



USERS MANUAL

# 3X3 2.4/5GHz 11ac miniPCIe Radio

Revision:1.03 IL  
Date: 2014,11,10



Model: WLE900VX-7S

7signal Revision: V2.2  
Date: 2015.9.3

## Features

- Qualcomm-Atheros QCA9880, Reference Design
- 2.4GHz max 19dBm & 5GHz max 19dBm output power (per chain)
- IEEE 802.11ac compliant & backward compatible with 802.11a/b/g/n
- 3X3 MIMO Technology & up to 1.3Gbps
- MiniPCI Express 1.1 interface
- Supports Spatial Multiplexing, low-density parity check (LDPC), Maximal Ratio Combining (MRC), Space Time Block Code (STBC)
- Supports IEEE 802.11d, e, h, I, k, RO, v time stamp, and w standards
- Supported by either CompexWRT with Atheros Reference Wireless Driver, or OpenWRT with ath10k Wireless Driver on WPJ344
- Cards are individually calibrated for Quality Assurance

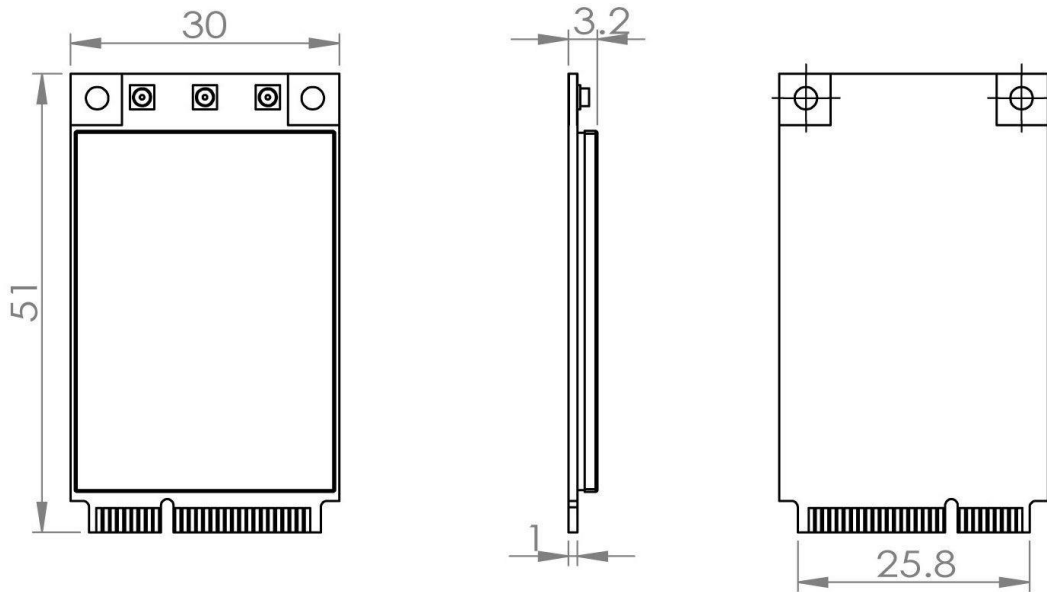
## Technical Specifications

| System Information    |           |  |                     |               |               |             |                      |                     |           |
|-----------------------|-----------|--|---------------------|---------------|---------------|-------------|----------------------|---------------------|-----------|
| Chipset               |           | QCA9890  |                     |               |               |             |                      |                     |           |
| Host Interface        |           | PCI-Express 1.1 Standard   |                     |               |               |             |                      |                     |           |
| Operating Voltage     |           | 3.3 VDC  |                     |               |               |             |                      |                     |           |
| Power Consumption     |           | 5W   |                     |               |               |             |                      |                     |           |
| Antenna Connector     |           | 3 x U.F L  |                     |               |               |             |                      |                     |           |
| Frequency Range       |           | 5.180 ~ 5.825 GHz  |                     |               |               |             |                      |                     |           |
| Modulation Techniques |           | OFDM: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM                                  |                     |               |               |             |                      |                     |           |
| RoHS Compliance       |           | Yes  |                     |               |               |             |                      |                     |           |
| Temperature Range     |           | Operating: -20°C to 70°C;<br>Storage: -40°C to 90°C                        |                     |               |               |             |                      |                     |           |
| Humidity              |           | Operating: 5% to 95% (non-condensing)<br>Storage: Max.90% (non-condensing) |                     |               |               |             |                      |                     |           |
| Dimensions (mm)       |           | 50.95 x 30 x 3.2 (H x W x D)   |                     |               |               |             |                      |                     |           |
| TX Specifications     |           |  |                     |               |               |             |                      |                     |           |
|                       | Data Rate | TX Power (per chain)   | TX Power (3 chains) | Tolerance     |               | Data Rate   | TX Power (per chain) | TX Power (3 chains) | Tolerance |
| 802.11bg              | 6Mbps     | 19dBm  | 24dBm               | ±2dB          | 2.4G 11n HT20 | MCS 0       | 19dBm                | 24dBm               | ±2dB      |
