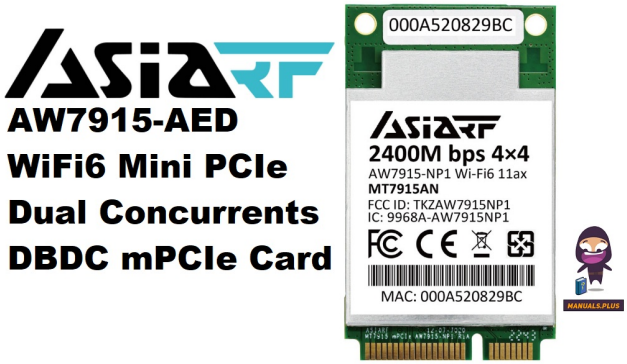


AsiaRF AW7915-AED WiFi6 Mini PCIe Dual Concurrents DBDC mPCIe Card Owner's Manual

Contents

AsiaRF AW7915-AED WiFi6 Mini PCIe Dual Concurrents DBDC mPCIe Card

Specifications

- **Product Name:** WiFi6 2T2R Dual Bands Dual Concurrents DBDC mPCIe Card IEEE802.11ax/ac/a/b/g/n AW7915-AED
- **PHY Rate:** Up to 573+1201Mbps
- **Channels Supported:** 20, 40, 80
- **MCS Support:** HE MCS0-11 BW20/40/80MHz with Nss=1~2
- **Processor:** ARM Cortex R4 processor & 32-bit RISC microprocessor
- **RF Integration:** 40nm low power process

Product Usage Instructions

Installation

1. Turn off your computer and disconnect it from the power source.
2. Open the computer case and locate an available mPCIe slot.
3. Insert the mPCIe card into the slot carefully, ensuring a secure fit.
4. Close the computer case and reconnect the power source.

Driver Installation

1. After installing the hardware, power on your computer.
2. Insert the driver installation CD that came with the product.
3. Follow the on-screen instructions to install the drivers for the mPCIe card.

4. Restart your computer to complete the driver installation process.

Configuration

1. Once the drivers are installed, access your computer's network settings.
2. Locate the newly installed mPCIe card in the list of network adapters.
3. Configure the wireless network settings as per your network requirements.
4. Save the settings and connect to your desired wireless network.

