

WIRELESS 11Ac WAVE2 MODULES

Dual Band 2.4/5GHz 4x4 802.11ac Wave 2 MiniPCle WiFi Module Designed for High Bandwidth Enterprise Wireless Access Points

Model: WLE1216VX-I



KEY FEATURES

- Qualcomm Atheros QCA9994
- 2.4GHz, 4x4 MU-MIMO OFDM Technology, up to 800Mbps physical data rate
- 5GHz, 4x4 MU-MIMO OFDM Technology, up to 1733Mbps physical data rate
- Dual Band 2.4/5GHz 4x4 WiFi 5 (802.11ac Wave 2)
- MiniPCle interface with PCIe 2.0
- Heat sink allows free air operation
- 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 ² C bus EEPROM
Reference Design	Qualcomm Atheros CAS03
Host Interface	MiniPCle interface with PCIe 2.0
Operating Voltage	3.3V
Power Consumption	9W (Max)
Wireless	2.4GHz 802.11b/g/n/ac, max 20dBm per chain 5GHz 802.11a/n/ac, max 19dBm per chain 4x U.FL Connectors
Frequency Range	2.412~2.472GHz, 5.150~5.825GHz
Modulation Techniques	CCK, OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
Channel Spectrum Widths for WLAN	Supports 20/40MHz at 2.4GHz, Support 20/40/80/80+80MHz at 5GHz
Supported Operating System	CompexWRT or OpenWRT/ LEDE
Certification	FCC & IC Certified, REACH and RoHS 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

*Configurations are subject to change without notifications.

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RF Performance Table for 2.4GHz

	Data Rate	TX Power (per chain)	TX Power (4 chains)	Tolerance
2.4GHz 802.11b	1Mbps	20dBm	26dBm	±2dB
	2Mbps	20dBm	26dBm	±2dB
	5.5Mbps	20dBm	26dBm	±2dB
	11Mbps	20dBm	26dBm	±2dB
2.4GHz 802.11g	6Mbps	20dBm	26dBm	±2dB
	9Mbps	20dBm	26dBm	±2dB
	12Mbps	20dBm	26dBm	±2dB
	18Mbps	20dBm	26dBm	±2dB
	24Mbps	19dBm	25dBm	±2dB
	36Mbps	18dBm	24dBm	±2dB
	48Mbps	17dBm	23dBm	±2dB
2.4GHz 802.11n HT20	54Mbps	16dBm	22dBm	±2dB
	MCS 0	20dBm	26dBm	±2dB
	MCS 1	20dBm	26dBm	±2dB
	MCS 2	20dBm	26dBm	±2dB
	MCS 3	19dBm	25dBm	±2dB
	MCS 4	18dBm	24dBm	±2dB
	MCS 5	17dBm	23dBm	±2dB
	MCS 6	16dBm	22dBm	±2dB
	MCS 7	15dBm	21dBm	±2dB
MCS 8	14dBm	20dBm	±2dB	
2.4GHz 802.11n/ac HT40	MCS 0	20dBm	26dBm	±2dB
	MCS 1	20dBm	26dBm	±2dB
	MCS 2	20dBm	26dBm	±2dB
	MCS 3	19dBm	25dBm	±2dB
	MCS 4	18dBm	24dBm	±2dB
	MCS 5	17dBm	23dBm	±2dB
	MCS 6	16dBm	22dBm	±2dB
	MCS 7	15dBm	21dBm	±2dB
	MCS 8	14dBm	20dBm	±2dB
	MCS 9	13dBm	19dBm	±2dB

