

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

**Model: WLE1216V5-20-I**



### KEY FEATURES

- Qualcomm Atheros QCA9994
- 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
- Full size form factor with 80+80MHz bandwidth support
- Heat sink allows free air operation
- IEEE 802.11ac compliant & backward compatible with 802.11a/n
- 4 spatial streams (4SS) at 80MHz
- 2 spatial streams (2SS) at 80+80MHz
- 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 QCA9994 'Cascade' Series
System Memory	256Kbit serial I <sup>2</sup> C bus EEPROM
Reference Design	Qualcomm Atheros CUS239
Host Interface	MiniPCle interface with PCIe 2.0
Operating Voltage	3.3V
Power Consumption	8.5W (Max)
Wireless	5GHz 802.11a/n/ac, max 21dBm 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 1B
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	FCC, CE Certified, REACH and RoSH Compliance
Environmental Temperature (Industrial Grade)	Operating: -40°C to 85°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	29.9 x 50.8 x 12.9

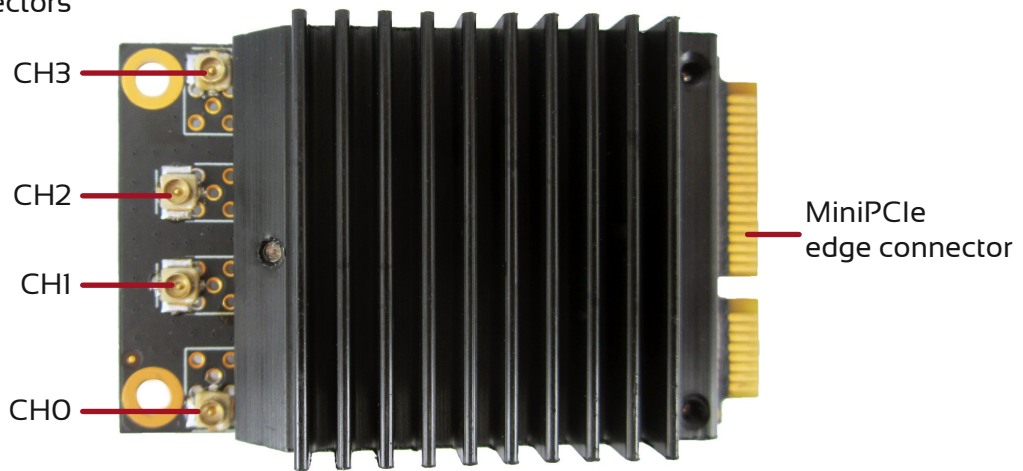
## RF Performance Table for 5GHz

	Data Rate	TX Power (per chain)	TX Power (4 chains)	Tolerance
5GHz 802.11a	6Mbps	21dBm	27dBm	±2dB
	9Mbps	21dBm	27dBm	±2dB
	12Mbps	21dBm	27dBm	±2dB
	18Mbps	21dBm	27dBm	±2dB
	24Mbps	20dBm	26dBm	±2dB
	36Mbps	19dBm	25dBm	±2dB
	48Mbps	18dBm	24dBm	±2dB
	54Mbps	17dBm	23dBm	±2dB
5GHz 802.11n/ac VHT20	MCS 0	21dBm	27dBm	±2dB
	MCS 1	21dBm	27dBm	±2dB
	MCS 2	21dBm	27dBm	±2dB
	MCS 3	20dBm	26dBm	±2dB
	MCS 4	19dBm	25dBm	±2dB
	MCS 5	18dBm	24dBm	±2dB
	MCS 6	17dBm	23dBm	±2dB
	MCS 7	16dBm	22dBm	±2dB
5GHz 802.11n/ac VHT40	MCS 8	15dBm	21dBm	±2dB
	MCS 0	21dBm	27dBm	±2dB
	MCS 1	21dBm	27dBm	±2dB
	MCS 2	21dBm	27dBm	±2dB
	MCS 3	20dBm	26dBm	±2dB
	MCS 4	19dBm	25dBm	±2dB
	MCS 5	18dBm	24dBm	±2dB
	MCS 6	18dBm	24dBm	±2dB
	MCS 7	17dBm	23dBm	±2dB
	MCS 8	16dBm	22dBm	±2dB
5GHz 802.11ac VHT80	MCS 9	15dBm	21dBm	±2dB
	MCS 0	20dBm	26dBm	±2dB
	MCS 1	20dBm	26dBm	±2dB
	MCS 2	20dBm	26dBm	±2dB
	MCS 3	20dBm	26dBm	±2dB
	MCS 4	19dBm	25dBm	±2dB
	MCS 5	18dBm	24dBm	±2dB
	MCS 6	18dBm	24dBm	±2dB
	MCS 7	17dBm	23dBm	±2dB
	MCS 8	16dBm	22dBm	±2dB
5GHz 802.11ac VHT80+80	MCS 9	15dBm	21dBm	±2dB
	MCS 0	20dBm	26dBm	±2dB
	MCS 1	20dBm	26dBm	±2dB
	MCS 2	20dBm	26dBm	±2dB
	MCS 3	20dBm	26dBm	±2dB
	MCS 4	19dBm	25dBm	±2dB
	MCS 5	18dBm	24dBm	±2dB
	MCS 6	18dBm	24dBm	±2dB
	MCS 7	17dBm	23dBm	±2dB
	MCS 8	16dBm	22dBm	±2dB

