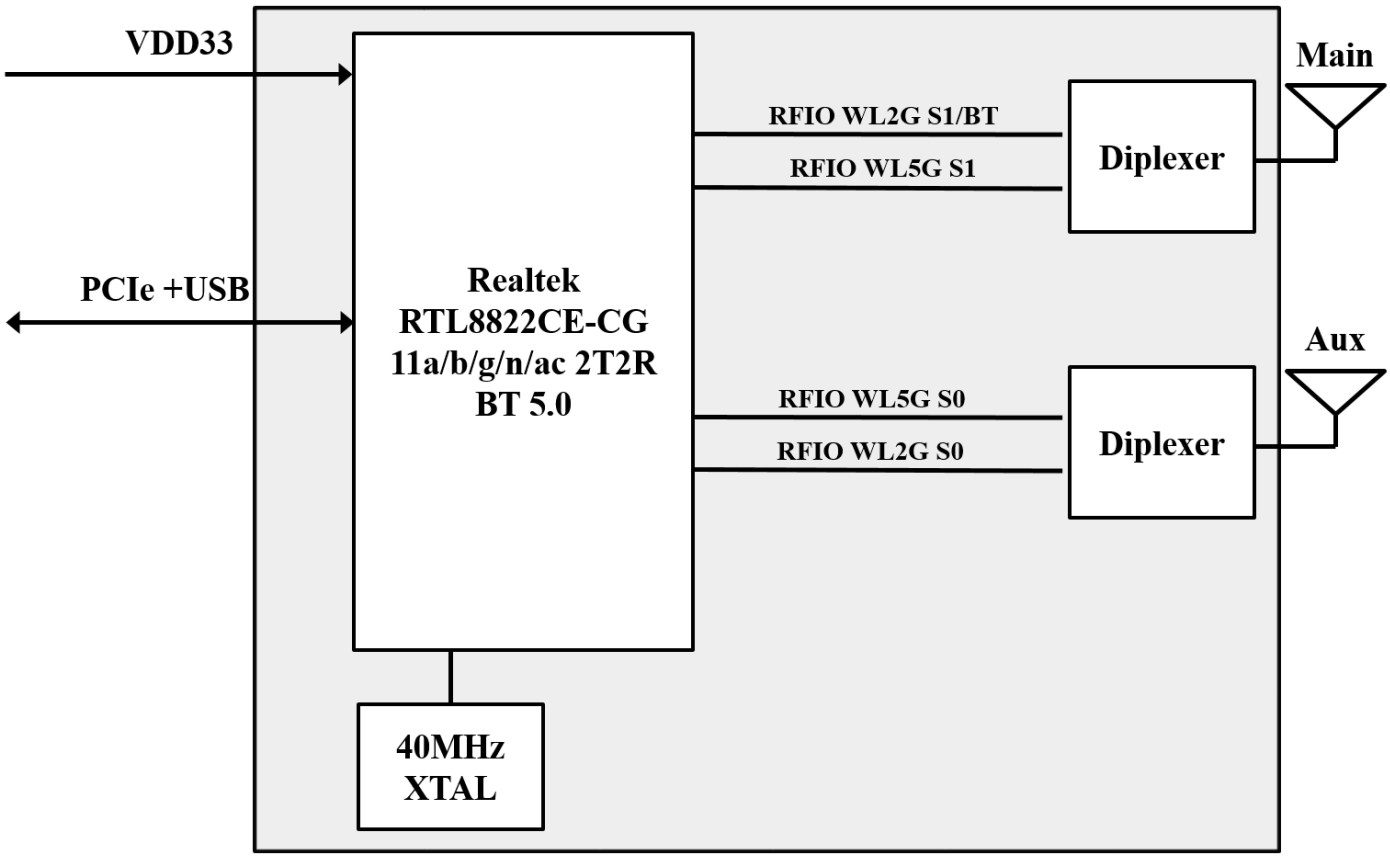
stream application is implemented for efficient utilization of the MIMO channel. Efficient IQ-imbalance, DC offset, phase noise, frequency offset, and timing offset compensations are provided for the radio frequency front-end.

The RTL8822CE-CG supports fast receiver Automatic Gain Control (AGC) with synchronous and asynchronous control loops among antennas, antenna diversity functions, and adaptive transmit power control functions to obtain better performance in the analog portions of the transceiver.

