

WiFi6E 3000 802.11ax G-band 2T2R and A-band 2T3R 2ss Dual Bands Dual Concurrents mPCIe Card AW7916-AED



DESCRIPTION

AW7916-AED is a WiFi6E 3000 highly advanced Mini PCIe Module with G-band 2T2R + A-band 2T3R 2ss Dual Bands Dual Concurrents (DBDC) based on Mediatek MT7916AN.

The capabilities enabling up to 3Gbps performance, supports 3×3 with 2 Spatial Streams for either 5 or 6GHz at maximum 160MHz bandwidth and 2×2 with 2 spatial streams for 2.4GHz at maximum 40MHz bandwidth. The additional 3rd antenna can be used for zero-wait DFS and/or MRC (up to 1024-QAM) for extra downlink (Rx) performance. Integrating the FEM radio into the Mediatek Filogic 630 platform yields integration advantages of smaller size and lower BOM costs for device makers.

Advanced access point features include up to 24 users (OFDMA), support of MU-MIMO clients, 512 MAC entries, 16 MBSSID and support for all Wi-Fi Alliance Wi-Fi 6 Release 2 features.

In addition, the chipset includes hardware-based Wi-Fi offload engine to alleviate the router AP from Wi-Fi connection-related processing, improving whole platform energy efficiency and performance. Filogic 630 can also be combined with Filogic 830 SoC platform for Tri-band Wi-Fi 6/6E solutions for Routers and Repeaters.

Features:

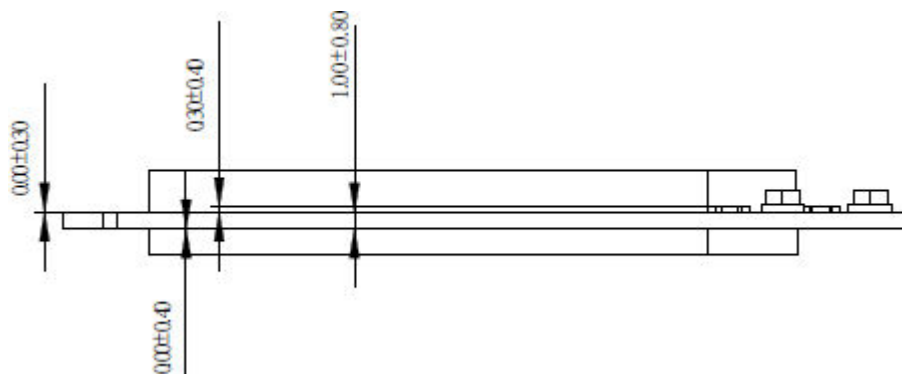
- IEEE 802.11 a/b/g/n/ac/ax compliant
- Support 20/40MHz bandwidth in G-band, and 20/40/80/160MHz bandwidth in A-band
- G-band 2T2R + A-band 2T3R 2ss, dual-band dual concurrent (DBDC) with PHY rate up to 3000Mbps
- Support MU-MIMO TX/RX
- Support MU-OFDMA TX/RX
- Support STBC, LDPC, TX Beamformer and RX Beamformer
- Support greenfield, mixed mode, legacy modes
- Security support for WFA WPA/WPA2/WPA3 personal, WPS2.0
- QoS support of WFA WMM, WMM PS
- 32-bit RISC MCU for Wi-Fi protocols and Wi-Fi offload
- Embedded SRAM/ROM
- UART interface with hardware flow control
- Programmable and multiplexed GPIO pins
- PCIe device fully compliant to PCIe v2.1 specification
- Integrate 4Kbit efuse to store device specific information and calibration data

Specification:

