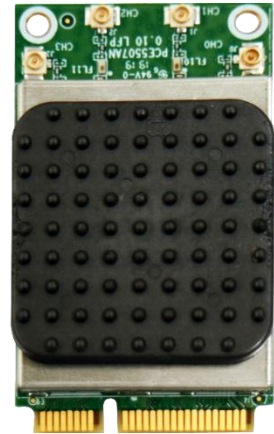


## WPEQ-450AC

5GHZ MU-MIMO 4x4

802.11AC WAVE 2 80+80MHZ 1733Mbps

Mini PCIe Module



### Wave-2 802.11ac with MU-MIMO 4x4 Solution

SparkLAN QCA9984 is a highly integrated Wireless LAN (WLAN), 802.11ac 4T4R Mini-PCIE Module that support 4-stream 802.11ac with multi-user MIMO (Multiple-Input, Multiple-Output) wireless LAN (WLAN). It is integrated 4T4R WLAN MAC, baseband, and single band RF in a single chip Mini-PCIE module.

QCA9984 provides a cost effective solution for M2M (machine to machine) connectivity product/device by Mini-PCIE, it can be easily integrated into the most familiar operation system (Linux).

#### Embedded Application

Applications include Multimedia  
Router and AP solution., etc.

#### Key Feature

- IEEE 802.11ac compliant & backward compatible with 802.11a/n
- Up to 1.73Gbps
- 2 spatial streams (2SS) MIMO 160MHz and 80+80MHz band width support
- 4 spatial streams (4SS) Multi-user MIMO (MU-MIMO)
- 802.11ac explicit transmit beamforming (TxBF) and legacy implicit TxBF for both beamformer and beamformee

**Specification**

<b>Standards</b>	IEEE 802.11ac/a/n (4T4R)
<b>Chipset</b>	Qualcomm Atheros 9984
<b>Data Rate</b>	802.11a: 54Mbps 802.11n: MCS0~15 802.11ac: MCS0~9
<b>Operating Frequency</b>	IEEE 802.11ac/a/n ISM Band: 5.150GHz~5.850GHz *Subject to local regulations
<b>Interface</b>	WLAN: PCIe
<b>Form Factor</b>	Mini PCIe
<b>Antenna</b>	4 x IPEX MHF1 connectors
<b>Modulation</b>	Wi-Fi : 802.11n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11a: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11ac: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM)
<b>Power Consumption</b>	TX mode: 2250mA(Max.) RX mode: 750mA(Max.)
<b>Operating Voltage</b>	DC 3.3V
<b>Operating Temperature Range</b>	-20°C ~ +70°C
<b>Storage Temperature Range</b>	-20°C ~ +90°C
<b>Humidity (Non-Condensing)</b>	5%~90% (Operating) 5%~90% (Storing)
<b>Dimension L x W x H (in mm)</b>	50.80mm(±0.3mm) x 29.85mm(±0.3mm) x 7.8mm(±0.3mm)
<b>Weight (g)</b>	12.6g
<b>Driver Support</b>	Linux (Open Source)
<b>Security</b>	64/128-bits WEP, WPA, WPA2, 802.1x