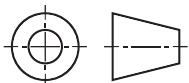
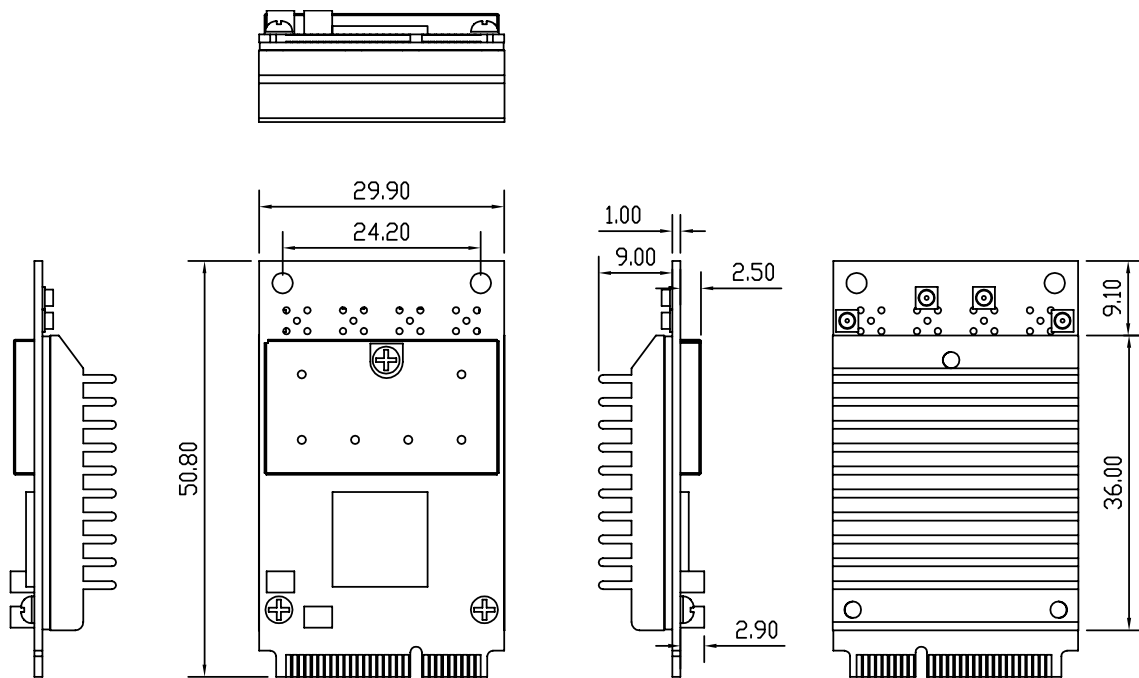
	Data Rate	RX Specifications Sensitivity	Tolerance
5GHz 802.11a	6Mbps	-94dBm	±2dB
	9Mbps	-93dBm	±2dB
	12Mbps	-92dBm	±2dB
	18Mbps	-89dBm	±2dB
	24Mbps	-86dBm	±2dB
	36Mbps	-84dBm	±2dB
	48Mbps	-79dBm	±2dB
	54Mbps	-77dBm	±2dB
5GHz 802.11n/ac VHT20	MCS 0	-94dBm	±2dB
	MCS 1	-91dBm	±2dB
	MCS 2	-90dBm	±2dB
	MCS 3	-86dBm	±2dB
	MCS 4	-83dBm	±2dB
	MCS 5	-80dBm	±2dB
	MCS 6	-77dBm	±2dB
	MCS 7	-75dBm	±2dB
5GHz 802.11n/ac VHT40	MCS 8	-71dBm	±2dB
	MCS 0	-91dBm	±2dB
	MCS 1	-88dBm	±2dB
	MCS 2	-85dBm	±2dB
	MCS 3	-82dBm	±2dB
	MCS 4	-79dBm	±2dB
	MCS 5	-75dBm	±2dB
	MCS 6	-73dBm	±2dB
	MCS 7	-72dBm	±2dB
	MCS 8	-69dBm	±2dB
5GHz 802.11ac VHT80	MCS 9	-66dBm	±2dB
	MCS 0	-88dBm	±2dB
	MCS 1	-85dBm	±2dB
	MCS 2	-83dBm	±2dB
	MCS 3	-79dBm	±2dB
	MCS 4	-76dBm	±2dB
	MCS 5	-71dBm	±2dB
	MCS 6	-69dBm	±2dB
	MCS 7	-69dBm	±2dB
	MCS 8	-65dBm	±2dB
MCS 9	-62dBm	±2dB	