The RTL8822CE-CG MAC supports 802.11e for multimedia applications, 802.11i and WAPI for security, and 802.11n/802.11ac for enhanced MAC protocol efficiency. Using packet aggregation techniques such as A-MPDU with BA and A-MSDU, protocol efficiency is significantly improved. Power saving mechanisms such as Legacy Power Save, U-APSD, and MIMO power saving reduce the power wasted during idle time, and compensate for the extra power required to transmit MIMO OFDM. The RTL8822CE-CG provides simple legacy, 20MHz/40MHz/80MHz co-existence mechanisms to ensure backward and network compatibility.

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

1.2 Block Diagram



AW-CM421HA BLOCK DIAGRAM

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

1.3 Specifications Table

1.3.1 General

Features	Description
Product Description	IEEE 802.11a/b/g/n/ac Wireless LAN 2T2R and Bluetooth 5.0 Combo Module (HMC)
Major Chipset	RTL8822CE-CG
Host Interface	Wi-Fi +BT ● PCIe + USB
Dimension	29.85mm x 26.65mm x 2.82mm (Tolerance remarked in mechanical drawing)
Form factor	HMC
Antenna	I-PEX MHF4 Connector Receptacle (20449) ANT1(Main)：WiFi/Bluetooth → TX/RX ANT2(Aux)：WiFi → TX/RX
Weight	0.6g

1.3.2 WLAN

Features	Description
WLAN Standard	IEEE 802.11 a/b/g/n/ac 2T2R
WLAN VID/PID	10EC/C822
WLAN SVID/SPID	1A3B/4210
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 – 1 ~ 13 ■ Japan, 1 ~ 14 (CH14 only for 802.11b) **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

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

Output Power (Board Level Limit)*

2.4G

	Min	Typ	Max	Unit
11b (11Mbps)	16.5	18	19	dBm
11g (54Mbps)	15.5	17	18	dBm
11n (HT20 MCS7)	14.5	16	17	dBm
11n (HT40 MCS7)	14.5	16	17	dBm

5G

	Min	Typ	Max	Unit
11a (54Mbps)	15	17	18.5	dBm
11n (HT20 MCS7)	14	16	17.5	dBm
11n (HT40 MCS7)	14	16	17.5	dBm
11ac (VHT80 MCS9)	12	14	15.5	dBm

Receiver Sensitivity

2.4G

	Min	Typ	Max	Unit
11b (11Mbps)		-82	-79	dBm
11g (54Mbps)		-68	-65	dBm
11n (HT20 MCS7)		-67	-64	dBm
11n (HT40 MCS7)		-64	-61	dBm

5G

	Min	Typ	Max	Unit
11a (54Mbps)		-68	-65	dBm
11n (HT20 MCS7)		-67	-64	dBm
11n (HT40 MCS7)		-64	-61	dBm
11ac (VHT80 MCS9)		-54	-51	dBm

Data Rate

WLAN:
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 173.3Mbps (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 (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.

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

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>13D3/3549</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><th></th><th>Min</th><th>Typ</th><th>Max</th><th>Unit</th></tr>
<tr><td>BDR</td><td>2</td><td>4</td><td>6</td><td>dBm</td></tr>
<tr><td>EDR</td><td>2</td><td>4</td><td>6</td><td>dBm</td></tr>
<tr><td>Low Energy (1MHz)</td><td>2</td><td>4</td><td>6</td><td>dBm</td></tr>
</table>
</td></tr>
<tr><td>Receiver Sensitivity</td><td>
<table>
<tr><th></th><th>Min</th><th>Typ</th><th>Max</th><th>Unit</th></tr>
<tr><td>BDR</td><td></td><td>-70</td><td></td><td>dBm</td></tr>
<tr><td>EDR</td><td></td><td>-70</td><td></td><td>dBm</td></tr>
<tr><td>Low Energy (1MHz)</td><td></td><td>-70</td><td></td><td>dBm</td></tr>
</table>
</td></tr>
</table>

