

## Dual Band 2.4 & 5 GHz 3x3 MIMO 802.11ac Mini PCIe WiFi Module Designed for Dual Band High Speed Wireless Access Points

**Model: WLE900VX-I (85C)**



### KEY FEATURES

- Qualcomm Atheros QCA9890
- XB140 Reference Design
- 2.4 GHz max 21 dBm & 5 GHz max 18 dBm output power (per chain)
- IEEE 802.11ac compliant & backward compatible with 802.11a/b/g/n
- 3x3 MIMO Technology, up to 1.3 Gbps
- Mini PCI Express edge connector
- 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)
- Cards are individually calibrated for Quality Assurance
- Supports 4.9 GHz operation

## Specifications

|  |  |
|--|--|
| Chipset                                | QCA9890  |
| Reference Design                       | XB140  |
| Host Interface                         | Mini PCI Express 1.1 Standard  |
| Operating Voltage                      | 3.3 V DC   |
| Antenna Connector                      | 3x U.FL  |
| Frequency Range                        | 2.412 GHz to 2.472 GHz, or<br>4.920 GHz to 5.825 GHz, selectable dual band   |
| Certification                          | FCC & CE Certified, RoHS Compliant   |
| Power Consumption                      | 5 W (Max)  |
| Supported Operating System             | Supported by CompexWRT with Qualcomm Atheros reference wireless drivers or OpenWRT/LEDE with ath10k wireless drivers, on WPJ344, WPJ558, WPJ563, WPJ564, WPQ864, and WPQ865. |
| Modulation Techniques                  | OFDM: BPSK, QPSK, DBPSK, DQPSK, 16-QAM, 64-QAM, 256-QAM  |
| Environmental Temperature              | Operating: -40°C to 85°C, Storage: -40°C to 90°C   |
| Environmental Humidity, non-condensing | Operating: 5% to 95%, Storage: Max. 90%  |
| ESD Sensitivity                        | Class 1C   |
| Dimensions (W x H x D)                 | 30.0 mm x 50.9 mm x 3.2 mm   |

## RF Performance Table

|                            | Data Rate | TX Power (per chain) | TX Power (3 chains) | Tolerance |
|----------------------------|-----------|----------------------|---------------------|-----------|
| 2.4 GHz<br>802.11b         | 1 Mbps    | 20 dBm               | 25 dBm              | ± 2 dB    |
|                            | 2 Mbps    | 20 dBm               | 25 dBm              | ± 2 dB    |
|                            | 5.5 Mbps  | 20 dBm               | 25 dBm              | ± 2 dB    |
|                            | 11 Mbps   | 20 dBm               | 25 dBm              | ± 2 dB    |
| 2.4 GHz<br>802.11g         | 6 Mbps    | 21 dBm               | 26 dBm              | ± 2 dB    |
|                            | 9 Mbps    | 21 dBm               | 26 dBm              | ± 2 dB    |
|                            | 12 Mbps   | 21 dBm               | 26 dBm              | ± 2 dB    |
|                            | 18 Mbps   | 21 dBm               | 26 dBm              | ± 2 dB    |
|                            | 24 Mbps   | 21 dBm               | 26 dBm              | ± 2 dB    |
|                            | 36 Mbps   | 20 dBm               | 25 dBm              | ± 2 dB    |
|                            | 48 Mbps   | 19 dBm               | 24 dBm              | ± 2 dB    |
|                            | 54 Mbps   | 18 dBm               | 23 dBm              | ± 2 dB    |
| 2.4 GHz<br>802.11n<br>HT20 | MCS 0     | 21 dBm               | 26 dBm              | ± 2 dB    |
|                            | MCS 1     | 21 dBm               | 26 dBm              | ± 2 dB    |
|                            | MCS 2     | 21 dBm               | 26 dBm              | ± 2 dB    |
|                            | MCS 3     | 20 dBm               | 25 dBm              | ± 2 dB    |
|                            | MCS 4     | 20 dBm               | 25 dBm              | ± 2 dB    |
|                            | MCS 5     | 20 dBm               | 25 dBm              | ± 2 dB    |
|                            | MCS 6     | 18 dBm               | 23 dBm              | ± 2 dB    |
|                            | MCS 7     | 16 dBm               | 21 dBm              | ± 2 dB    |
| 2.4 GHz<br>802.11n<br>HT40 | MCS 0     | 20 dBm               | 25 dBm              | ± 2 dB    |
|                            | MCS 1     | 20 dBm               | 25 dBm              | ± 2 dB    |
|                            | MCS 2     | 20 dBm               | 25 dBm              | ± 2 dB    |
|                            | MCS 3     | 19 dBm               | 24 dBm              | ± 2 dB    |
|                            | MCS 4     | 19 dBm               | 24 dBm              | ± 2 dB    |
|                            | MCS 5     | 19 dBm               | 24 dBm              | ± 2 dB    |
|                            | MCS 6     | 18 dBm               | 23 dBm              | ± 2 dB    |
|                            | MCS 7     | 16 dBm               | 21 dBm              | ± 2 dB    |