|                       | 54Mbps    | 15dBm  | 20dBm               | ±2dB          |               | MCS 7       | 13dBm                | 18dBm               | ±2dB      |
| 2.4G 11n HT40         | MCS 0     | 18dBm  | 23dBm               | ±2dB          | 802.11a       | 6Mbps       | 18dBm                | 22dBm               | ±2dB      |
|                       | MCS 7     | 13dBm  | 18dBm               | ±2dB          |               | 54Mbps      | 15dBm                | 20dBm               | ±2dB      |
| 5G11n HT20            | MCS 0     | 19dBm  | 22dBm               | ±2dB          | 5G11n HT40    | MCS 0       | 18dBm                | 22dBm               | ±2dB      |
|                       | MCS 7     | 13dBm  | 18dBm               | ±2dB          |               | MCS 7       | 12dBm                | 17dBm               | ±2dB      |
| 5G11ac HT20           | MCS 0     | 19dBm  | 22dBm               | ±2dB          | 5G11ac HT40   | MCS 0       | 18dBm                | 21dBm               | ±2dB      |
|                       | MCS 7     | 12dBm  | 17dBm               | ±2dB          |               | MCS 9       | 11dBm                | 16dBm               | ±2dB      |
| 5G11ac HT80           | MCS 0     | 18dBm  | 22dBm               | ±2dB          |               |             |                      |                     |           |
|                       | MCS 9     | 10dBm  | 15dBm               | ±2dB          |               |             |                      |                     |           |
| RX Specifications     |           |  |                     |               |               |             |                      |                     |           |
|                       | DataRate  | Sensitivity  | Tolerance           |               | DataRate      | Sensitivity | Tolerance            |                     |           |
| 802.11a               | 6Mbps     | -96dBm   | ±2dB                | 5G11n HT40    | MCS 0         | -95dBm      | ±2dB                 |                     |           |
|                       | 54Mbps    | -84dBm   | ±2dB                |               | MCS 7         | -77dBm      | ±2dB                 |                     |           |
| 5G11n HT40            | MCS 0     | -92dBm   | ±2dB                | 11ac HT20     | MCS 0         | -94dBm      | ±2dB                 |                     |           |
|                       | MCS 7     | -77dBm   | ±2dB                |               | MCS 9         | -70dBm      | ±2dB                 |                     |           |
| 11ac HT40             | MCS 0     | -91dBm   | ±2dB                | 11ac HT80     | MCS 0         | -90dBm      | ±2dB                 |                     |           |
|                       | MCS 9     | -65dBm   | ±2dB                |               | MCS 9         | -61dBm      | ±2dB                 |                     |           |
| 802.11bg              | 6Mbps     | -94dBm   | ±2dB                | 2.4G 11n HT20 | MCS 0         | -94dBm      | ±2dB                 |                     |           |
|                       | 54Mbps    | -80dBm   | ±2dB                |               | MCS 7         | -77dBm      | ±2dB                 |                     |           |
| 2.4G 11n HT40         | MCS 0     | -93dBm   | ±2dB                |               |               |             |                      |                     |           |
|                       | MCS 7     | -75dBm   | ±2dB                |               |               |             |                      |                     |           |

### Notes:

1. The UNII-2C Band edge 20MHz channel number 144 is not available and cannot be programmed to operate.
2. The UNII-2C Band edge 40MHz channel number 142 is not available and cannot be programmed to operate.