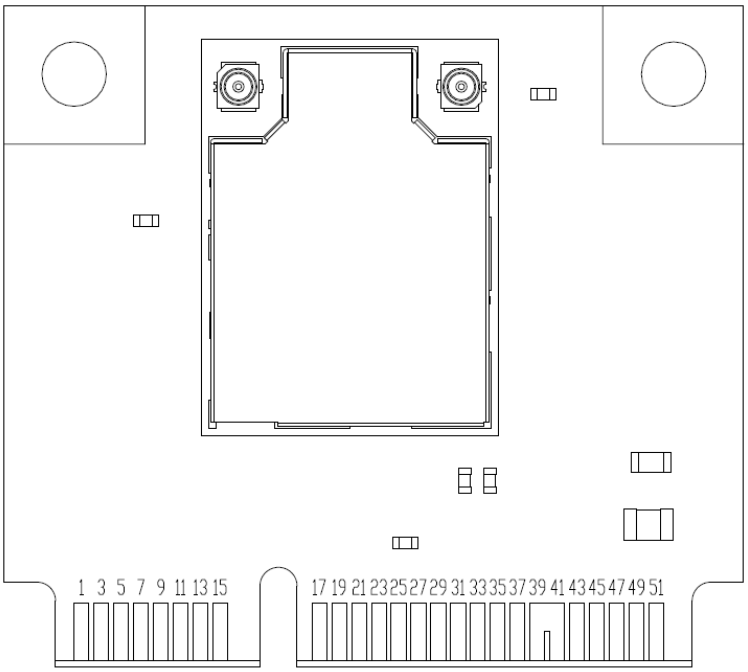
1.3.4 Operating Conditions

Features	Description
Operating Conditions	
Voltage	Power supply for host:3.3V
Operating Temperature	0℃~70℃
Operating Humidity	less than 85%R.H.
Storage Temperature	-30℃~ 85℃
Storage Humidity	less than 60%R.H.
ESD Protection	
Human Body Model	3.5KV
Changed Device Model	500V

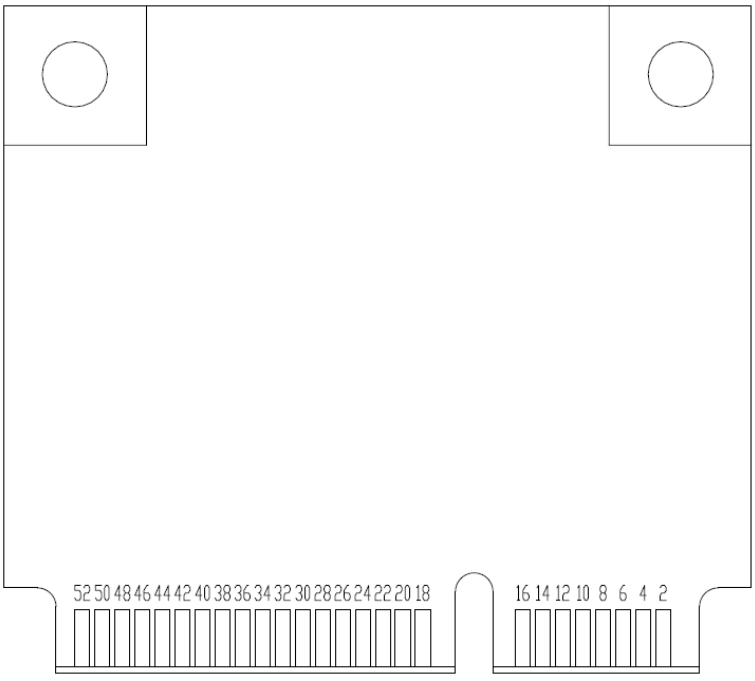
The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

2. Pin Definition

2.1 Pin Map



AW-CM421HA Pin Map (Top View)



AW-CM421HA Pin Map (Bottom View)

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

2.2 Pin Table

Pin No	Definition	Basic Description	Voltage	Type
1	WAKE#	Open Drain active Low signal. This signal is used to request that the system return from a sleep/suspended state to service a function initiated wake event.	3.3V	O/D
2	3.3V	3.3V power supply.	3.3V	VCC
3	NC	Floating Pin, No connect to anything.		Floating
4	GND	Ground.		GND
5	NC	Floating Pin, No connect to anything.		Floating
6	NC	Floating Pin, No connect to anything.		Floating
7	CLKREQ#	Reference clock request.	3.3V	I/O
8	NC	Floating Pin, No connect to anything.		Floating
9	GND	Ground.		GND
10	NC	Floating Pin, No connect to anything.		Floating
11	REFCLK-	Differential reference clock.		I
12	NC	Floating Pin, No connect to anything.		Floating
13	REFCLK+	Differential reference clock.		I
14	NC	Floating Pin, No connect to anything.		Floating
15	GND	Ground.		GND
16	NC	Floating Pin, No connect to anything.		Floating
17	NC	Floating Pin, No connect to anything.		Floating
18	GND	Ground.		GND
19	NC	Floating Pin, No connect to anything.		Floating
20	W_DISABLE#	Turn off WLAN RF analog and front–end. Active low. This pin is controlled by system.	3.3V	I
21	GND	Ground.		GND
22	PERST#	PCI Express reset with weak pull–down.	3.3V	I
23	PERn0	Differential transmit (module side)		O