	Data Rate	RX Specifications Sensitivity	Tolerance
2.4GHz 802.11b	1Mbps	-96dBm	±2dB
	2Mbps	-93dBm	±2dB
	5.5Mbps	-90dBm	±2dB
	11Mbps	-86dBm	±2dB
2.4GHz 802.11g	6Mbps	-90dBm	±2dB
	9Mbps	-88dBm	±2dB
	12Mbps	-86dBm	±2dB
	18Mbps	-84dBm	±2dB
	24Mbps	-81dBm	±2dB
	36Mbps	-78dBm	±2dB
	48Mbps	-76dBm	±2dB
2.4GHz 802.11n HT20	54Mbps	-73dBm	±2dB
	MCS 0	-89dBm	±2dB
	MCS 1	-87dBm	±2dB
	MCS 2	-84dBm	±2dB
	MCS 3	-81dBm	±2dB
	MCS 4	-78dBm	±2dB
	MCS 5	-75dBm	±2dB
	MCS 6	-72dBm	±2dB
	MCS 7	-69dBm	±2dB
MCS 8	-66dBm	±2dB	
2.4GHz 802.11n/ac HT40	MCS 0	-87dBm	±2dB
	MCS 1	-85dBm	±2dB
	MCS 2	-82dBm	±2dB
	MCS 3	-79dBm	±2dB
	MCS 4	-76dBm	±2dB
	MCS 5	-74dBm	±2dB
	MCS 6	-71dBm	±2dB
	MCS 7	-68dBm	±2dB
	MCS 8	-65dBm	±2dB
	MCS 9	-62dBm	±2dB

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RF Performance Table for 5GHz

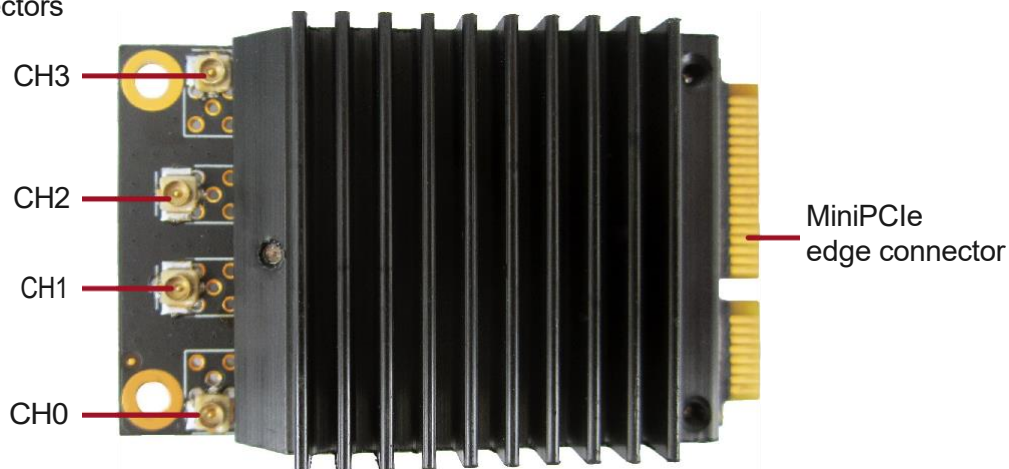
	Data Rate	TX Power (per chain)	TX Power (4 chains)	Tolerance
5GHz 802.11a	6Mbps	19dBm	25dBm	±2dB
	9Mbps	19dBm	25dBm	±2dB
	12Mbps	19dBm	25dBm	±2dB
	18Mbps	19dBm	25dBm	±2dB
	24Mbps	18dBm	24dBm	±2dB
	36Mbps	17dBm	23dBm	±2dB
	48Mbps	16dBm	22dBm	±2dB
	54Mbps	15dBm	21dBm	±2dB
5GHz 802.11n/ac VHT20	MCS 0	19dBm	25dBm	±2dB
	MCS 1	19dBm	25dBm	±2dB
	MCS 2	19dBm	25dBm	±2dB
	MCS 3	18dBm	24dBm	±2dB
	MCS 4	17dBm	23dBm	±2dB
	MCS 5	16dBm	22dBm	±2dB
	MCS 6	15dBm	21dBm	±2dB
	MCS 7	14dBm	20dBm	±2dB
5GHz 802.11n/ac VHT40	MCS 8	13dBm	19dBm	±2dB
	MCS 0	19dBm	25dBm	±2dB
	MCS 1	19dBm	25dBm	±2dB
	MCS 2	19dBm	25dBm	±2dB
	MCS 3	18dBm	24dBm	±2dB
	MCS 4	17dBm	23dBm	±2dB
	MCS 5	16dBm	22dBm	±2dB
	MCS 6	16dBm	22dBm	±2dB
	MCS 7	15dBm	21dBm	±2dB
	MCS 8	13dBm	19dBm	±2dB
5GHz 802.11ac VHT80	MCS 9	12dBm	18dBm	±2dB
	MCS 0	18dBm	24dBm	±2dB
	MCS 1	18dBm	24dBm	±2dB
	MCS 2	18dBm	24dBm	±2dB
	MCS 3	18dBm	24dBm	±2dB
	MCS 4	17dBm	23dBm	±2dB
	MCS 5	16dBm	22dBm	±2dB
	MCS 6	16dBm	22dBm	±2dB
	MCS 7	15dBm	21dBm	±2dB
	MCS 8	13dBm	19dBm	±2dB
5GHz 802.11ac VHT80+80	MCS 9	12dBm	18dBm	±2dB
	MCS 0	18dBm	24dBm	±2dB
	MCS 1	18dBm	24dBm	±2dB
	MCS 2	18dBm	24dBm	±2dB
	MCS 3	18dBm	24dBm	±2dB
	MCS 4	17dBm	23dBm	±2dB
	MCS 5	16dBm	22dBm	±2dB
	MCS 6	16dBm	22dBm	±2dB
	MCS 7	15dBm	21dBm	±2dB
	MCS 8	13dBm	19dBm	±2dB