## Dimension Drawing



## Ordering Information

| Item Code   | Chipset      | Form factor | Card Information                    |
|-------------|--------------|-------------|-------------------------------------|
| WLE900VX-7S | Atheros 9890 | Full size   | 3x3 802.11ac 2.4G/5G PCIe mini card |

## Compliance Information

### FCC Compliance Statement:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

This device must accept any interference received, including interference that may cause undesired operation. Product that is a radio transmitter is labeled with FCC ID.

### FCC Caution:

- (1) Exposure to Radio Frequency Radiation. This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.
- (2) Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.
- (3) This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
- (4) Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

### RF exposure warning

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. The equipment must not be co-located or operating in conjunction with any other antenna or transmitter.

**IMPORTANT NOTE:** In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

The antenna gain which being use as below:

| Antenna Type                      | Manufacturer   | Tx Paths       | Max Directional Gain (dBi) |
|-----------------------------------|--|----------------|----------------------------|
| Panel Antenna 1#                  | Compex Systems Pte Ltd                                       | 3              | 2.4GHz: 11.0               |
| Panel Antenna 2#                  | Kenbotong Communication LTD                                  | 3              | 2.4GHz: 10.0, 5GHz: 10.0   |
| Panel Antenna 3#                  | Smart Ant Inc  | 3              | 2.4GHz: 7.0, 5GHz: 7.0     |
| Panel Antenna 4#                  | TAOGLAS Inc  | 3              | 2.4GHz: 4.5, 5GHz: 6.7     |
| Panel Antenna 5#                  | Compex Systems Pte Ltd                                       | 3              | 2.4GHz: 5.0, 5GHz: 5.0     |
| Panel Antenna 6#                  | Compex Systems Pte Ltd                                       | 3              | 2.4GHz: 5.0, 5GHz: 5.0     |
| Dipole Antenna 1#                 | Kunshan Wavelink Electronic Co., Ltd.                        | 3              | 2.4GHz: 2.0, 5GHz: 2.0     |
| Vivaldi PCB + Metal Slot Antennas | 7signal Solutions Inc custom PCB and sheet metal slot design | 3 simultaneous | 2.4GHz: 6.0, 5GHz: 6.0     |

Note: 5.725~5.850GHz supports a max antenna gain of 10dBi, 5.15~5.35, 5.47~5.725GHz supports a max antenna gain of 7dBi. This device is only a client module, the device does not perform radar detection and does not support ad-hoc operation in the DFS band.

**OEM integration instructions:**

This device is intended only for OEM integrators under the following conditions:

The module is limited to only installations in mobile applications. The antenna must be installed such that 20 cm is maintained between the antenna and users, and the transmitter module may not be co-located with any other transmitter antenna. The module shall be only used with the integral antenna(s) that have been originally tested and certified with this module.

As long as 3 conditions above are met, further transmitter test will not be required.

However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirement with this module installed (for example, digital device emission, PC peripheral requirements, etc.)

**OEM integration instructions:**

In the event that these conditions cannot be met (for example certain laptop configuration or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

**End product labeling:**

This transmitter module is authorization only for use in devices where the antenna may be installed such that 20 cm will be maintained between the antenna and user. The final end product must be labeled in a visible area with the following: "Contains Transmitter Module FCC ID: YLFSE2100WL" or "Contains FCC ID: YLFSE2100WL"

**Information that must be placed in the end user manual:**

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as shown in this manual.