Dimension

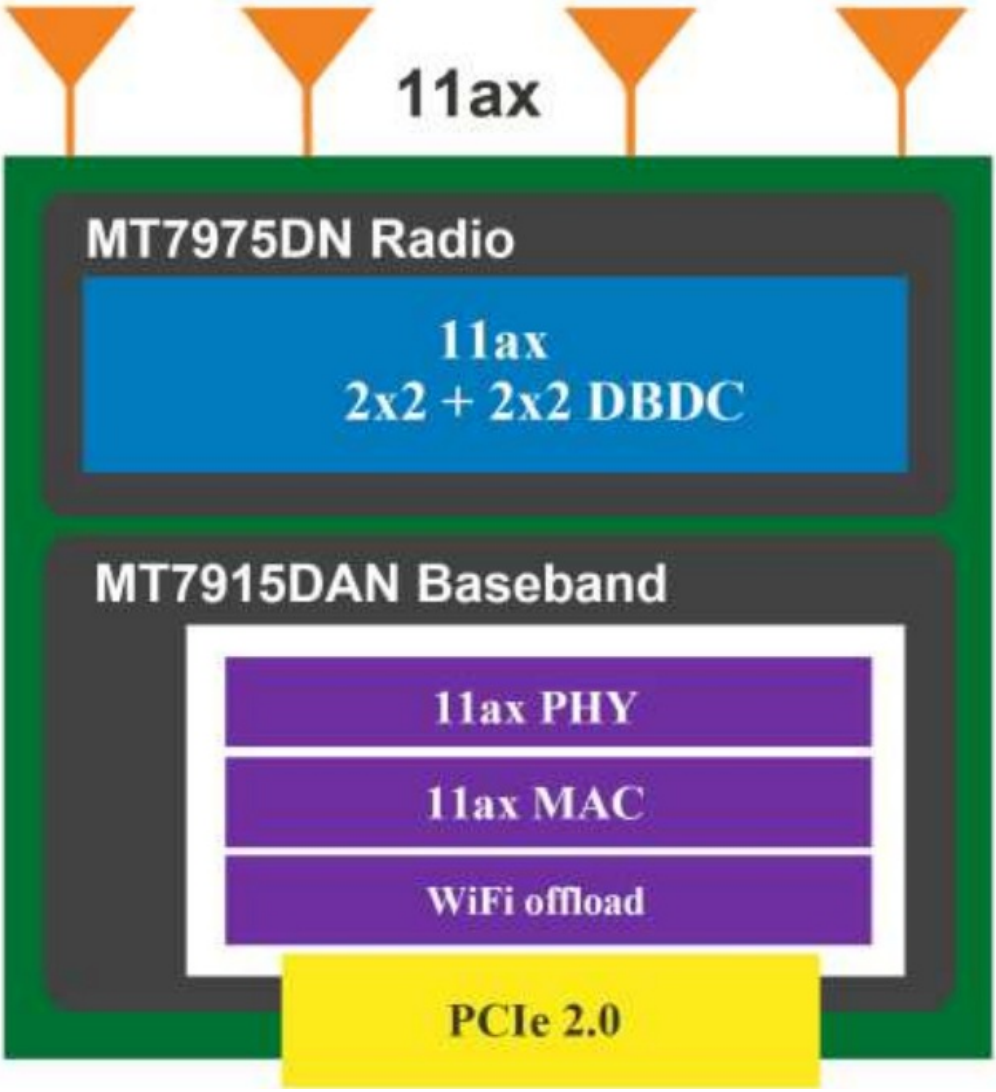
DESCRIPTION

- AW7915-AED is a WiFi6 Mini PCIe Module 2T2R based on Mediatek MT7915DAN, which is a WiFi Mini PCIe single chip which supports a 573+1201 Mbps PHY rate with an M.2 AE key interface.
- It fully complies with IEEE 802.11ax/ac and IEEE 802.11 ac/a/b/g/n standards, offering feature-rich wireless connectivity at high standards and delivering reliable, cost-effective throughput from an extended distance.
- The most important is one module could be Dual Bands Dual Concurrent (DBDC), which means 2.4GHz and 5GHz simultaneously operated.
- Optimized RF architecture and base band algorithms provide superb performance and low power consumption. Intelligent MAC design deploys a highly efficient offload engine and hardware data processing accelerators which completely offloads Wi-Fi task of the host processor. MT7915DAN is designed to support standard based features in the areas of security, quality of service and international regulations, giving end users the greatest performance any time and in any circumstance.
- MT7915DAN is designed to support high data throughput over WiFi. The host interface PCIe is integrated to provide stable bandwidth between the host platform and MT7915DAN.
- **Deep sleep mode:** Multiple power domains are implemented on the chip. In deep sleep mode, the PMU could be further configured to be in a low power state to save the power consumption.
- **Two CPU systems:** There are both 32-bits RISC MCU subsystem. The CPU has its local memory. There are

several options of clock frequency to provide the optimal performance with the best power consumption.

- The 32-bit RISC MCU is used to do clock control, power management, and host interface configuration. PDMA (packet DMA) engines are integrated to support on-the-fly data buffer management.
- MT7915DAN had the WiFi MAC and BBP subsystem and used with MT7975DN, which provides the best-in-class radio and low power performance.
- The Wi-Fi MAC and BBP subsystems use with MT7975DN together, which provide the best-in-class radio and low power performance.
- With the advent of 802.11ax/ac, multiuser MIMO (MU-MIMO) is defined. MT7915DAN supports MU-MIMO with different configurations.
- An AP can use its antenna arrays to transmit multiple frames to different clients at the same time and over the same frequency spectrum.

MT7915DAN Block Diagram



Features

- 2T2R in 2.4G+2T2R in 5G with support of up to 573+1201Mbps PHY rate
- Supports 20, 40, 80 channels
- HE MCS0-11 BW20/40/80MHz with Nss=1~2
- Short Guard Interval

- Space-time block code (STBC)
- Low-density party check (LDPC)
- Support digital pre-distortion to enhance PA performance
- Smoothing (channel estimation) extension to MIMO case
- Embedded ARM Cortex R4 processor for full host CPU offload
- Embedded 32-bit RISC microprocessor
- Support STBC, LDPC, TX Beamformer and RX Beamformee
- Decoded BW20/40/80 up to 4×2 MU materix feedback
- Greenfield, mixed mode, legacy modes support
- Highly integrated RF with 40nm low power process

Noise mitigation:

- Supports background scan function for fast channel switching
- Supports spectrum analysis for non-Wi-Fi signals
- Intelligent power saving
- WFA WMM, WMM PS (QoS)
- Integrate high-efficiency internal 2.4G/5G PAs
- Intelligent Calibration (iCal) reduces the production time

