

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 600Mbps 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 5GHz 802.11a/n/ac 4x U.FL Connectors
Frequency Range	2.412~2.462GHz, 5.150~5.850GHz
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	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.

Component Map



Power Requirements

DC Power	3.3V
Power Consumption	9W (Max)

miniPCle Slot Pin Assignment

Top side		Bottom side	
1	WAKE_L	2	VDD_3V3
3	CHP_PWD_L	4	GND
5	NC	6	NC
7	CLKREQ_L	8	NC
9	GND	10	NC
11	REFCLK-	12	NC
13	REFCLK+	14	NC
15	GND	16	NC
Mechanical key			
17	NC	18	GND
19	NC	20	WLAN_DISABLE_N(GPIO18)
21	GND	22	RESET_L
23	PERN0	24	VDD_3V3
25	PERP0	26	GND
27	GND	28	NC
29	GND	30	NC
31	PETN0	32	NC
33	PETP0	34	GND
35	GND	36	NC
37	NC	38	NC
39	VDD_3V3	40	GND
41	VDD_3V3	42	NC
43	GND	44	WLAN_LED_L(GPIO17)
45	NC	46	NC
47	NC	48	NC
49	NC	50	GND
51	NC	52	VDD_3V3

OEM/Integrators Installation Manual

Important Notice to OEM integrators 1. This module is limited to OEM installation ONLY. 2. This module is limited to installation in mobile or fixed applications, according to Part 2.1091(b). 3. The separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations 4. For FCC Part 15.31 (h) and (k): The host manufacturer is responsible for additional testing to verify compliance as a composite system. When testing the host device for compliance with Part 15 Subpart B, the host manufacturer is required to show compliance with Part 15 Subpart B while the transmitter module(s) are installed and operating. The modules should be transmitting, and the evaluation should confirm that the module's intentional emissions are compliant (i.e. fundamental and out of band emissions). The host manufacturer must verify that there are no additional unintentional emissions other than what is permitted in Part 15 Subpart B or emissions are complaint with the transmitter(s) rule(s). The Grantee will provide guidance to the host manufacturer for Part 15 B requirements if needed.

Important Note

notice that any deviation(s) from the defined parameters of the antenna, as described by the instructions, require that the host product manufacturer must notify to COMPEX that they wish to change the antenna design. In this case, a Class II permissive change application is required to be filed by the USI, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

End Product Labeling

When the module is installed in the host device, the FCC/IC label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily re-moved. If not, a second label must be placed on the outside of the final device that contains the following text: "Contains FCC ID: TK4WLE1216VX" "Contains IC: 7849A-WLE1216VX". The FCC ID/IC Certification Number can be used only when all FCC/IC compliance requirements are met.

Antenna

- (1) The antenna must be installed such that 20 cm is maintained between the antenna and users,
- (2) The transmitter module may not be co-located with any other transmitter or antenna.

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC/IC authorization is no longer considered valid, and the FCC ID/IC 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/IC authorization. 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.

Antenna Type	Frequency Band (GHz)	TX Paths	Max Antenna Gain (dBi)	Cable Loss (dB)	Actual Antenna Gain (dBi)	Directional Gain (dBi)	
						For Power	For PSD
Dipole Antenna	2.4	4	3.16	0.52	2.64	2.64	8.66
	5.0	4	4.18	0.83	3.35	3.35	9.37

Remark:

1. The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.
2. For CDD transmissions, directional gain is calculated as follows, $N_{ANT} = 4$, $N_{SS} = 1$.
If all antennas have the same gain, G_{ANT} , Directional gain = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows.
 - For power spectral density (PSD) measurements on all devices,
Array Gain = $10 \log (N_{ANT}/ N_{SS})$ dB = 6.02;
 - For power measurements on IEEE 802.11 devices,
Array Gain = 0 dB for $N_{ANT} \leq 4$;

Manual Information to the End User

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 show in this manual.

Federal Communication Commission Interference 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 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 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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

List of applicable FCC rules

This module has been tested and found to comply with part 15 requirements for Modular Approval. The modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

This device is intended only for OEM integrators under the following

conditions: (For module device use)

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 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 requirements required with this module installed.

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

Industry Canada Statement

This device complies with Industry Canada's licence-exempt RSSs. 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

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

This device is intended only for OEM integrators under the following conditions: (For module device use)

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna. As long as 2 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 requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: (Pour utilisation de dispositif module)

- 1) L'antenne doit être installée de telle sorte qu'une distance de 20 cm est respectée entre l'antenne et les utilisateurs, et
- 2) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 2 conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

IMPORTANT NOTE:

In the event that these conditions cannot be met (for example certain laptop configurations or colocation with another transmitter), then the Canada authorization is no longer considered valid, and the IC 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 Canada authorization.

NOTE IMPORTANTE:

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains IC: 7849A-WLE1216VX".

Plaque signalétique du produit final

Ce module émetteur est autorisé uniquement pour une utilisation dans un dispositif où l'antenne peut être installée de telle sorte qu'une distance de 20cm peut être maintenue entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 7849A-WLE1216VX".

Manual Information to the End User

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 show in this manual.

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

1.List of applicable FCC rules. KDB 996369 D03, Section 2.2

Complies with FCC Part 15.247 & 15.407

2.Summarize the specific operational use conditions. KDB 996369 D03, Section 2.3

Refer to antenna information as above or the specification

3.Limited Module Procedures. KDB 996369 D03, Section 2.4

Refer to antenna information as above or the specification

4.Trace antenna designs. KDB 996369 D03, Section 2.5

Refer to antenna information as above or the specification

5.RF exposure considerations. KDB 996369 D03, Section 2.6

It will be installed in their own products only, host model name: WPJXXX.

6.Antennas KDB 996369 D03, Section 2.7

Refer to antenna information as above or the specification

7.Label and compliance information. KDB 996369 D03, Section 2.8

Refer label file.