Standards	Wireless: G-band 2T2R + A-band 2T3R 2ss, dual-band dual concurrent (DBDC) with PHY rate up to 3000Mbps
Data Rate	IEEE 802.11ax 3000Mbps@TX/RX
Receiver Sensitivity	11b: -99dBm@11Mbps 11g: -95dBm@54Mbps 11g/n: -90dBm@HT20,MCS7, -86dBm@HT40,MCS7 11a: -90Bm@54Mbps 11a/n: -85dBm@HT20,MCS7, -81dBm@HT40,MCS7 11ac: -90dBm+/-2dBm @VHT20 MCS8 11ac: -85dBm+/-2dBm @VHT40 MCS9 11ac: -68dBm+/-2dBm @VHT80 MCS9 11ax: -61dBm+/-2dBm @HE20 MCS11 11ax: -58dBm+/-2dBm @HE40 MCS11 11ax: -55dBm+/-2dBm @HE80 MCS11
Antenna	External Antenna connector (IPEX) x3
Frequency Range	US,2.4G Bands: 2.412GHz~2.462 GHz, 5G Bands:5.15GHz ~5.895GHz, 6G Bands: 5.925 ~ 7.125 GHz Canada,2.4G Bands: 2.412GHz~2.462 GHz, 5G Bands:5.15GHz ~5.875GHz, 6G Bands: 5.925 ~ 7.125 GHz EU, Japan: 2.4G Bands: 2.412GHz~2.472GHz, 5G Bands:5.15GHz ~5.875GHz, 6G Bands: 5.925 ~ 6.425 GHz
Software	Security: 64/128-bit WEP Encryption, WPA, WPA2 Driver: Linux
Operating Voltage	DC 3.3V $\pm$ 5%
Temperature	Operating: 0°C ~ +70°C Storage : -20°C ~ +90°C
Humidity	Operating Humidity: 10%~90% non-condensing Storage Humidity: 10%~90% non-condensing
Dimension	50.95(H) x 30(W)mm

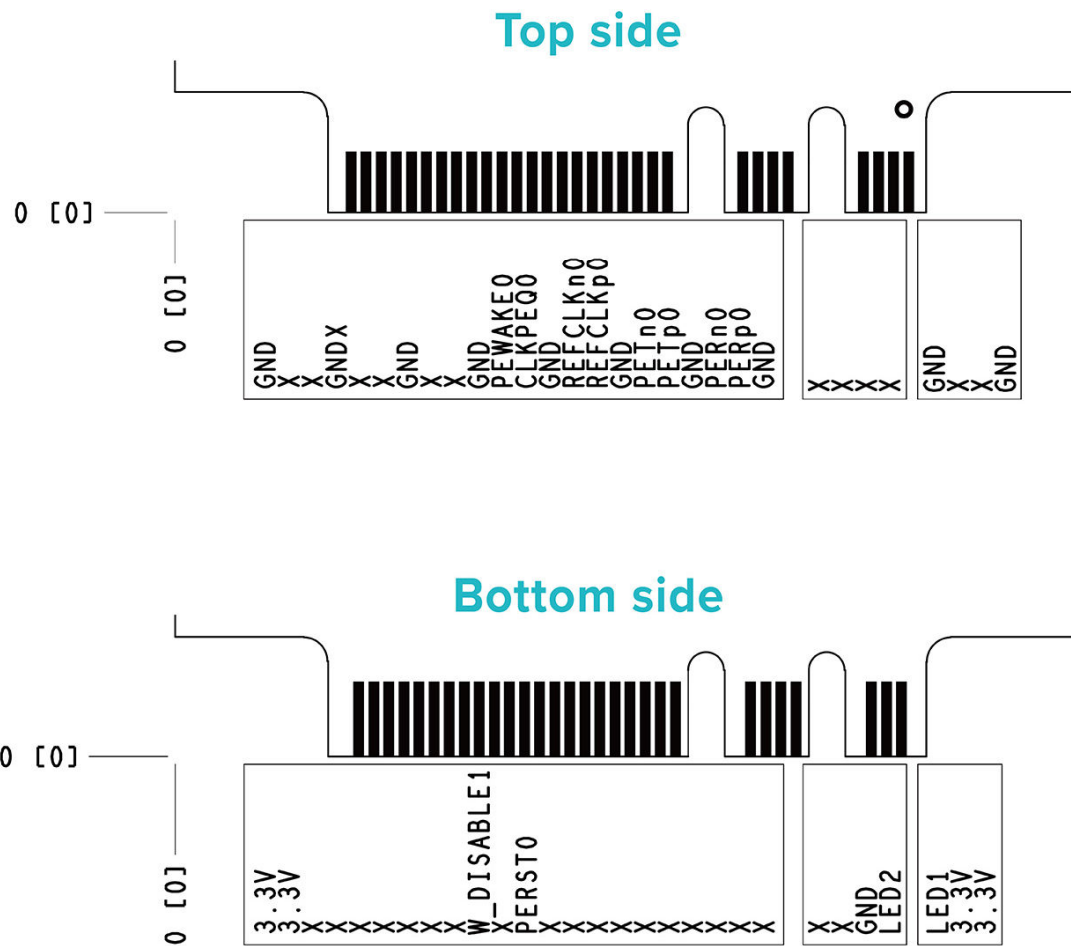
Power consumption maximum is 8W, average is 5W.