## Component Map

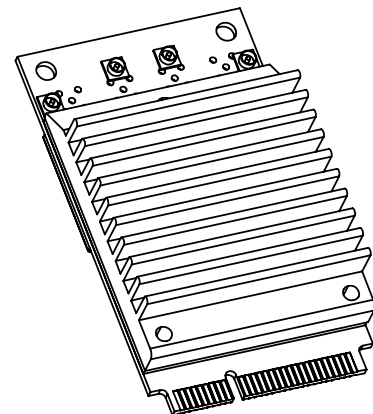
U.FL connectors



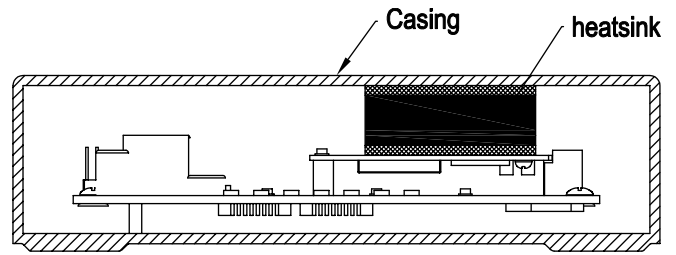
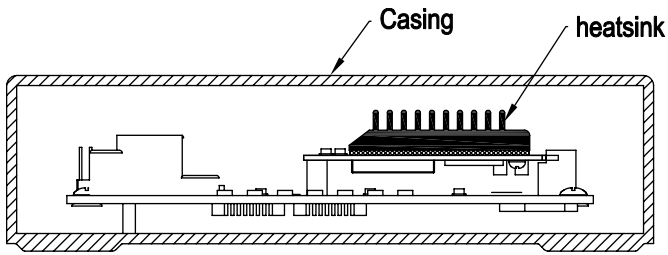
## Mechanical Dimensions



All dimensions are in mm.



## Heatsink Options



## Ordering Configuration

Item Code	Model	Description
WLE1216V5-20 7B001.03-I-2	WLE1216V5-20-I	Industrial Grade 4x4 802.11a/n/ac 5GHz Wave 2 miniPCle card