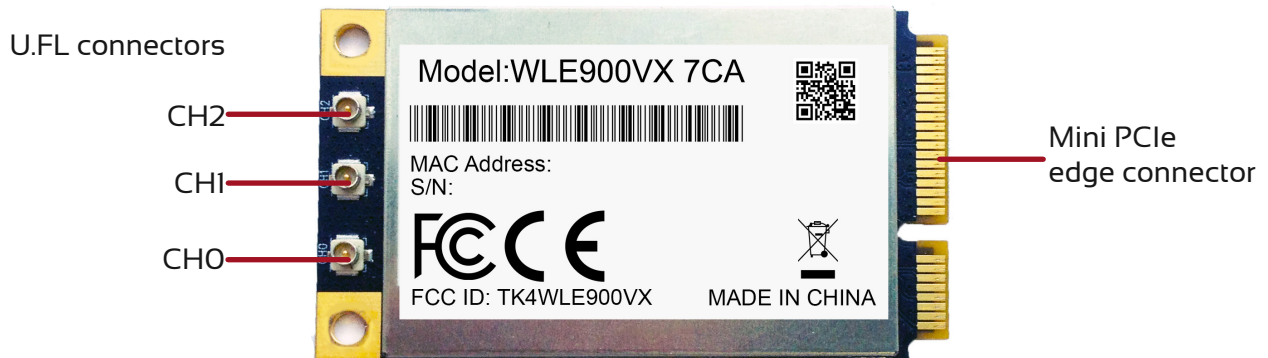
|                            | Data Rate | RX Specifications Sensitivity | Tolerance |
|----------------------------|-----------|-------------------------------|-----------|
| 2.4 GHz<br>802.11b         | 1 Mbps    | -95 dBm                       | ± 2 dB    |
|                            | 2 Mbps    | -94 dBm                       | ± 2 dB    |
|                            | 5.5 Mbps  | -92 dBm                       | ± 2 dB    |
|                            | 11 Mbps   | -90 dBm                       | ± 2 dB    |
| 2.4 GHz<br>802.11g         | 6 Mbps    | -94 dBm                       | ± 2 dB    |
|                            | 9 Mbps    | -93 dBm                       | ± 2 dB    |
|                            | 12 Mbps   | -92 dBm                       | ± 2 dB    |
|                            | 18 Mbps   | -90 dBm                       | ± 2 dB    |
|                            | 24 Mbps   | -88 dBm                       | ± 2 dB    |
|                            | 36 Mbps   | -85 dBm                       | ± 2 dB    |
|                            | 48 Mbps   | -81 dBm                       | ± 2 dB    |
|                            | 54 Mbps   | -80 dBm                       | ± 2 dB    |
| 2.4 GHz<br>802.11n<br>HT20 | MCS 0     | -94 dBm                       | ± 2 dB    |
|                            | MCS 1     | -91 dBm                       | ± 2 dB    |
|                            | MCS 2     | -89 dBm                       | ± 2 dB    |
|                            | MCS 3     | -84 dBm                       | ± 2 dB    |
|                            | MCS 4     | -83 dBm                       | ± 2 dB    |
|                            | MCS 5     | -78 dBm                       | ± 2 dB    |
|                            | MCS 6     | -78 dBm                       | ± 2 dB    |
|                            | MCS 7     | -76 dBm                       | ± 2 dB    |
| 2.4 GHz<br>802.11n<br>HT40 | MCS 0     | -92 dBm                       | ± 2 dB    |
|                            | MCS 1     | -88 dBm                       | ± 2 dB    |
|                            | MCS 2     | -85 dBm                       | ± 2 dB    |
|                            | MCS 3     | -82 dBm                       | ± 2 dB    |
|                            | MCS 4     | -79 dBm                       | ± 2 dB    |
|                            | MCS 5     | -75 dBm                       | ± 2 dB    |
|                            | MCS 6     | -75 dBm                       | ± 2 dB    |
|                            | MCS 7     | -73 dBm                       | ± 2 dB    |