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

24	NC	Floating Pin, No connect to anything.		Floating
25	PERp0	Differential transmit (module side)		O
26	GND	Ground.		GND
27	GND	Ground.		GND
28	NC	Floating Pin, No connect to anything.		Floating
29	GND	Ground.		GND
30	SMB_CLK	Floating Pin, No connect to anything.		Floating
31	PETn0	Differential receive (module side)		I
32	NC	Floating Pin, No connect to anything.		Floating
33	PETp0	Differential receive (module side)		I
34	GND	Ground.		GND
35	GND	Ground.		GND
36	USB_D-	DM_USB_BT.		I/O
37	Reserved	Ground.		GND
38	USB_D+	DP_USB_BT.		I/O
39	3.3V	3.3V power supply.	3.3V	VCC
40	GND	Ground.		GND
41	3.3V	3.3V power supply.	3.3V	VCC
42	NC	Floating Pin, No connect to anything.		Floating
43	Reserved	Ground.		GND
44	LED_WLAN#	WL led function.	1.9V	O
45	NC	Floating Pin, No connect to anything.		Floating
46	LED_WPAN#	BT led function.	1.9V	O
47	NC	Floating Pin, No connect to anything.		Floating
48	NC	Floating Pin, No connect to anything.		Floating
49	NC	Floating Pin, No connect to anything.		Floating
50	GND	Ground.		GND

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

51	**BT_DISABLE#**	**This pin can externally disable the BT function when BT_DIS# is pulled Low. When this pin is pulled low, USB interface will be also disabled. (IC internal pull up)** **This pin can be also defined as the BT Radio-off function with host interface remaining connected.**	**3.3V**	**I**
52	**3.3V**	**3.3V power supply.**		**VCC**

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

3. Electrical Characteristics

3.1 Recommended Operating Conditions

Symbol	Parameter	Minimum	Typical	Maximum	Unit
VD33	I/O voltage	3.0	3.3	3.6	V

3.2 Digital IO Pin DC Characteristics

Table 1. 3.3V IO DC Characteristics

Symbol	Parameter	Minimum	Typical	Maximum	Unit
V_{IH}	Input high voltage	2.0	3.3	3.6	V
V_{IL}	Input low voltage	--	0	0.9	V
V_{OH}	Output high voltage	2.97	--	3.3	V
V_{OL}	Output low voltage	0	--	0.33	V

Table 2. 1.8V IO DC Characteristics

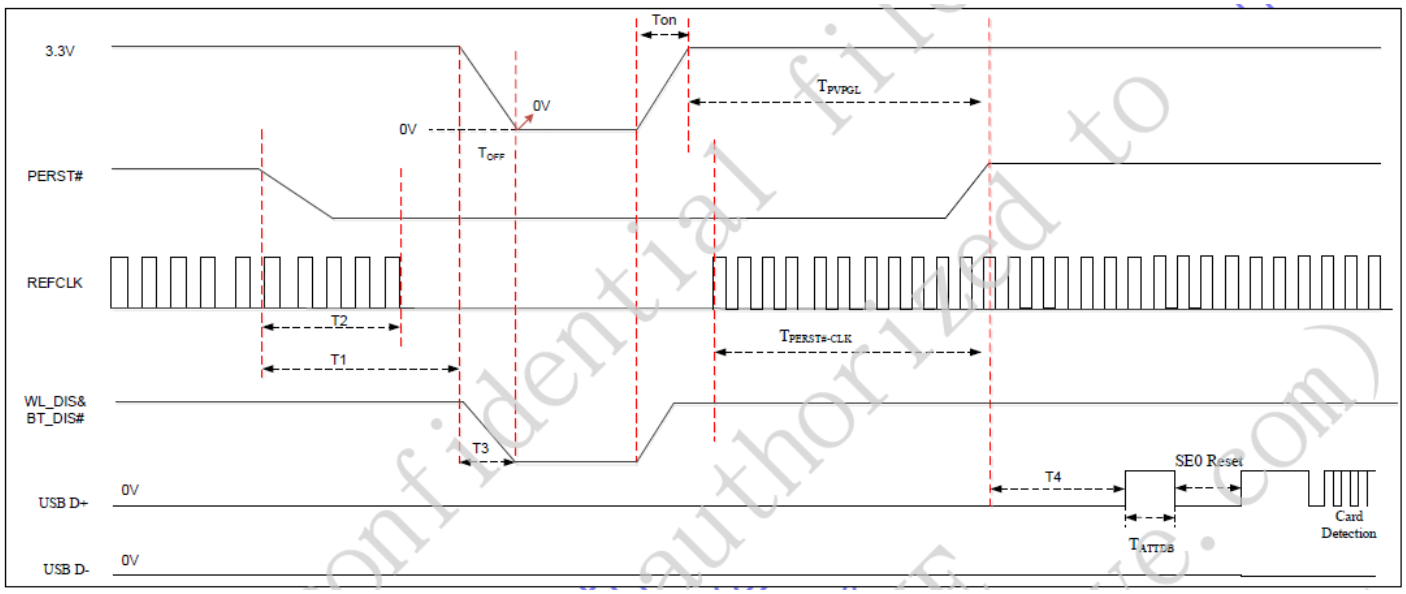
Symbol	Parameter	Minimum	Typical	Maximum	Unit
V_{IH}	Input high voltage	1.7	1.8	2.0	V
V_{IL}	Input low voltage	--	0	0.8	V
V_{OH}	Output high voltage	1.62	--	1.8	V
V_{OL}	Output low voltage	0	--	0.18	V

