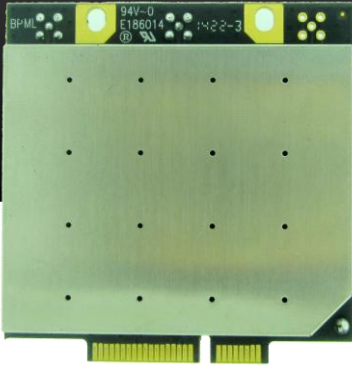




# WIRELESS-AC 2X2 27DBM NETWORK MINI PCIE ADAPTER

Model: WLE600V5-27

ac wave series

## Features

- Qualcomm-Atheros QCA9882, Peregrine Series
- Maximum 27dBm output power (per chain), 30dBm (aggregate)
- IEEE 802.11ac complaint & backward compatible with 802.11a/n
- 2X2 MIMO Technology & up to 867Mbps
- 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
- Cards are individually calibrated for Quality Assurance
- Supported by either CompexWRT with Atheros Reference Wireless Driver OR OpenWRT with ath10k Wireless Driver on WPJ344

## Applications (combined with WPJ344)

- Indoor AP
- Outdoor AP
- 802.11ac/an CPE
- 802.11ac/an Point to Point
- Base Station

## Technical Specifications

| System Information     |                                                                           |             |           |                        |          |             |           |
|------------------------|---------------------------------------------------------------------------|-------------|-----------|------------------------|----------|-------------|-----------|
| Chipset                | QCA9882,Peregrine Series                                                  |             |           |                        |          |             |           |
| Host Interface         | PCI-Express 1.1 Standard                                                  |             |           |                        |          |             |           |
| Operating Voltage      | 3.3 VDC, 5V (compulsory and external) <sup>1</sup>                        |             |           |                        |          |             |           |
| Power Consumption      | 7.4W                                                                      |             |           |                        |          |             |           |
| Antenna Connector      | 2 x MMCX Antenna Connector                                                |             |           |                        |          |             |           |
| Frequency Range        | 5.150 ~ 5.250, 5.725 ~ 5.850 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 50 x 3.2 (H x W x D)                                              |             |           |                        |          |             |           |
| RX Specifications      |                                                                           |             |           |                        |          |             |           |
|                        | DataRate                                                                  | Sensitivity | Tolerance |                        | DataRate | Sensitivity | Tolerance |
| 802.11a                | 6Mbps                                                                     | -94dBm      | ±2dB      | 5GHz<br>11n/ac<br>HT20 | MCS 0    | -94dBm      | ±2dB      |
|                        | 9Mbps                                                                     | -94dBm      | ±2dB      |                        | MCS 1    | -94dBm      | ±2dB      |
|                        | 12Mbps                                                                    | -94dBm      | ±2dB      |                        | MCS 2    | -92dBm      | ±2dB      |
|                        | 18Mbps                                                                    | -92dBm      | ±2dB      |                        | MCS 3    | -88dBm      | ±2dB      |
|                        | 24Mbps                                                                    | -89dBm      | ±2dB      |                        | MCS 4    | -84dBm      | ±2dB      |
|                        | 36Mbps                                                                    | -86dBm      | ±2dB      |                        | MCS 5    | -81dBm      | ±2dB      |
|                        | 48Mbps                                                                    | -82dBm      | ±2dB      |                        | MCS 6    | -78dBm      | ±2dB      |
|                        | 54Mbps                                                                    | -80dBm      | ±2dB      |                        | MCS 7    | -77dBm      | ±2dB      |
|                        |                                                                           |             |           |                        | MCS 8    | -74dBm      | ±2dB      |
| 5GHz<br>11n/ac<br>HT40 | MCS 0                                                                     | -93dBm      | ±2dB      | 5GHz<br>11ac<br>HT80   | MCS 9    | -71dBm      | ±2dB      |
|                        | MCS 1                                                                     | -91dBm      | ±2dB      |                        | MCS 0    | -89dBm      | ±2dB      |
|                        | MCS 2                                                                     | -90dBm      | ±2dB      |                        | MCS 1    | -88dBm      | ±2dB      |
|                        | MCS 3                                                                     | -85dBm      | ±2dB      |                        | MCS 2    | -85dBm      | ±2dB      |
|                        | MCS 4                                                                     | -82dBm      | ±2dB      |                        | MCS 3    | -81dBm      | ±2dB      |
|                        | MCS 5                                                                     | -78dBm      | ±2dB      |                        | MCS 4    | -79dBm      | ±2dB      |
|                        | MCS 6                                                                     | -77dBm      | ±2dB      |                        | MCS 5    | -75dBm      | ±2dB      |
|                        | MCS 7                                                                     | -75dBm      | ±2dB      |                        | MCS 6    | -74dBm      | ±2dB      |
|                        | MCS 8                                                                     | -73dBm      | ±2dB      |                        | MCS 7    | -72dBm      | ±2dB      |
|                        | MCS 9                                                                     | -71dBm      | ±2dB      |                        | MCS 8    | -70dBm      | ±2dB      |
|                        |                                                                           |             | MCS 9     | -68dBm                 | ±2dB     |             |           |

