5GHz 2x2 MU-MIMO 802.11ac Mini PCIe WiFi Module

Designed for Next Generation 802.11ac Wave 2 Access Points

Model: WLE650V5-25A-I

KEY FEATURES

- Qualcomm Atheros QCA9898
- 5GHz max 25dBm output power (per chain)
- Heat sink allows free air operation
- 2x2 MIMO Technology, up to 867Mbps
- 2 spatial streams (2SS) at 80MHz bandwidth
- 1 spatial stream (1SS) at 80+80MHz bandwidth
- Built-in ESD Protection with ESD/EMP Immunity Threshold: 15KeV[1]
- 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, k, r, v time stamp, and w standards
- Supports Dynamic Frequency Selection (DFS)

Specifications

Chipset	QCA9898
System Memory	256Kbit serial I²C bus EEPROM
Host Interface	Mini PCI Express 2.0 Standard
Operating Voltage	DC 3.3V, 5V[3]
Antenna Connector	2x MMCX
Frequency Range	5.180 ~ 5.825 GHz
Certification	TBD
Power Consumption	9.49W (Max)
Supported Operating System	CompexWRT ≥ v3.1.3 or OpenWRT/LEDE kernel ≥ v4.13.0 on WPJ558/WPJ563/WPJ564 with 5V jumper, WPQ864, and WPQ865
Modulation Techniques	OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
Temperature Range	Operating: -20°C to 70°C Storage: -40°C to 90°C
Humidity	Operating: 5% to 95% (non-condensing) Storage: Max. 90% (non-condensing)
ESD Sensitivity	Class 1B
Dimensions (H x W x D)	50.8mm x 29.9mm x 12.2mm

[1] Module grounding cable included.

[2] W The 5V is for the power amplifier (PA). The 5V jumper labels are J5, R309, and J18 on the WPJ558-A, WPJ563-A, and WPJ564-A boards respectively. Please enable 5V supply to the mPCIe card by shorting the 5V jumper next to the card slot on these boards.

RF Performance Table

	Data Rate	TX Power (per chain)	TX Power (2 chains)	Tolerance
5GHz 802.11a	6Mbps	25dBm	28dBm	±2dB
	9Mbps	25dBm	28dBm	±2dB
	12Mbps	25dBm	28dBm	±2dB
	18Mbps	25dBm	28dBm	±2dB
	24Mbps	24dBm	27dBm	±2dB
	36Mbps	23dBm	26dBm	±2dB
	48Mbps	22dBm	25dBm	±2dB
	54Mbps	21dBm	24dBm	±2dB
5GHz 802.11n/ac VHT20	MCS 0	25dBm	28dBm	±2dB
	MCS 1	25dBm	28dBm	±2dB
	MCS 2	25dBm	28dBm	±2dB
	MCS 3	24dBm	27dBm	±2dB
	MCS 4	23dBm	26dBm	±2dB
	MCS 5	22dBm	25dBm	±2dB
	MCS 6	21dBm	24dBm	±2dB
	MCS 7	20dBm	23dBm	±2dB
	MCS 8	18dBm	21dBm	±2dB
5GHz 802.11n/ac VHT40	MCS 0	25dBm	28dBm	±2dB
	MCS 1	25dBm	28dBm	±2dB
	MCS 2	25dBm	28dBm	±2dB
	MCS 3	24dBm	27dBm	±2dB
	MCS 4	23dBm	26dBm	±2dB
	MCS 5	22dBm	25dBm	±2dB
	MCS 6	21dBm	24dBm	±2dB
	MCS 7	20dBm	23dBm	±2dB
	MCS 8	19dBm	22dBm	±2dB
	MCS 9	18dBm	21dBm	±2dB
5GHz 802.11ac VHT80	MCS 0	25dBm	28dBm	±2dB
	MCS 1	25dBm	28dBm	±2dB
	MCS 2	25dBm	28dBm	±2dB
	MCS 3	24dBm	27dBm	±2dB
	MCS 4	23dBm	26dBm	±2dB
	MCS 5	22dBm	25dBm	±2dB
	MCS 6	21dBm	24dBm	±2dB
	MCS 7	20dBm	23dBm	±2dB
	MCS 8	19dBm	22dBm	±2dB
	MCS 9	18dBm	21dBm	±2dB
5GHz 802.11ac VHT80+80	MCS 0	24dBm	27dBm	±2dB
	MCS 1	24dBm	27dBm	±2dB
	MCS 2	24dBm	27dBm	±2dB
	MCS 3	24dBm	27dBm	±2dB
	MCS 4	23dBm	26dBm	±2dB
	MCS 5	22dBm	25dBm	±2dB
	MCS 6	21dBm	24dBm	±2dB
	MCS 7	20dBm	23dBm	±2dB
	MCS 8	18dBm	21dBm	±2dB
	MCS 9	17dBm	20dBm	±2dB