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

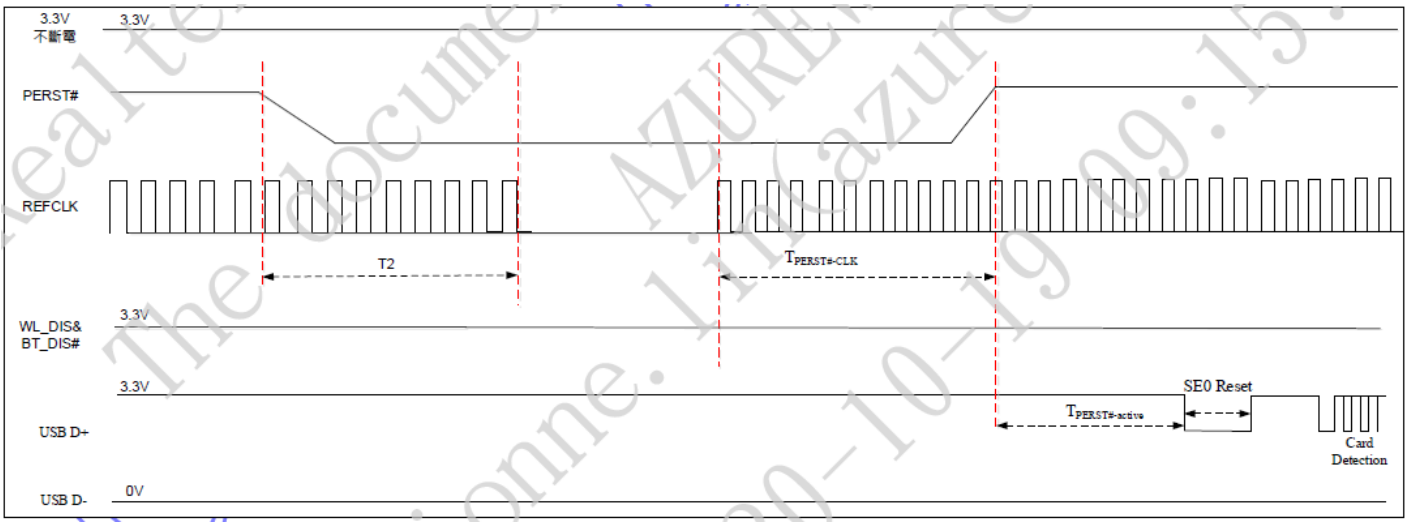
3.3 PCIE Interface

3.3.1 Power up Timing Sequence

3.3.1.1 When WLAN is power off



3.3.1.2 When WLAN is NOT power off



Ton: The main power ramp up duration

Toff: The main power off duration

TPVPGL: Power valid PERST# input inactive

TPERST#-CLK: Reference clock stable before PERST# inactive

TATTDB: The debounce interval with a minimal duration of 100ms that provided by the USB system

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

software

$T_{SE0\ Reset}$: USB host send SE0 Reset duration

$T_{PERST\#-active}$: PCI-e initial duration after PERST# inactive

Note:

T1: PERST# goes active before the power on the connector is removed.