Main board Power Supply design please provide 3.3V 3.5A, minimum 3.3V 3A.

[illegible]

1F, 7, Houde Street, Younghe District, New Taipei City, Taiwan, R.O.C

Pins define



Packing information

Using antistatic tray.

One tray for 35pcs PCBA.

One carton for 23 trays=805 PCBAs

One tray for 35pcs PCBA



23 trays in one carton



Sealing carton



Carton label is as below:

One carton label



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 Statement

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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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 and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

FCC 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 **20cm** between the radiator & your body.

ISED Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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.

Les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant

les mêmes canaux.

Devices shall not be used for control of or communications with unmanned aircraft systems.

Les dispositifs ne doivent pas être utilisés pour commander des systèmes d' aéronef sans pilote ni pour communiquer avec de tels systèmes.

This radio transmitter [IC: 9968A-AW7916NPD] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Frequency Band	Model Number	Antenna Type	Gain(dBi)
2400-2483.5MHz; 5150-5850MHz 5925-7125MHz	ANTS0WF602M02001	Dipole	2.4GHz: 5 5GHz: 5 6GHz: 5

Le présent émetteur radio [IC: 9968A-AW7916NPD] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

Frequency Band	Model Number	Antenna Type	Gain(dBi)
2400-2483.5MHz; 5150-5850MHz 5925-7125MHz	ANTS0WF602M02001	Dipole	2.4GHz: 5 5GHz: 5 6GHz: 5

ISED Radiation Exposure Statement:

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance **20cm** between the radiator & your body.

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

The transmitter module may not be co-located with any other transmitter or antenna.

Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

Pour les produits disponibles aux États-Unis / Canada du marché, seul le canal 1 à 11 peuvent être exploités. Sélection d'autres canaux n'est pas possible.

The OEM or integrator is obligated to adhere to these requirements and restrictions as a condition for using the module's certification. The OEM or integrator is responsible to perform the required additional host regulatory testing and/or obtaining the required host approvals for compliance.

This module is intended for OEM integrators under the following conditions:

1. Ensure that the end-user has no manual instructions to remove or install module.
2. This module is certified pursuant to Part 15 rules section 15.247, 15.407 and RSS-247, RSS-248.
3. This module has been approved to operate with the antenna types listed below, with the maximum permissible gain indicated and must include 0.3 dB cable loss compensation.

Frequency Band	Model Number	Antenna Type	Gain(dBi)
2400-2483.5MHz; 5150-5850MHz 5925-7125MHz	ANTS0WF602M02001	Dipole	2.4GHz: 5 5GHz: 5 6GHz: 5
5850-5895MHz (US only)	ANTS0WF602M02001	Dipole	5GHz: 5

"The module is instructed that the module can only be installed in an indoor client device which is limited to indoor locations and is under control of a low-power indoor access points (6ID) or subordinate (6PP). An indoor client device with a direct connection to the internet cannot source the internet to other access points, clients or subordinate devices. Indoor client devices are prohibited from connecting directly to any another client device. Operation of transmitters in the 5.925-7.125

GHz band is prohibited for control of or communications with unmanned aircraft systems.”

“The module is instructed that the module can only be installed in an indoor client device which is limited to indoor locations and is under control of a U-NII-4 low-power indoor access points or subordinate. An indoor client device shall passively scan to associate with an access point or a subordinate. Clients are permitted to initiate a brief probe message requesting to join and associate with a specific access point or Subordinate. Clients cannot have a direct connection to the internet to source the internet to other clients, access points, subordinates or clients from a wired or direct connection.”

4. Label and compliance information

Label of the end product:

FCC:
The host product must be labeled in a visible area with the following " Contains FCC ID: TKZAW7916-NPD". The end product shall bear the following 15.19 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.

ISED:

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 transmitter module IC: 9968A-AW7916NPD” or “Contains IC: 9968A-AW7916NPD

Contient le module d'émission IC: 9968A-AW7916NPD

The Host Model Number (HMN) must be indicated at any location on the exterior of the end product or product packaging or product literature which shall be available with the end product or online.