## Ordering Information

| Item Code             | Chipset      | Form factor | Card Informations                       |
|-----------------------|--------------|-------------|-----------------------------------------|
| WLE600V5-27 8AB000ESD | Atheros 9882 | Wide size   | 2x2 11ac 5GHz High Power miniPCIe Radio |

## Instruction procedure

Plug the module into the hosts and update the driver in the system of the hosts.  
Get the proper driver from the website <http://www.comtex.com.sg/>.

<sup>1</sup> Customers have to connect a 5V power supply to the pin on WLE600V5-27

## **FCC Certification Requirements.**

### **List of applicable FCC rules**

FCC Part 15 Subpart B, Part 15 Subpart E

### **Summarize the specific operational use conditions**

Not Applicable

### **Limited module procedures**

Not Applicable

### **Trace antenna designs**

No Micro-Strip Antennas and traces was used.

### **RF exposure considerations**

Refer to FCC certification requirements

### **External Antennas**

| Antenna Type   | Frequency Band (GHz) | Model Name  | Max Antenna Gain (dBi) |
|----------------|----------------------|-------------|------------------------|
| Dipole Antenna | 5.15~5.35            | KMA5250_7   | 7.0                    |
|                | 5.70 ~5.90           | KMA5800_6   | 6.0                    |
| Panel Antenna  | 4.90 ~5.90           | FP4959-22DP | 22.5                   |

Note: When used with dipole antenna, this device was defined as P-T-MP application and support NII-1 / NII-3 bands. When used with panel antenna, this device was defined as P-T-P application and support NII-3 band.

### **Label and compliance information**

Refer to FCC Label

### **Information on test modes and additional testing requirements**

Not Applicable

### **Additional testing, Part 15 Subpart B disclaimer**

Refer to FCC 15B Report

According to the definition of mobile and fixed device is described in Part 2.1091(b), this device is a mobile device.

And the following conditions must be met:

1. This Modular Approval is limited to OEM installation for mobile and fixed applications only. The antenna installation and operating configurations of this transmitter, including any applicable source-based time-averaging duty factor, antenna gain and cable loss must satisfy MPE categorical Exclusion Requirements of 2.1091.
2. The EUT is a mobile device; maintain at least a 51 cm separation between the EUT and the user's body and must not transmit simultaneously with any other antenna or transmitter.
3. A label with the following statements must be attached to the host end product: This device contains FCC ID: TK4WLE600V5.
4. To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, maximum antenna gain (including cable loss) must not exceed:
5. This module must not transmit simultaneously with any other antenna or transmitter
6. The host end product must include a user manual that clearly defines operating requirements and conditions that must be observed to ensure compliance with current FCC RF exposure guidelines.

For portable devices, in addition to the conditions 3 through 6 described above, a separate approval is required to satisfy the SAR requirements of FCC Part 2.1093

If the device is used for other equipment that separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and different antenna configurations.