	Data Rate	RX Specifications Sensitivity	Tolerance
5GHz 802.11a	6Mbps	-96dBm	±2dB
	9Mbps	-95dBm	±2dB
	12Mbps	-94dBm	±2dB
	18Mbps	-92dBm	±2dB
	24Mbps	-90dBm	±2dB
	36Mbps	-86dBm	±2dB
	48Mbps	-82dBm	±2dB
	54Mbps	-79dBm	±2dB
5GHz 802.11n/ac VHT20	MCS 0	-94dBm	±2dB
	MCS 1	-91dBm	±2dB
	MCS 2	-89dBm	±2dB
	MCS 3	-85dBm	±2dB
	MCS 4	-82dBm	±2dB
	MCS 5	-78dBm	±2dB
	MCS 6	-76dBm	±2dB
	MCS 7	-74dBm	±2dB
	MCS 8	-70dBm	±2dB
5GHz 802.11n/ac VHT40	MCS 0	-90dBm	±2dB
	MCS 1	-86dBm	±2dB
	MCS 2	-84dBm	±2dB
	MCS 3	-81dBm	±2dB
	MCS 4	-78dBm	±2dB
	MCS 5	-73dBm	±2dB
	MCS 6	-71dBm	±2dB
	MCS 7	-70dBm	±2dB
	MCS 8	-66dBm	±2dB
	MCS 9	-65dBm	±2dB
5GHz 802.11ac VHT80	MCS 0	-87dBm	±2dB
	MCS 1	-84dBm	±2dB
	MCS 2	-82dBm	±2dB
	MCS 3	79dBm	±2dB
	MCS 4	-74dBm	±2dB
	MCS 5	-71dBm	±2dB
	MCS 6	-69dBm	±2dB
	MCS 7	-67dBm	±2dB
	MCS 8	-63dBm	±2dB
	MCS 9	-60dBm	±2dB

