Wireless Module

WPEQ-276AX

WiFi 6E (802.11ax) 2x2 MU-MIMO

6GHz Single Band Mini PCIe Module

802.11ax with MU-MIMO 2x2 Solution

The first WiFi-6E (802.11ax) Qualcomm based AP solution on module formfactor from SparkLAN. WPEQ-276AX, is based on QCN9072 chipset solution. This is a true enterprise based wireless module that powers 2T2R (2x2) MU-MIMO, in 6Ghz Single band mode, hitting a theoretical speed of up to 2.4Gbps with 160MHz support.

Unlike typical Qualcomm reference design around QCN9072, WPEQ-276AX shrink the traditional 50mmx50mm M.2 E-Key design to a more popular Mini PCIe Full size formfactor of just 50mm x 30mm, run at 3.3V voltage. Provides a greater versatility to use on more common seen design.

WPEQ-276AX performs both AP and STA functionality with 2 spatial streams, although recommended more for hardware AP applications as it supports 4096-QAM, OFDMA technology, makes it perfect for heavy lifting applications such as Enterprise grade AP, UTM, public & transportation Hotspot, and other industrial capable Access Points.

Embedded Application

Applications include Multimedia Router and AP solution., etc.

Key Feature

- 6GHz, 2x2 MU-MIMO OFDMA Technology, up to 4804Mbps physical data rate
- Single Band 6GHz 2x2 Wi-Fi 6E (802.11ax)
- 2 spatial streams (2SS)
- Perfect for AP solutions
- Support standard full size Mini PCIe module

Specification

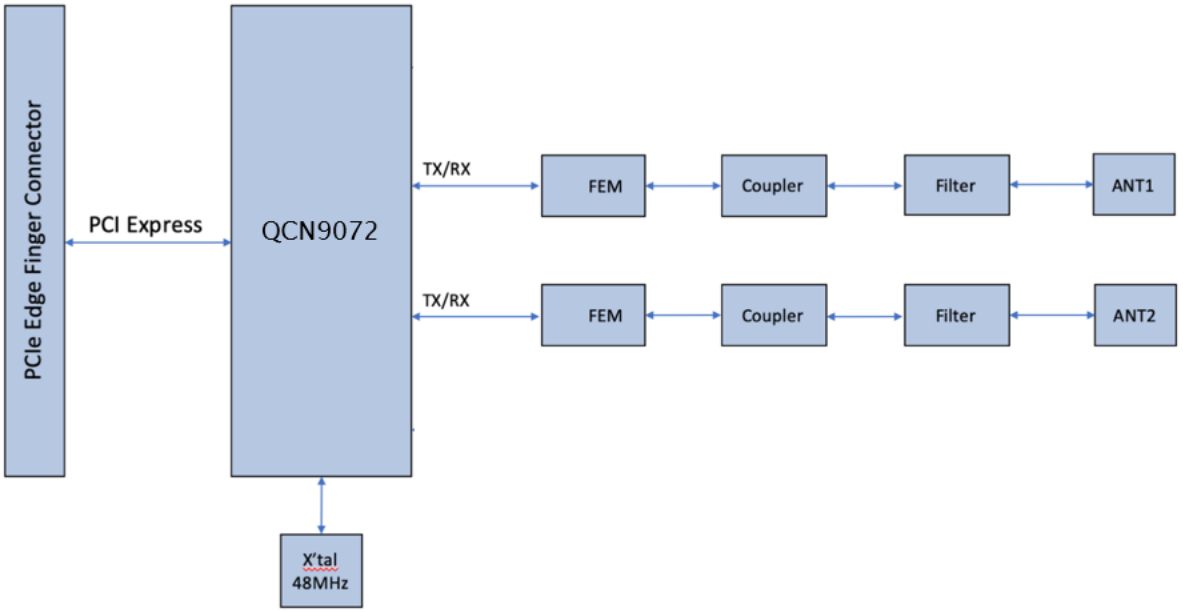
Standards	IEEE 802.11ax 2T2R 6G
Chipset	Qualcomm Atheros QCN9072
Data Rate	802.11ax: HE0~11
Operating Frequency	IEEE 802.11ax 5.925~7.125GHz *Subject to local regulations
Interface	WLAN: PCIe
Form Factor	Mini PCIe
Antenna	2 x IPEX MHF1 connectors
Modulation	Wi-Fi : 802.11ax: OFDMA (BPSK, QPSK, DBPSK, DQPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, 4096-QAM)
Power Consumption	TX mode: 1288mA(Max.) RX mode: 965mA(Max.)
Operating Voltage	DC 3.3V
Operating Temperature Range	-20°C ~ +70°C
Storage Temperature Range	-20°C ~ +90°C
Humidity (Non-Condensing)	5%~90% (Operating) 5%~90% (Storing)
Dimension L x W x H (in mm)	50.80mm(±0.15mm) x 29.85mm(±0.15mm) x 9.30mm(±0.3mm)
Weight (g)	14.82g
Driver Support	Linux (Open Source)
Security	64/128-bits WEP, WPA, WPA2,WPA3,802.1x