## OUTPUT POWER & SENSITIVITY

### 802.11a (Pre-Chain)

Data Rate	Tx $\pm$ 2dBm	Rx Sensitivity
54Mbps	17dBm	$\leq$ -72dBm

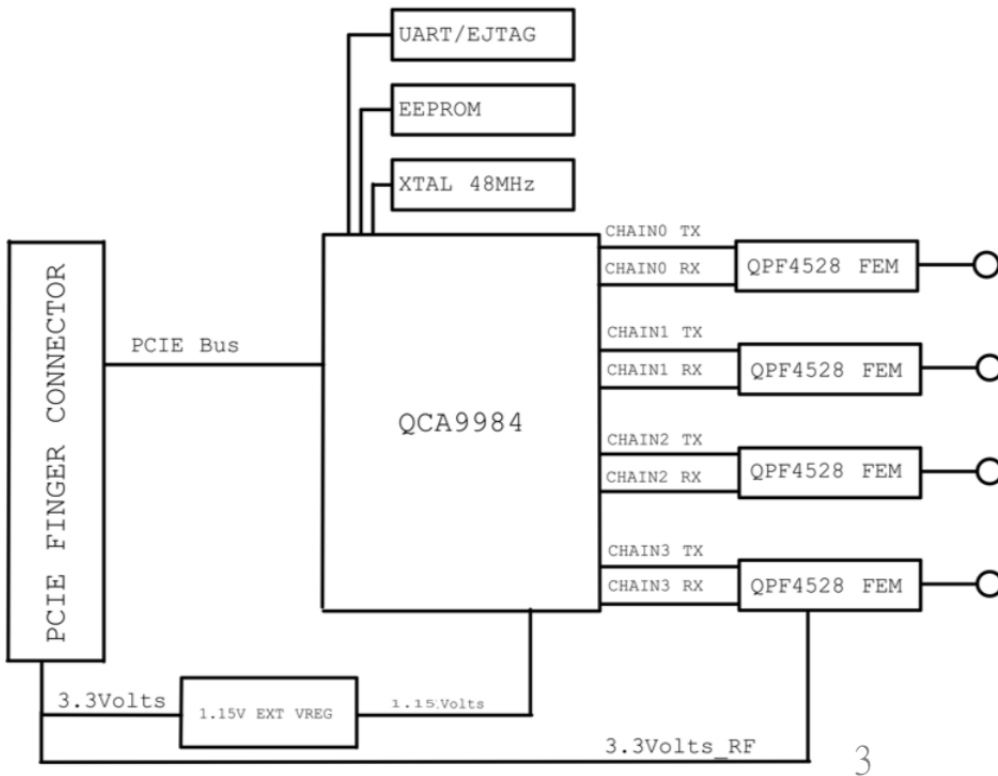
### 802.11n / 5GHz (Pre-Chain)

	Data Rate	Tx $\pm$ 2dBm (1TX)	Rx Sensitivity
HT20	MCS7	16dBm	$\leq$ -68dBm
	MCS7	15dBm	$\leq$ -66dBm

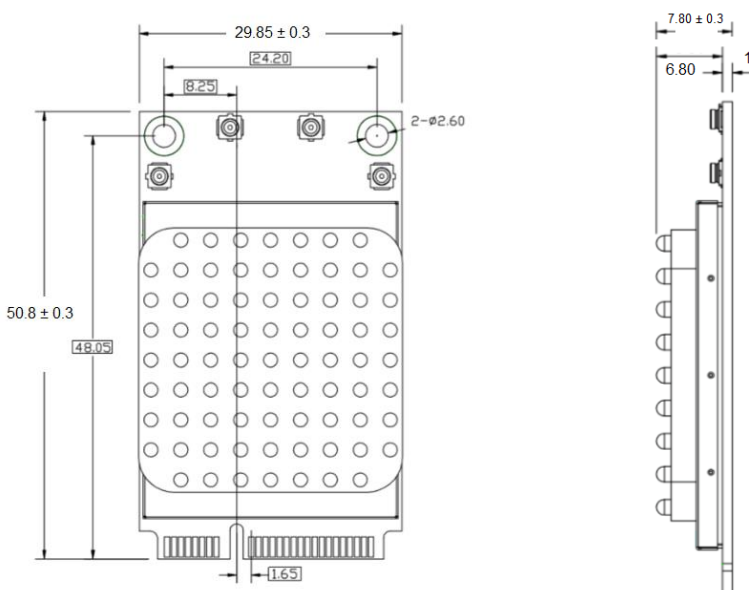
### 802.11ac (Pre-Chain)

	Data Rate	Tx $\pm$ 2dBm (1TX)	Rx Sensitivity
VHT80	MCS9	14dBm	$\leq$ -56dBm
	MCS9	14dBm	$\leq$ -56dBm