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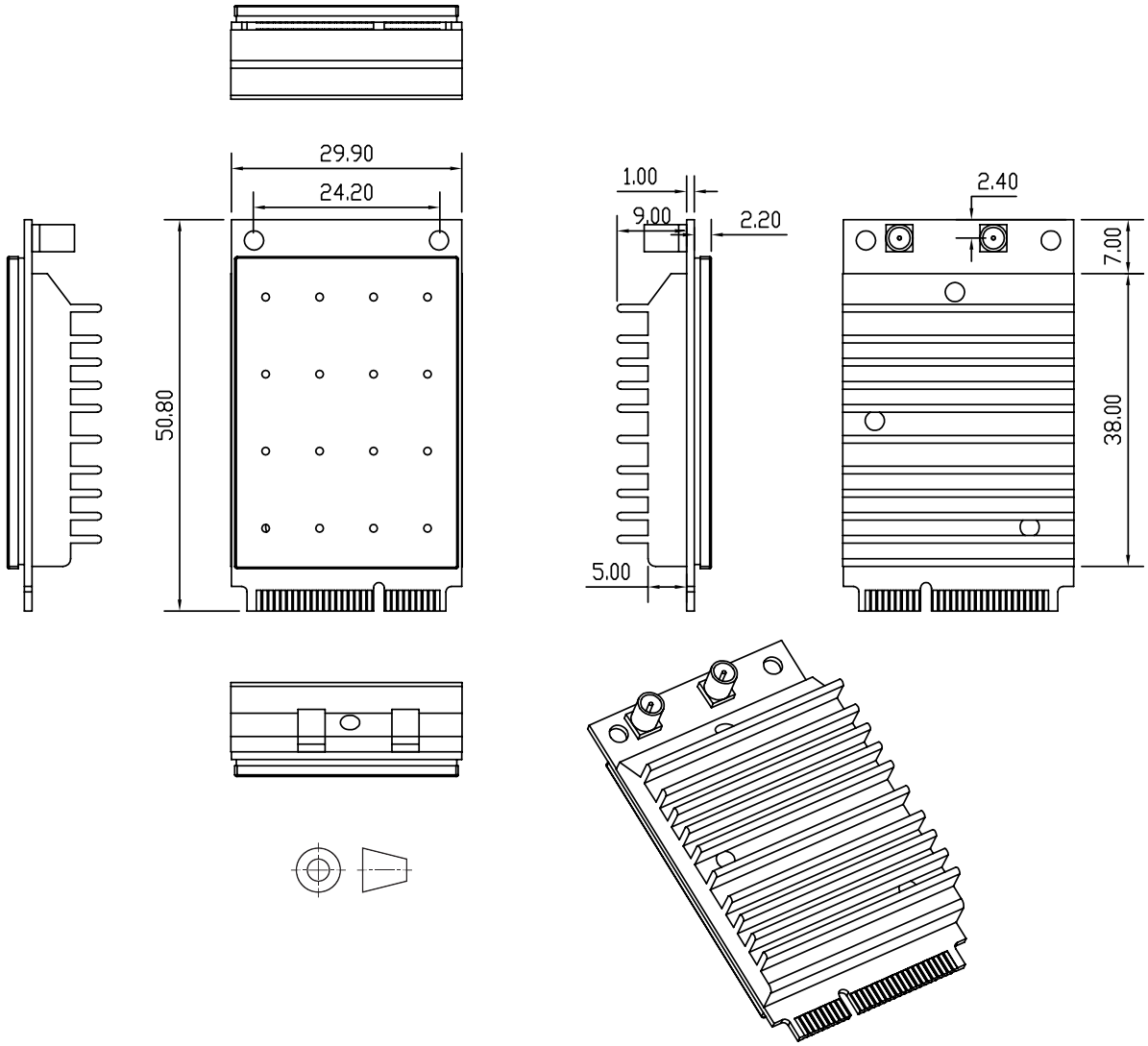
Connector Map

Mechanical Dimensions



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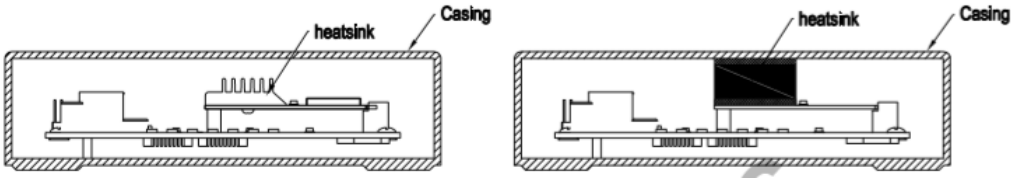
Heatsink Options



Ordering Configuration

Item Code	Model	Description
WLE650V5-25 7B0000-I	WLE650V5-25A-I	Industrial Grade 2x2 802.11a/n/ac 5GHz miniPCIe card with MMCX connectors

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