## RF Performance Table

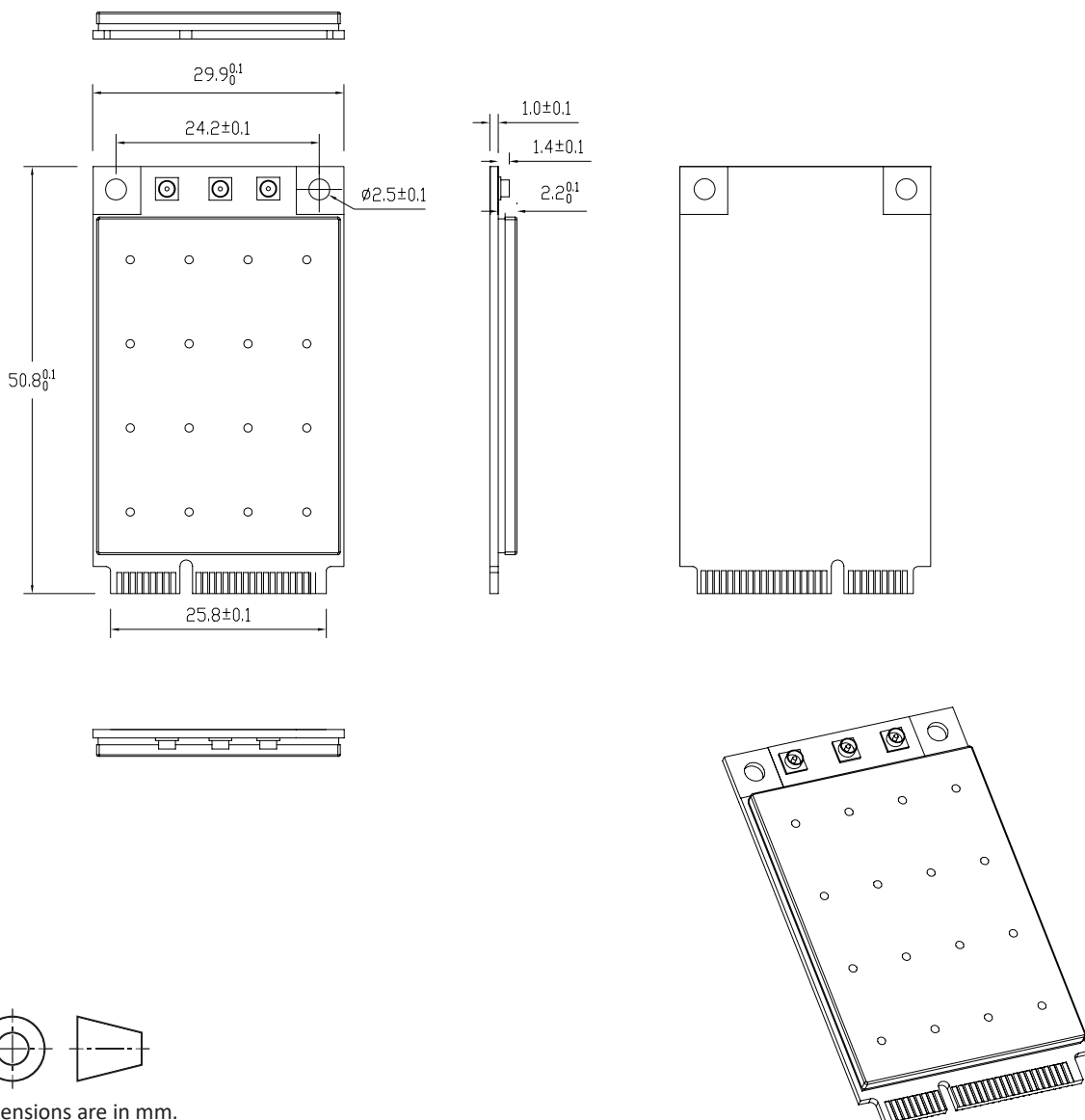
|                             | Data Rate | TX Power (per chain) | TX Power (3 chains) | Tolerance |
|-----------------------------|-----------|----------------------|---------------------|-----------|
| 5 GHz<br>802.11a            | 6 Mbps    | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | 9 Mbps    | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | 12 Mbps   | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | 18 Mbps   | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | 24 Mbps   | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | 36 Mbps   | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | 48 Mbps   | 16 dBm               | 21 dBm              | ± 2 dB    |
|                             | 54 Mbps   | 15 dBm               | 20 dBm              | ± 2 dB    |
| 5 GHz<br>802.11n/ac<br>HT20 | MCS 0     | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | MCS 1     | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | MCS 2     | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | MCS 3     | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | MCS 4     | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | MCS 5     | 17 dBm               | 22 dBm              | ± 2 dB    |
|                             | MCS 6     | 16 dBm               | 21 dBm              | ± 2 dB    |
|                             | MCS 7     | 14 dBm               | 19 dBm              | ± 2 dB    |
| 5 GHz<br>802.11n/ac<br>HT40 | MCS 8     | 13 dBm               | 18 dBm              | ± 2 dB    |
|                             | MCS 0     | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | MCS 1     | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | MCS 2     | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | MCS 3     | 17 dBm               | 22 dBm              | ± 2 dB    |
|                             | MCS 4     | 17 dBm               | 22 dBm              | ± 2 dB    |
|                             | MCS 5     | 16 dBm               | 21 dBm              | ± 2 dB    |
|                             | MCS 6     | 15 dBm               | 20 dBm              | ± 2 dB    |
|                             | MCS 7     | 14 dBm               | 19 dBm              | ± 2 dB    |
|                             | MCS 8     | 13 dBm               | 18 dBm              | ± 2 dB    |
| 5 GHz<br>802.11ac<br>HT80   | MCS 9     | 13 dBm               | 18 dBm              | ± 2 dB    |
|                             | MCS 0     | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | MCS 1     | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | MCS 2     | 18 dBm               | 23 dBm              | ± 2 dB    |
|                             | MCS 3     | 17 dBm               | 22 dBm              | ± 2 dB    |
|                             | MCS 4     | 17 dBm               | 22 dBm              | ± 2 dB    |
|                             | MCS 5     | 16 dBm               | 21 dBm              | ± 2 dB    |
|                             | MCS 6     | 15 dBm               | 20 dBm              | ± 2 dB    |
|                             | MCS 7     | 14 dBm               | 19 dBm              | ± 2 dB    |
|                             | MCS 8     | 13 dBm               | 18 dBm              | ± 2 dB    |