OUTPUT POWER & SENSITIVITY

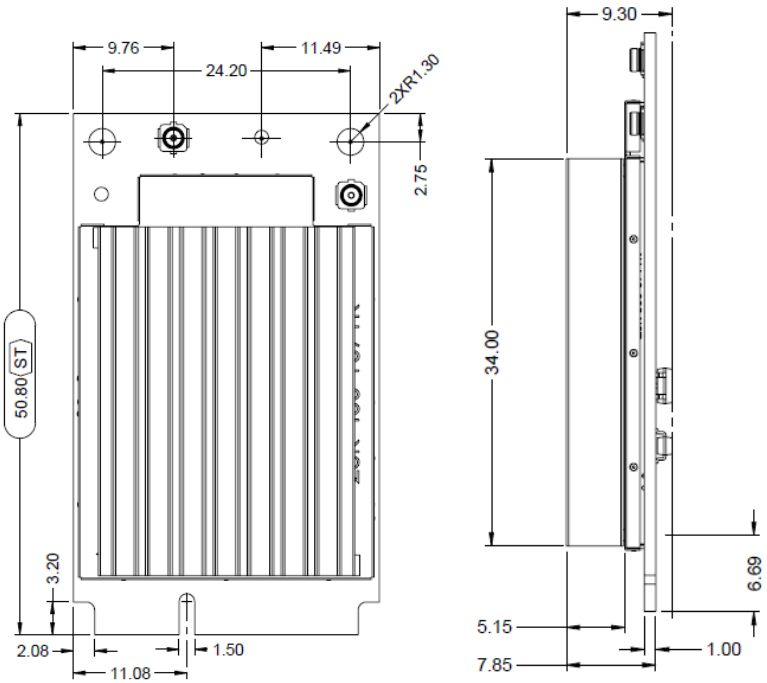
802.11ax / 6GHz (Pre-Chain)				
HE20	**Data Rate**	**Tx ± 2dBm (1TX)**	**Tx ± 2dBm (2TX)**	**Rx Sensitivity**
	HE11	13dBm	16dBm	≦-60dBm

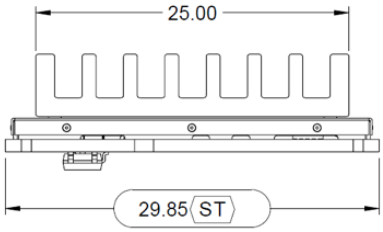
HE40	HE11	13dBm	16dBm	≦-56dBm
HE80	HE11	13dBm	16dBm	≦-53dBm
HE160	HE11	13dBm	16dBm	≦-51 dBm

Block Diagram

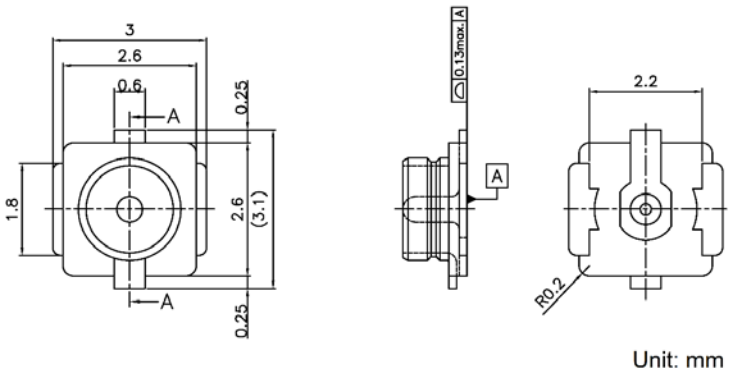


Mechanical Dimension (mm)





MHF1 connector spec.



