

## Single Band 5GHz 4x4 802.11ac Wave 2 MiniPCle WiFi Module Designed for High 80+80MHz Bandwidth Enterprise Wireless Access Points

**Model: WLE1216V5-23**



### KEY FEATURES

- Qualcomm Atheros QCA9984
- 5GHz, 4x4 MU-MIMO OFDM Technology, up to 1733Mbps physical data rate
- Single Band 5GHz 4x4 WiFi 5 (802.11ac Wave 2)
- MiniPCle interface with PCIe 2.0
- IEEE 802.11ac compliant & backward compatible with 802.11a/n
- 2 spatial streams (2SS) MIMO 80+80MHz bandwidth support
- 4 spatial streams (4SS)
- 802.11ac explicit transmit beamforming (TxBF) and legacy implicit TxBF for both beamformer and beamformee
- Supports Spatial Multiplexing, Cyclic-Delay Diversity (CDD), Low-Density Parity Check (LDPC) Codes, Maximal Ratio Combining (MRC), Space Time Block Code (STBC)
- Supports IEEE 802.11d, e, h, i, j, k, r, u, v time stamp, w , and z standards
- Supports Dynamic Frequency Selection (DFS)

## Specifications

Chipset	Qualcomm Atheros QCA9984 'Cascade' Series
Reference Design	Qualcomm Atheros CUS239
Host Interface	MiniPCle interface with PCIe 2.0
Operating Voltage	5V
Power Consumption	13W (Max)
Wireless	5GHz 802.11a/n/ac, max 23dBm per chain 4x U.FL Connectors
Frequency Range	5.150~5.825GHz
Modulation Techniques	OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
Channel Spectrum Widths for WLAN	Supports 20/40/80/80+80MHz at 5GHz
ESD Sensitivity	Class 1C
Supported Operating System	Supported by CompexWRT (v3.x and above) with Qualcomm Atheros reference wireless drivers; on WPJ558, WPJ563, and WPJ564: throughput up to 800Mbps; on WPQ864 and WPQ865: throughput up to 1300Mbps; or OpenWRT/LEDE with ath10k wireless drivers.
Certification	REACH and RoHS Compliance
Environmental Temperature	Operating: -20°C to 70°C, Storage: -40°C to 90°C
Environmental Humidity, Non-Condensing	Operating: 5% to 95%, Storage: Max. 90%
Dimensions (W x H x D) in mm	73.7 x 51.0 x 5.5

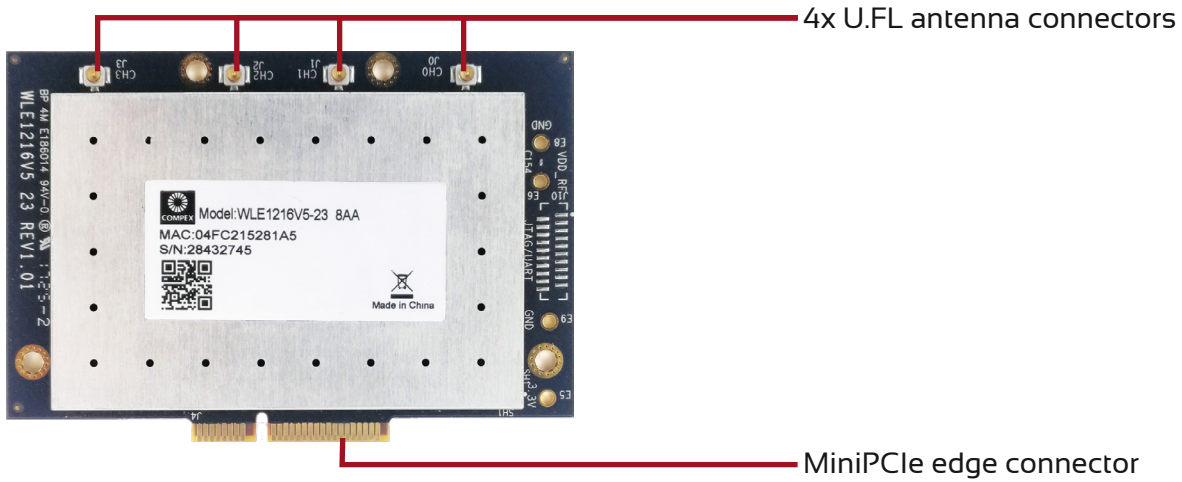
\*Configurations are subject to change without notifications.