|                             | Data Rate | RX Specifications Sensitivity | Tolerance |
|-----------------------------|-----------|-------------------------------|-----------|
| 5 GHz<br>802.11a            | 6 Mbps    | -94 dBm                       | ± 2 dB    |
|                             | 9 Mbps    | -94 dBm                       | ± 2 dB    |
|                             | 12 Mbps   | -92 dBm                       | ± 2 dB    |
|                             | 18 Mbps   | -90 dBm                       | ± 2 dB    |
|                             | 24 Mbps   | -86 dBm                       | ± 2 dB    |
|                             | 36 Mbps   | -84 dBm                       | ± 2 dB    |
|                             | 48 Mbps   | -81 dBm                       | ± 2 dB    |
|                             | 54 Mbps   | -80 dBm                       | ± 2 dB    |
| 5 GHz<br>802.11n/ac<br>HT20 | MCS 0     | -93 dBm                       | ± 2 dB    |
|                             | MCS 1     | -90 dBm                       | ± 2 dB    |
|                             | MCS 2     | -87 dBm                       | ± 2 dB    |
|                             | MCS 3     | -83 dBm                       | ± 2 dB    |
|                             | MCS 4     | -80 dBm                       | ± 2 dB    |
|                             | MCS 5     | -77 dBm                       | ± 2 dB    |
|                             | MCS 6     | -74 dBm                       | ± 2 dB    |
|                             | MCS 7     | -73 dBm                       | ± 2 dB    |
| 5 GHz<br>802.11n/ac<br>HT40 | MCS 8     | -71 dBm                       | ± 2 dB    |
|                             | MCS 0     | -90 dBm                       | ± 2 dB    |
|                             | MCS 1     | -88 dBm                       | ± 2 dB    |
|                             | MCS 2     | -85 dBm                       | ± 2 dB    |
|                             | MCS 3     | -82 dBm                       | ± 2 dB    |
|                             | MCS 4     | -79 dBm                       | ± 2 dB    |
|                             | MCS 5     | -75 dBm                       | ± 2 dB    |
|                             | MCS 6     | -73 dBm                       | ± 2 dB    |
|                             | MCS 7     | -73 dBm                       | ± 2 dB    |
|                             | MCS 8     | -69 dBm                       | ± 2 dB    |
| 5 GHz<br>802.11ac<br>HT80   | MCS 9     | -67 dBm                       | ± 2 dB    |
|                             | MCS 0     | -88 dBm                       | ± 2 dB    |
|                             | MCS 1     | -86 dBm                       | ± 2 dB    |
|                             | MCS 2     | -84 dBm                       | ± 2 dB    |
|                             | MCS 3     | -81 dBm                       | ± 2 dB    |
|                             | MCS 4     | -77 dBm                       | ± 2 dB    |
|                             | MCS 5     | -74 dBm                       | ± 2 dB    |
|                             | MCS 6     | -73 dBm                       | ± 2 dB    |
|                             | MCS 7     | -70 dBm                       | ± 2 dB    |
|                             | MCS 8     | -67 dBm                       | ± 2 dB    |

## Connector Map



## Mechanical Dimensions



## Ordering Configuration

| Item Code          | Model            | Description  |
|--------------------|------------------|--|
| WLE900VX 7CA000S-I | WLE900VX-I (85C) | Industrial Grade 3x3 802.11a/b/g/n/ac<br>2.4 GHz / 5 GHz miniPCle card |