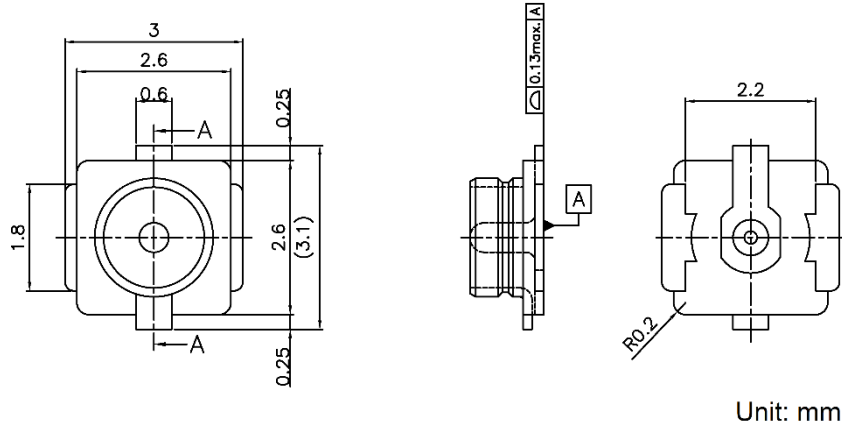
**Block Diagram**



**Mechanical Dimension (mm)**



### MHF1 connector spec.



### Pin Assignment

Pin#	Pin Name	Description	Pin#	Pin Name	Description
1	WAKE_L	Output and 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.	2	+3.3V	+3.3V
3	No Connection	-	4	GND	GND
5	No Connection	-	6	No Connection	-
7	CLKREQ_L	Output for reference clock request signal	8	No Connection	-
9	GND	GND	10	No Connection	-
11	REFCLK-	Input signal for PCI Express differential reference clock (100 MHz)	12	No Connection	-
13	REFCLK+	Input signal for PCI Express differential reference clock (100 MHz)	14	No Connection	-
15	GND	GND	16	No Connection	-
17	No Connection	-	18	GND	GND

Pin#	Pin Name	Description	Pin#	Pin Name	Description
19	No Connection	-	20	W_DISABLE_L (OPT)	Input and active low signal. This signal is used by the system to disable radio operation on add-in cards that implement radio frequency applications. When implemented, this signal requires a pull-up resistor on the card.
21	GND	GND	22	PERST_L	Input signal for functional reset to the card
23	PERn0	PCI Express x1 data interface: one differential receive pair	24	+3.3V	+3.3V
25	PERp0	PCI Express x1 data interface: one differential receive pair	26	GND	GND
27	GND	GND	28	No Connection	-
29	GND	GND	30	No Connection	-
31	PETn0	PCI Express x1 data interface: one differential transmit pair	32	No Connection	-
33	PETp0	PCI Express x1 data interface: one differential transmit pair	34	GND	GND
35	GND	GND	36	No Connection	-
37	GND	GND	38	No Connection	-
39	+3.3V	+3.3V	40	GND	GND
41	+3.3V	+3.3V	42	No Connection	-
43	GND	GND	44	LED_WLAN_L (OPT)	Output and open drain active low signal. This signal is used to allow the PCI Express Mini Card add-in card to provide status indicators via LED devices that will be provided by the system.
45	No Connection	-	46	No Connection	-
47	No Connection	-	48	No Connection	-
49	+3.3V (OPT)	+3.3V	50	GND	GND
51	+3.3V (OPT)	+3.3V	52	+3.3V	+3.3V

\*NA→No active

\*OPT →Optional

(This is optional as the function may or may not work under all platform configurations, to ensure this product performs the feature you need, please contact our Sales first with your platform design and configuration details before implementing layout design.)

## Certification

### Dipole Ant.

 FCC

 IC

 NCC

 CE (RED EN 300 328 V2.1.1 / EN 301 893 V2.1.1)

 MIC

 ASNZS

## Ordering Information

Product Name	Part Number	Description
WPEQ-450AC	R9701890027	11ac/a/n 4T4R Mini PCIe

## Optional Accessory

Product Name	Part Number	Description
AD-103AG	R3410110203	Dipole Antenna, 2dBi 2.4GHz/5GHz, RP-SMA(M) connector
AD-300N	R3410110219	Antenna Dual -Band 2.4GHz/5GHz 3dBi/5dBi Omnidirectional RP-SMA PLUG(BSMA)
AD-302N	R3410110221	Dipole Antenna, 3dBi/2dBi 2.4G/5GHz, RP-SMA(M) connector
AD-303N	R3410110222	Dipole Antenna, 3dBi/3dBi 2.4G/5GHz, RP-SMA(M) connector
CBIRF-ME150	R3470300023	I-PEX/MHF1 to RP-SMA Female; L:150mm; Coaxial 1.37 Black
CBIRF-ME250	R3470300024	I-PEX/MHF1 to RP-SMA Female; L:250mm; Coaxial 1.37 Black