T2: Clock to inactive after PERST# goes active.

T3: WL_DIS# and BT_DIS# goes asserted when the power on the connector is removed.

T4: USB D+ go active after PERST# goes inactive.

Table 3. The typical timing range

Symbol	Unit	Min	Typical	Max
T_{on}	ms	0.5	1.5	5
T_{PVPGL}	ms	Implementation specific; recommended 50ms		--
$T_{PERST\#-CLK}$	us	100		--
T_{attach}	ms	0.5	2	5
T_{ATTDB}	ms	100	--	--
$T_{SE0\ Reset}$	ms	10	--	--

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

3.3.2 PCIE PERST# Timing Sequence

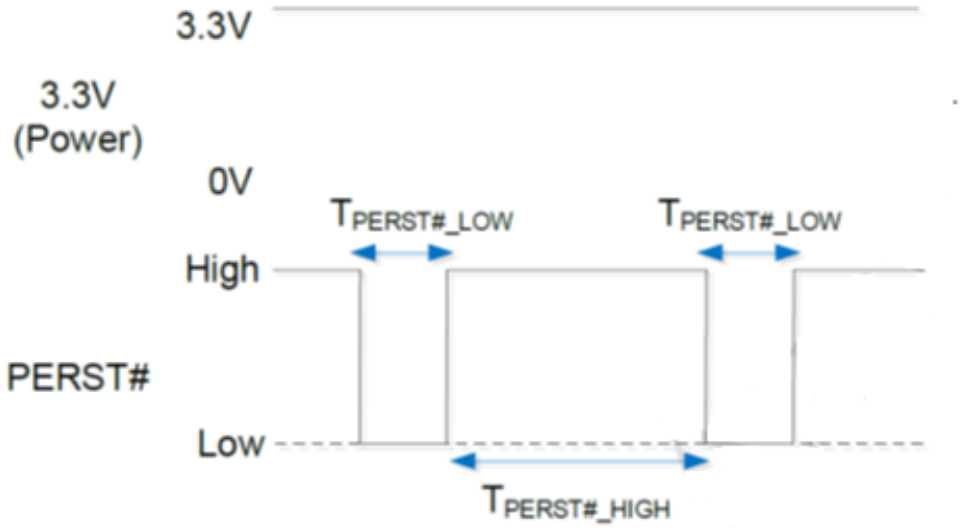


Table 4. PERST# Timing Parameters

	Min	Typical	Max	Unit	Description
T PERST#_LOW	6	10	X	ms	PERST# low duration
T PERST#_HIGH	400	500	X	ms	PERST# high duration