Unit: mm

Pin Assignment

The following section illustrate signal pin-outs for the module connector.

TOP			
Pin#	**Pin Name**	**Type**	**Description**
1	WAKE#	I/O	Open Drain active Low signal. When the add-in card supports wakeup, this signal is used by the add-in card to request that the system return from a sleep/suspended state to service a function initiated wake event. When the add-in card supports the OBFF mechanism, this signal is used by the system to indicate OBFF or CPU Active State transitions.
3	COEX1	NC	No Connection
5	COEX2	NC	No Connection
7	CLKREQ#	I/O	PCIe clock request
9	GND	G	Ground connections
11	REFCLK-	I	PCIe differential clock input- Negative
13	REFCLK+	I	PCIe differential clock input- Positive
15	GND	G	Ground connections
17	UIM_IC_DM	NC	No Connection
19	UIM_IC_DP	NC	No Connection
21	GND	G	Ground connections
23	PETn0	O	PCIe Transmit data-Negative
25	PETp0	O	PCIe Transmit data-Positive
27	GND	G	Ground connections
29	GND	G	Ground connections
31	PERn0	I	PCIe receive data-Negative
33	PERp0	I	PCIe receive data-Positive
35	GND	G	Ground connections
37	GND	G	Ground connections
39	+3.3Vaux	P	VDD system power supply input
41	+3.3Vaux	P	VDD system power supply input
43	GND	G	Ground connections
45	ANTCTRL2	O	WLAN PCIe L1 transmit output differential signals(optional)
47	ANTCTRL3	O	WLAN PCIe L1 transmit output differential signals(optional)
49	Reserved	I	WLAN PCIe L1 receive input differential signals(optional)
51	W_DISABLE2#	I	WLAN PCIe L1 receive input differential signals

BOTTOM			
Pin#	**Pin Name**	**Type**	**Description**
2	3.3Vaux	P	VDD system power supply input
4	GND	G	Ground connections
6	1.5V/COEX3	NC	No Connection
8	UIM_PWR	NC	No Connection
10	UIM_DATA	NC	No Connection
12	UIM_CLK	NC	No Connection
14	UIM_RESET	NC	No Connection
16	UIM_SPU	NC	No Connection
18	GND	G	Ground connections
20	W_DISABLE1#	NC	No Connection
22	PERST#	I	PCIe host indication to reset the device. Active low.
24	+3.3Vaux	P	VDD system power supply input
26	GND	G	Ground connections
28	+1.5V/ ANTCTRL0	NC	No Connection
30	SMB_CLK	NC	No Connection
32	SMB_DATA	NC	No Connection
34	GND	G	Ground connections
36	USB_D-	NC	No Connection
38	USB_D+	NC	No Connection
40	GND	G	Ground connections
42	LED_WWAN#	O	LED interface 1
44	LED_WLAN#	O	LED interface 0 for RFA debug
46	LED_WPAN#	NC	No Connection
48	+1.5V/ ANTCTRL1	NC	No Connection
50	GND	G	Ground connections
52	+3.3Vaux	P	VDD system power supply input

Note: Power (P), Ground (G), Open-Drain (OD), Input (I), Output (O), Do Not Connect (DNC), No Connection (NC)

Certification

- ■ **FCC**
- ■ **IC**
- ☐ **NCC**
- ■ **CE** (RED EN 300 328 V2.2.2 / EN 301 893 V2.1.1)
- ☐ **MIC**
- ☐ **ASNZS**

Ordering Information

Product Name	Part Number	Description
WPEQ-276AX	R9701A90006	11ax 2T2R WiFi 6E Mini PCIe Module

Optional Accessory

Product Name	Part Number	Description
AD-501AX	R3410A10050	Dipole Antenna, 3.7dBi/5dBi/5dBi 2.4G/5G/6GHz, RP-SMA(M) connector
CBIRF-ME150	R3470300023	RF Cable, I-PEXMHF1 to RP-SMA(F); L150mm; Coaxial 1.37 Black
CBIRF-ME250	R3470300024	RF Cable, I-PEX/MHF1 to RP-SMA Female; L:250mm; Coaxial 1.37 Black