## RF Performance Table for 5GHz

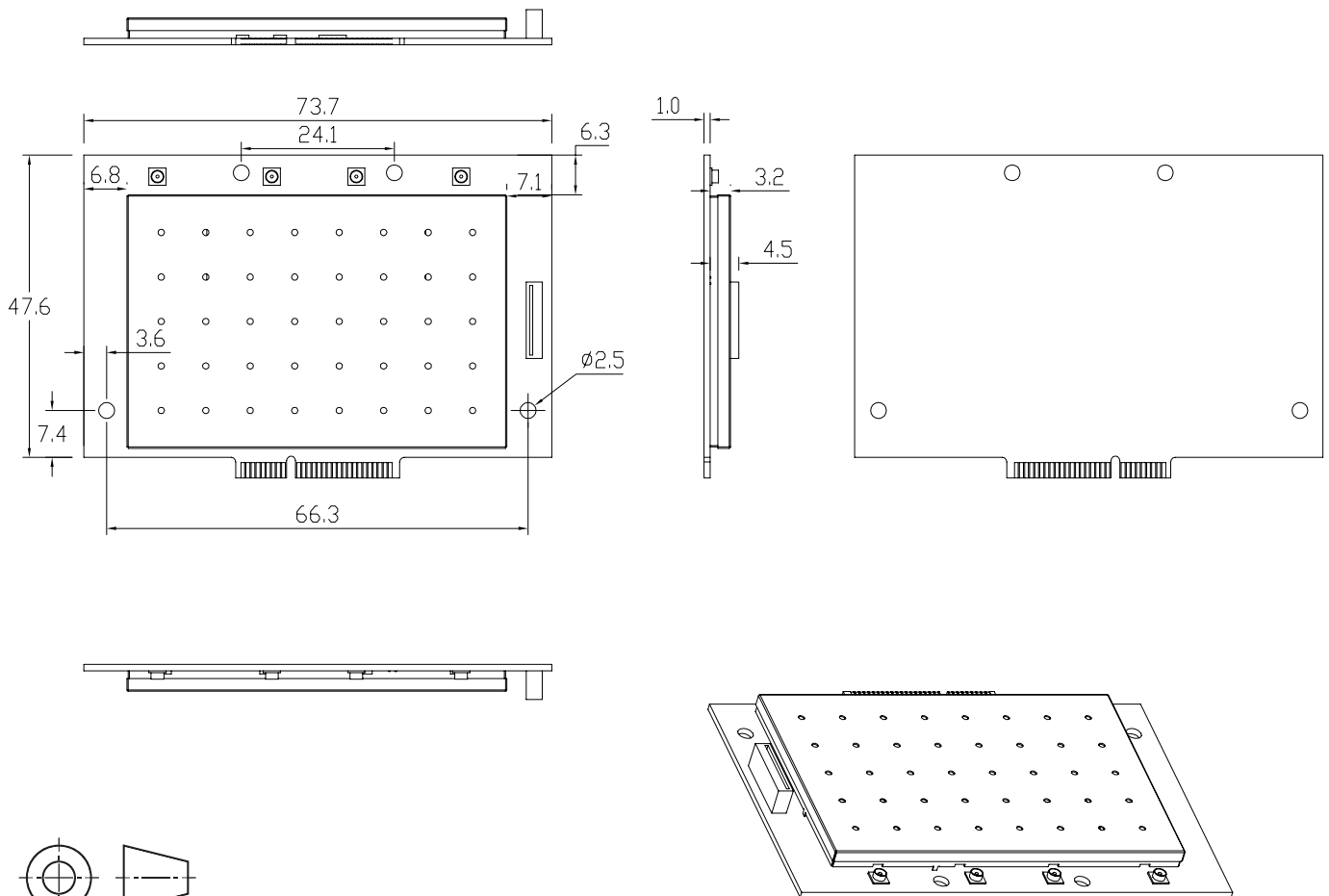
	Data Rate	TX Power (per chain)	TX Power (4 chains)	Tolerance
5GHz 802.11a	6Mbps	23dBm	29dBm	±2dB
	9Mbps	23dBm	29dBm	±2dB
	12Mbps	23dBm	29dBm	±2dB
	18Mbps	23dBm	29dBm	±2dB
	24Mbps	23dBm	29dBm	±2dB
	36Mbps	23dBm	29dBm	±2dB
	48Mbps	23dBm	29dBm	±2dB
	54Mbps	22dBm	28dBm	±2dB
5GHz 802.11n/ac VHT20	MCS 0	23dBm	29dBm	±2dB
	MCS 1	23dBm	29dBm	±2dB
	MCS 2	23dBm	29dBm	±2dB
	MCS 3	23dBm	29dBm	±2dB
	MCS 4	23dBm	29dBm	±2dB
	MCS 5	23dBm	29dBm	±2dB
	MCS 6	22dBm	28dBm	±2dB
	MCS 7	21dBm	27dBm	±2dB
5GHz 802.11n/ac VHT40	MCS 8	20dBm	26dBm	±2dB
	MCS 0	23dBm	29dBm	±2dB
	MCS 1	23dBm	29dBm	±2dB
	MCS 2	23dBm	29dBm	±2dB
	MCS 3	23dBm	29dBm	±2dB
	MCS 4	23dBm	29dBm	±2dB
	MCS 5	23dBm	29dBm	±2dB
	MCS 6	22dBm	28dBm	±2dB
	MCS 7	21dBm	27dBm	±2dB
	MCS 8	20dBm	26dBm	±2dB
5GHz 802.11ac VHT80	MCS 9	20dBm	26dBm	±2dB
	MCS 0	23dBm	29dBm	±2dB
	MCS 1	23dBm	29dBm	±2dB
	MCS 2	23dBm	29dBm	±2dB
	MCS 3	23dBm	29dBm	±2dB
	MCS 4	23dBm	29dBm	±2dB
	MCS 5	23dBm	29dBm	±2dB
	MCS 6	22dBm	28dBm	±2dB
	MCS 7	21dBm	27dBm	±2dB
	MCS 8	20dBm	26dBm	±2dB
5GHz 802.11ac VHT80+80	MCS 9	20dBm	26dBm	±2dB
	MCS 0	23dBm	29dBm	±2dB
	MCS 1	23dBm	29dBm	±2dB
	MCS 2	23dBm	29dBm	±2dB
	MCS 3	23dBm	29dBm	±2dB
	MCS 4	23dBm	29dBm	±2dB
	MCS 5	23dBm	29dBm	±2dB
	MCS 6	22dBm	28dBm	±2dB
	MCS 7	21dBm	27dBm	±2dB
	MCS 8	20dBm	26dBm	±2dB