	Data Rate	RX Specifications Sensitivity	Tolerance
5GHz 802.11a	6Mbps	-91dBm	±2dB
	9Mbps	-89dBm	±2dB
	12Mbps	-87dBm	±2dB
	18Mbps	-85dBm	±2dB
	24Mbps	-83dBm	±2dB
	36Mbps	-80dBm	±2dB
	48Mbps	-77dBm	±2dB
	54Mbps	-74dBm	±2dB
5GHz 802.11n/ac VHT20	MCS 0	-90dBm	±2dB
	MCS 1	-88dBm	±2dB
	MCS 2	-86dBm	±2dB
	MCS 3	-84dBm	±2dB
	MCS 4	-81dBm	±2dB
	MCS 5	-79dBm	±2dB
	MCS 6	-77dBm	±2dB
	MCS 7	-74dBm	±2dB
5GHz 802.11n/ac VHT40	MCS 8	-71dBm	±2dB
	MCS 0	-89dBm	±2dB
	MCS 1	-87dBm	±2dB
	MCS 2	-85dBm	±2dB
	MCS 3	-82dBm	±2dB
	MCS 4	-80dBm	±2dB
	MCS 5	-77dBm	±2dB
	MCS 6	-74dBm	±2dB
	MCS 7	-71dBm	±2dB
	MCS 8	-68dBm	±2dB
5GHz 802.11ac VHT80	MCS 9	-65dBm	±2dB
	MCS 0	-85dBm	±2dB
	MCS 1	-83dBm	±2dB
	MCS 2	-81dBm	±2dB
	MCS 3	-78dBm	±2dB
	MCS 4	-75dBm	±2dB
	MCS 5	-73dBm	±2dB
	MCS 6	-70dBm	±2dB
	MCS 7	-67dBm	±2dB
	MCS 8	-64dBm	±2dB
5GHz 802.11ac VHT80+80	MCS 9	-61dBm	±2dB