5. Information on test modes and additional testing requirements

This module is restricted to integration into hosts for indoor use only.

This module has been approved under stand-alone configuration.

OEM integrator has be limited the operation channels in channel 1-11 for 2.4GHz band.

The separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093/RSS-102 and different antenna configurations.

The information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host can be found at KDB Publication 996369 D04.

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

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/ISED authorization is no longer considered valid and the FCC/IC No. 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/ISED authorization.

6. Additional testing, Part 15 Subpart B and ICES-003 disclaimer

Appropriate measurements (e.g. Part 15 Subpart B compliance) and if applicable additional equipment authorizations (e.g. SDoC) of the host product to be addressed by the integrator/manufacture.

This module is only FCC/ISED authorized for the specific rule parts 15.247, 15.407/RSS-247 listed on the grant, and the host product manufacturer is responsible for compliance to any other FCC/ISED rules that apply to the host product as being Part 15 Subpart B/ICES-003 compliant.

7. Note EMI Considerations

Note that a host manufacture is recommended to use D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties

For standalone mode, reference the guidance in D04 Module Integration Guide and for simultaneous mode; see D02 Module Q&A Question 12, which permits the host manufacturer to confirm compliance.

8. How to make changes

If any changes or modifications need to be made to the integrated product, such as adding or adjusting the antenna or cable, follow the guidelines provided by Grantee.

For further assistance, please contact:

AsiaRF Co., Ltd

Address: 2F, No. 53 Minquan Rd., Yonghe Dist., New Taipei City, 234621, Taiwan, R.O.C.

Tel: +886 2 2940-7880

Conditions To Be Observed By Use of 6GHz Bands (5.925GHz~7.125GHz)

An indoor client device (6XD), where a client device is defined in FCC Part. 15.202, is limited to indoor locations and is under control of a low-power indoor access point (6ID) or subordinate (6PP). It is only possible to operate the client device can only operate under the control of a low-power indoor access point and subordinate.

A client may initiate brief messages to associate with a low-power indoor access point or subordinate and establish a connection only after receiving a confirmation signal confirming that an AP is present and operating on a particular channel. After being associated, the indoor client can only initiate transmission with that access point. Indoor client devices (6XD) are prohibited from making a direct air interface connection to other clients.

An indoor client device cannot have a direct connection to the internet.

9. The user manual of the end product should include (information for OEMs):

The module must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

Information To Be Supplied to the End User by the OEM or Integrator

FCC:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least **20 cm** from all persons.

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.

The antenna(s) used for this transmitter must not transmit simultaneously with any other antenna or transmitter.

FCC regulations restrict the operation of this device to indoor use only.

Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

This device is limited to under control of a low-power indoor access point (6ID) or subordinate(6PP).

This device cannot have a direct connection to the internet.

The end user manual shall include all required regulatory information/warning as shown in this document.

ISED:

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Devices shall not be used for control of or communications with unmanned aircraft systems.

The device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for
Devices shall not be used for control of or communications with unmanned aircraft systems.

Les dispositifs ne doivent pas être utilisés pour commander des systèmes d' aéronef sans pilote ni pour communiquer avec de tels systèmes.

Les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

ISED Radiation Exposure Statement:

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance **20cm** between the radiator & your body.

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

The transmitter module may not be co-located with any other transmitter or antenna.

Le module émetteur peut ne pas être coimplanté avec un autre émetteur ou antenne.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

Pour les produits disponibles aux États-Unis / Canada du marché, seul le canal 1 à 11 peuvent être exploités. Sélection d'autres canaux n'est pas possible.

This radio transmitter [IC: 9968A-AW7916NPD] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Frequency Band	Model Number	Antenna Type	Gain(dBi)
2400-2483.5MHz; 5150-5850MHz 5925-7125MHz	ANTS0WF602M02001	Dipole	2.4GHz: 5 5GHz: 5 6GHz: 5

Le présent émetteur radio [IC: 9968A-AW7916NPD] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

Frequency Band	Model Number	Antenna Type	Gain(dBi)
2400-2483.5MHz; 5150-5850MHz 5925-7125MHz	ANTS0WF602M02001	Dipole	2.4GHz: 5 5GHz: 5 6GHz: 5