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

3.3.3 PCIE Power Off Sequence

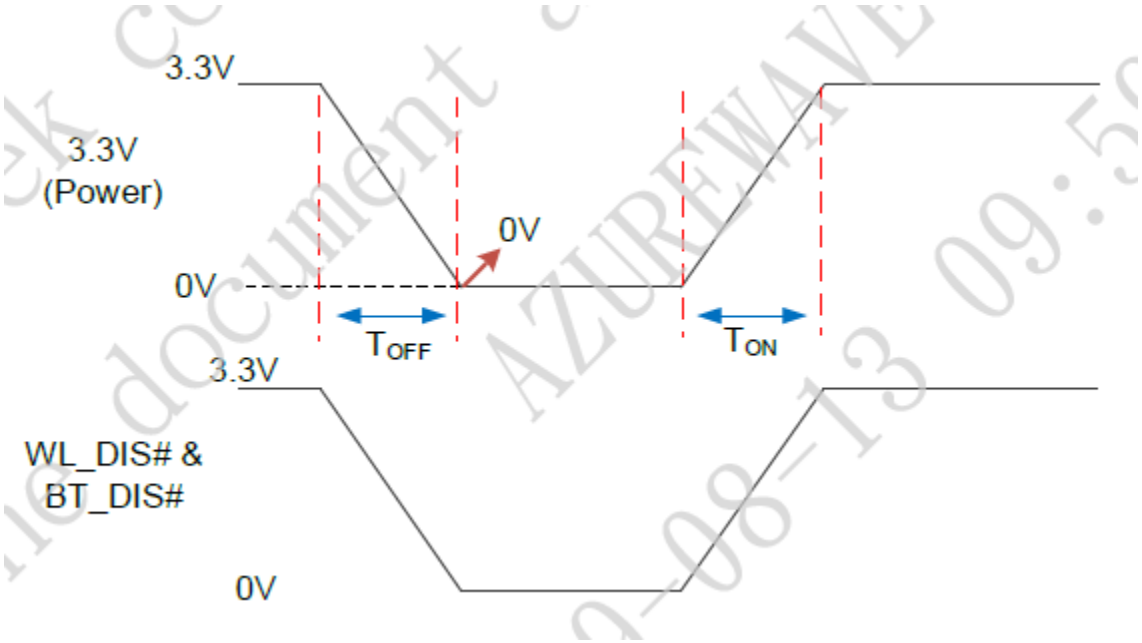


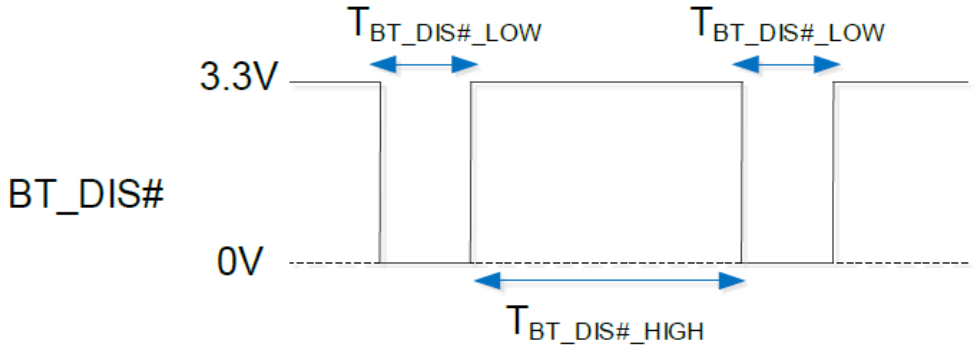
Table 5. PCIE Power Off Timing Parameters

	Min	Typical	Max	Unit	Description
T OFF	1.5	--	--	ms	Measure point start on 100% Measure point end on 0% (must be 0V)
TON	0.5	1.5	5	ms	Measure point start on 0%(must be 0V) Measure point end on 100%

Note: If BT_DIS# can't connect to the same power source with 3.3V, it need to be de-asserted before PERST# with 100ms in power on sequence.

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

3.3.4 BT_DIS Timing Sequence



	Min	Typical	Max	Unit	Description
BT_DIS#_LOW	200	--	--	ms	BT_DIS# low duration
BT_DIS#_HIGH	500	--	--	ms	BT_DIS# high duration

3.3.5 Platform State Transitions

Table 6. USB Platform Power Rail Requirements

3.3V Power range	3.3V Ripple	3.3V Noise	Rise time	
			Min	Max
+/- 0.165V	300mVpp@ switching frequency > 1MHz		1ms	5ms

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

3.4 Power Consumption*

3.4.1 WLAN

Band (GHz)	Mode	BW (MHz)	Link Speed	Voltage=3.3 V			
				Transmit		Receive	
				Max.	Avg.	Max.	Avg.
2.4	802.11b	20	11M	TBD	TBD	TBD	TBD
	802.11n	20	144.5M	TBD	TBD	TBD	TBD
		40	300M	TBD	TBD	TBD	TBD
5	802.11n	20	144.5M	TBD	TBD	TBD	TBD
		40	300M	TBD	TBD	TBD	TBD
	802.11ac	20	173.5M	TBD	TBD	TBD	TBD
		40	400M	TBD	TBD	TBD	TBD
		80	867.0M	TBD	TBD	TBD	TBD

* The power consumption is based on AzureWave test environment, these data for reference only.