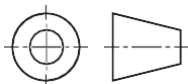
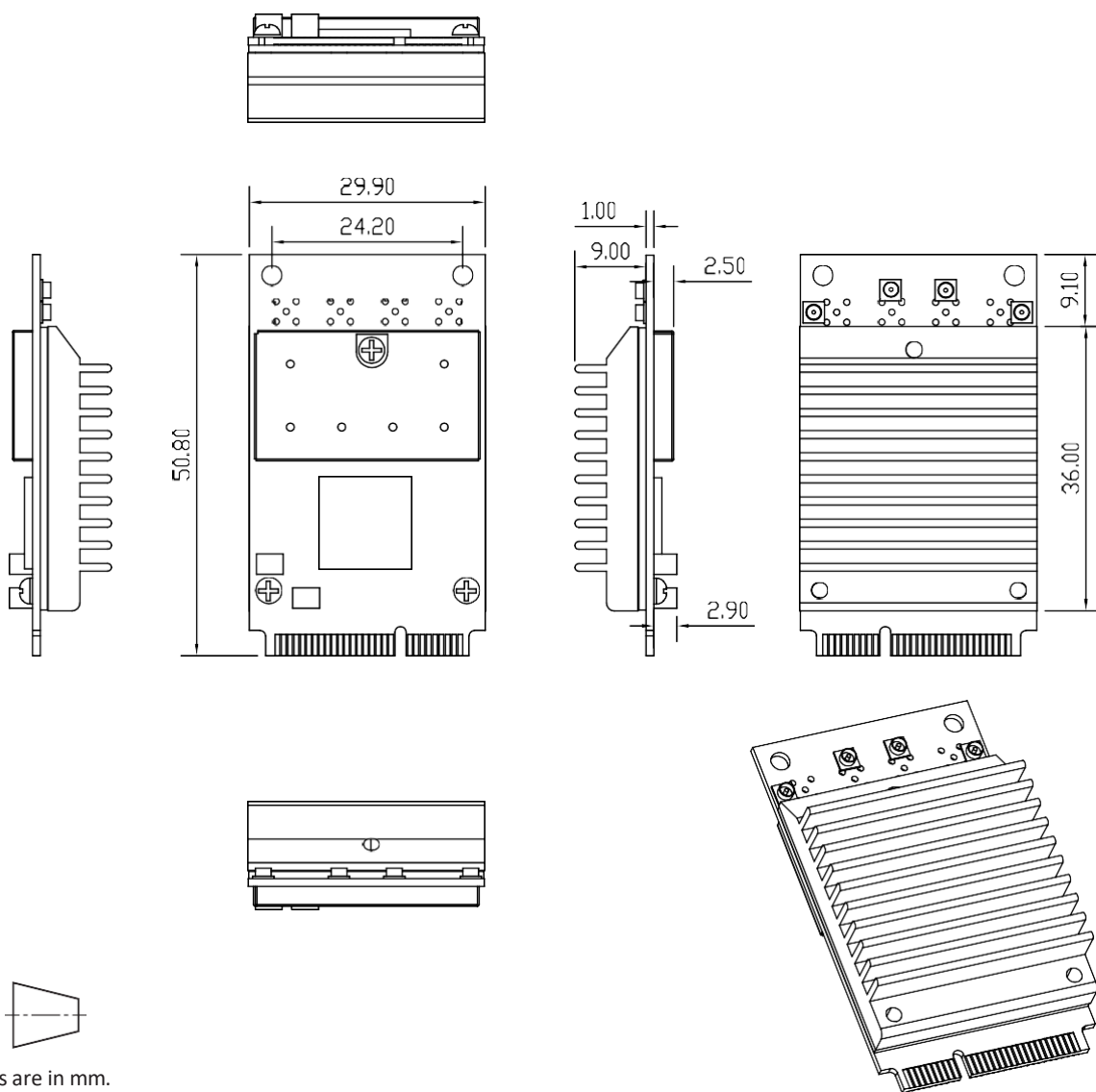
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Component Map

U.FL connectors



Mechanical Dimensions



All dimensions are in mm.

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Ordering Configuration

Item Code	Model	Description
WLE1216VX 7B0001.01-I-2	WLE1216VX I-Temp	4x4 802.11 a/b/g/n/ac Dual Band Wave 2 miniPCle Card with flat heatsink industrial chip