	Data Rate	RX Specifications Sensitivity	Tolerance
5GHz 802.11a	6Mbps	-96dBm	±2dB
	9Mbps	-94dBm	±2dB
	12Mbps	-93dBm	±2dB
	18Mbps	-89dBm	±2dB
	24Mbps	-87dBm	±2dB
	36Mbps	-85dBm	±2dB
	48Mbps	-83dBm	±2dB
	54Mbps	-82dBm	±2dB
5GHz 802.11n/ac VHT20	MCS 0	-96dBm	±2dB
	MCS 1	-94dBm	±2dB
	MCS 2	-92dBm	±2dB
	MCS 3	-88dBm	±2dB
	MCS 4	-85dBm	±2dB
	MCS 5	-84dBm	±2dB
	MCS 6	-82dBm	±2dB
	MCS 7	-80dBm	±2dB
5GHz 802.11n/ac VHT40	MCS 8	-76dBm	±2dB
	MCS 0	-93dBm	±2dB
	MCS 1	-90dBm	±2dB
	MCS 2	-88dBm	±2dB
	MCS 3	-85dBm	±2dB
	MCS 4	-84dBm	±2dB
	MCS 5	-82dBm	±2dB
	MCS 6	-80dBm	±2dB
	MCS 7	-78dBm	±2dB
	MCS 8	-75dBm	±2dB
5GHz 802.11ac VHT80	MCS 9	-72dBm	±2dB
	MCS 0	-89dBm	±2dB
	MCS 1	-86dBm	±2dB
	MCS 2	-84dBm	±2dB
	MCS 3	-81dBm	±2dB
	MCS 4	-79dBm	±2dB
	MCS 5	-75dBm	±2dB
	MCS 6	-73dBm	±2dB
	MCS 7	-71dBm	±2dB
	MCS 8	-69dBm	±2dB
MCS 9	-67dBm	±2dB	

## Component Map



## Mechanical Dimensions



All dimensions are in mm.

## Ordering Configuration

Item Code	Model	Description
WLE1216V5-23 8AA0001.03	WLE1216V5-23	4x4 802.11a/n/ac 5GHz miniPCIe card