For this device, OEM integrators must be provided with labeling instructions of finished products. Please refer to KDB784748 D01 v07, section 8. Page 6/7 last two paragraphs:

A certified modular has the option to use a permanently affixed label, or an electronic label. For a permanently affixed label, the module must be labeled with an FCC ID - Section 2.926 (see 2.2 Certification (labeling requirements) above). The OEM manual must provide clear instructions explaining to the OEM the labeling requirements, options and OEM user manual instructions that are required (see next paragraph).

For a host using a certified modular with a standard fixed label, if (1) the module's FCC ID is not visible when installed in the host, or (2) if the host is marketed so that end users do not have straightforward commonly used methods for access to remove the module so that the FCC ID of the module is visible; then an additional permanent label referring to the enclosed module: "Contains Transmitter Module FCC ID: TK4WLE600V5" or "Contains FCC ID: TK4WLE600V5" must be used. The host OEM user manual must also contain clear instructions on how end users can find and/or access the module and the FCC ID.

The final host / module combination may also need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.

The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

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.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference

by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

## **IC Statement**

### **IRSS-GEN**

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

### **Radiation Exposure Statement:**

The EUT is a mobile device; maintain at least a 51 cm separation between the EUT and the user's body and must not transmit simultaneously with any other antenna or transmitter.

### **Déclaration d'exposition aux radiations:**

L'EST est un appareil mobile; maintenir une distance d'au moins 51 cm entre l'EST et le corps de l'utilisateur et ne pas émettre simultanément avec une autre antenne ou un autre émetteur.

The host product shall be properly labelled to identify the modules within the host product.

The Innovation, Science and Economic Development Canada certification label of a module shall be clearly visible at all times when installed in the host product; otherwise, the host product must be labeled to display the Innovation, Science and Economic Development Canada

certification number for the module, preceded by the word "Contains" or similar wording expressing the same meaning, as follows: "Contains IC: 7849A-WLE600V5 " or "where: 7849A-WLE600V5 is the module's certification number".

Le produit hôte doit être correctement étiqueté pour identifier les modules dans le produit hôte. L'étiquette de certification d'Innovation, Sciences et Développement économique Canada d'un module doit être clairement visible en tout temps lorsqu'il est installé dans le produit hôte; sinon, le produit hôte doit être étiqueté pour afficher le numéro de certification d'Innovation, Sciences et Développement économique Canada pour le module, précédé du mot «Contient» ou d'un libellé similaire exprimant le même sens, comme suit: Contient IC: 7849A-WLE600V5 ou "où: 7849A-WLE600V5 est le numéro de certification du module".

The device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;

For devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits as appropriate;

Le dispositif utilisé dans la bande 5150-5250 MHz est uniquement utilisé en intérieur pour réduire la fréquence

Possibilité d'interférences nuisibles pour les systèmes de satellites mobiles co-canaux;

Pour les appareils avec antenne (S) détachable (S), le gain d'antenne maximal autorisé pour les appareils dans La bande 5725-5850 MHz doit être telle que l'équipement soit toujours conforme à la directive E.I.R.P. Limites selon le cas;

| Antenna Type   | Frequency Band (GHz) | Model Name  | Max Antenna Gain (dBi) |
|----------------|----------------------|-------------|------------------------|
| Dipole Antenna | 5.15~5.35            | KMA5250_7   | 7.0                    |
|                | 5.70 ~5.90           | KMA5800_6   | 6.0                    |
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Note: When used with dipole antenna, this device was defined as P-T-MP application and support NII-1 / NII-3 bands. When used with panel antenna, this device was defined as P-T-P application and support NII-3 band.

Note: lorsqu'il est utilisé avec l'antenne dipolaire, ce dispositif a été défini comme une application P-T-MP et supporte les bandes NII-1 / NII-3. Lorsqu'il est utilisé avec une antenne à panneaux, ce dispositif a été défini comme une application P-T-P et supporte la bande NII-3.

For licence-exempt equipment with detachable antennas, the user manual shall also contain the following notice in a conspicuous location

Pour les équipements exempts de licence et équipés d'antennes amovibles, le manuel d'utilisation doit également contenir la notice suivante dans une position visible