3.4.2 Bluetooth

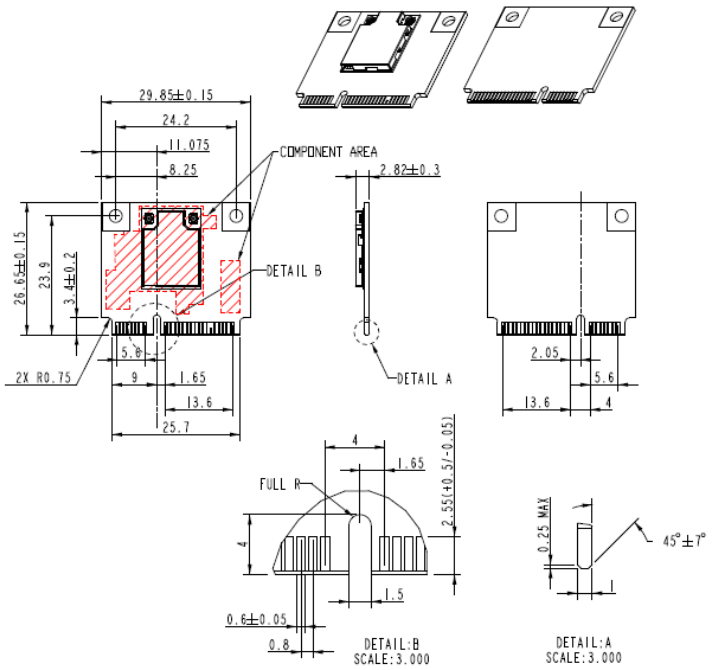
No.	Mode	Voltage=3.3 V	
		Max.	Avg.
1	No Connection with any BT device	TBD	TBD
2	Connect BT Device	TBD	TBD
3	Transmit by BER 2.1	TBD	TBD
4	Receiver by BER 2.1	TBD	TBD

* The power consumption is based on AzureWave test environment, these data for reference only.

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

4. Mechanical Information

4.1 Mechanical Drawing



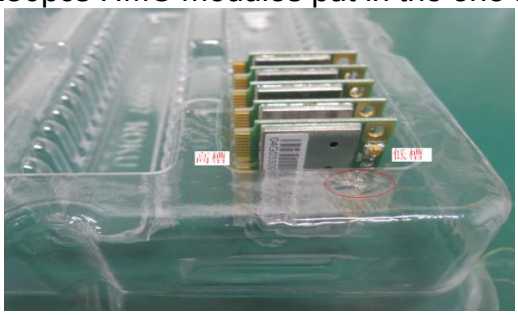
TOLERANCES UNLESS OTHERWISE SPECIFIED:±0.1mm

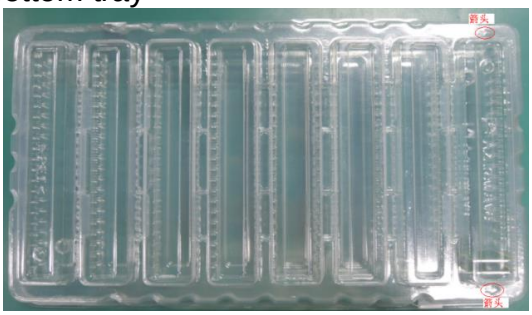
			AzureWave					MODEL NO.		DESCRIPTION					DOCUMENT LEVEL	
								2421HA		OUTLINE DRAWING					NORMAL	
			DIM.	X≤80	80<X≤180	180<X≤315	315<X≤800	PART NO.	DRAWING NO.	MATERIAL	UNIT	SCALE	REV	PAGE	DATE	DESIGNED
ITEM	DESCRIPTION	DATE	TOL.	±0.1	±0.15	±0.20	±0.25		R2-2421HA-COD-01		mm	1/1	A	1/1	2020/01/09	STEVE CHANG

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

5. Packaging Information

1. 150pcs HMC modules put in the one bottom tray

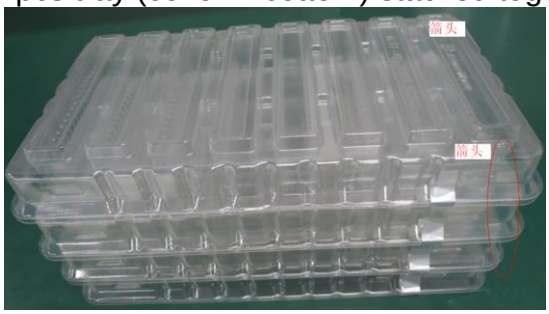




2. One cover tray put on bottom tray



3. 4pcs tray (cover + bottom) stacked together



4. Use P.P Strap to pack 4 trays



5. Put packed trays into inner box

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.



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





The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.



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



The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.

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: pcs C/N N.W. G.W. RoHS COMPLIANT
Example of box label	
Example of balance label	

The information contained herein is the exclusive property of AzureWave and shall not be distributed, reproduced, or disclosed in whole or in part without prior written permission of AzureWave.