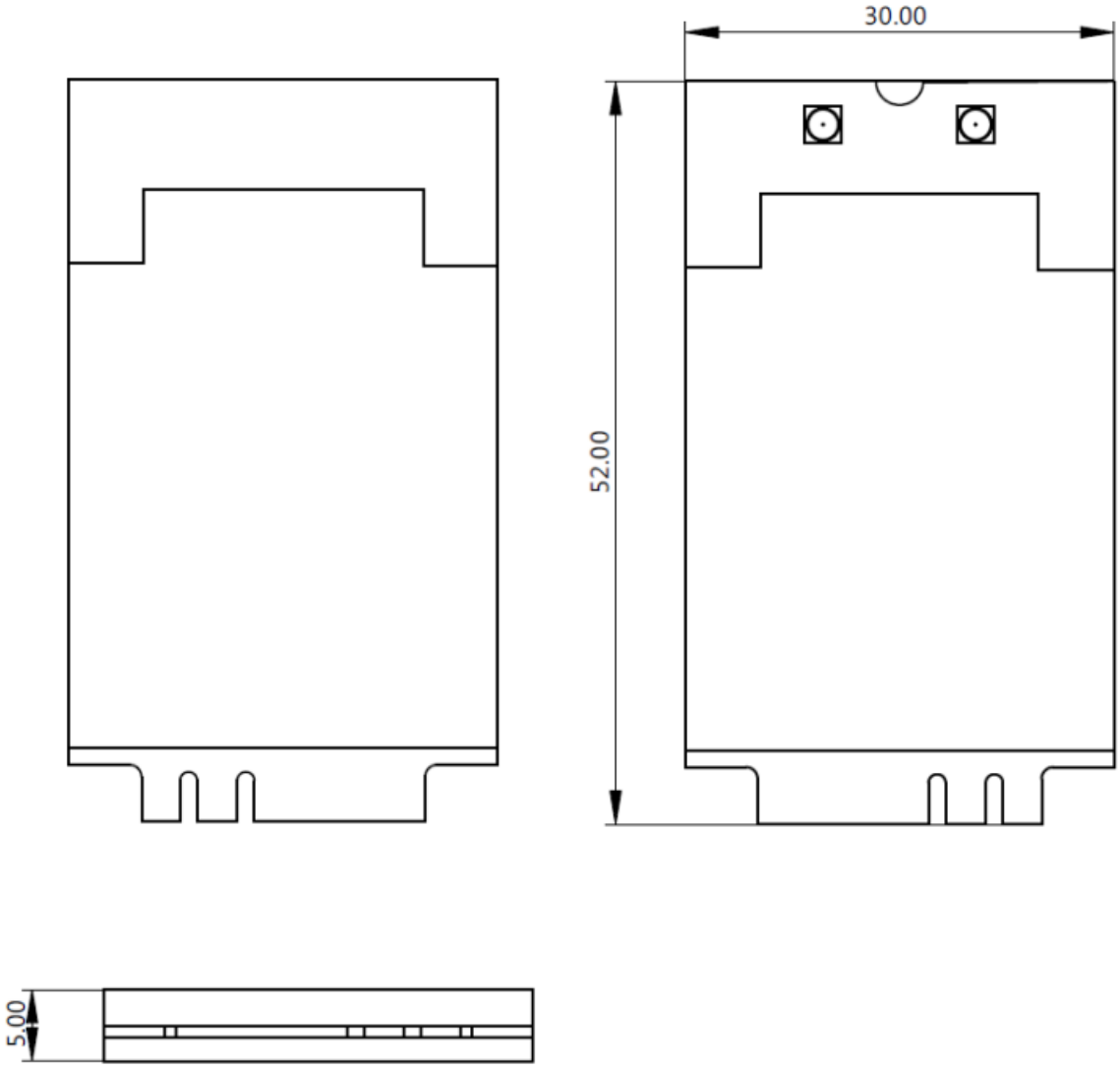
Specification

Standards	**Wireless: IEEE 802.11ax/ac/b/g/n (2Tx2R)**
Data Rate	IEEE 802.11ax 1201Mbps@TX/RX IEEE 802.11ac 1773Mbps@TX/RX IEEE 802.11a/n 600Mbps@TX/RX IEEE 802.11a/g 108Mbps IEEE 802.11b 22Mbps IEEE 802.11ac up to 1733Mbps
Output Power	11b: 23dbm+/- 1.5dbm @ 11Mbps 11g: 20dbm+/- 1.5dbm @ 54Mbps 11g/n: 20dBm +/- 1.5dbm @MCS7,HT20, 17dBm@MCS7,HT40 11a: 19.5dBm +/- 1.5dbm @ 54Mbps 11a/n: 19.5dBm+/- 1.5dbm @MCS7,HT20, 17dBm@MCS7,HT40 11ac HT20: 20+/-1.5dBm@MCS8 11ac HT40: 17+/-1.5dBm@MCS9 11ac HT80: 14.5+/-1.5dBm@MCS9 11ax HT20: 20+/-1.5dBm@MCS9 11ax HT40: 17+/-1.5dBm@MCS9 11ax HT80: 14.5+/-1.5dBm@MCS11

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) x2
Frequency Range	US, Canada 2.412GHz~2.462 GHz (CH1~CH11) EU, Japan: 2.412GHz~2.472GHz (CH1~CH13) 5.150~5.250GHz 5.725~5.850GHz
Software	Security: 64/128-bit WEP Encryption, WPA, WPA2 Driver: Linux
Operating Voltage	DC 3.3V ± 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 9.1W, and the average is 7W.
- Main board Power Supply design Please provide 3.3V 3.5A, minimum 3.3V 3A.
- **11ax related reading:**
  - **https://www.ni.com/zh-tw/innovations/white-papers/16/introduction-to-802-11ax-high-efficiency-wireless.**
- **html**
  - **https://en.wikipedia.org/wiki/IEEE_802.11ax**

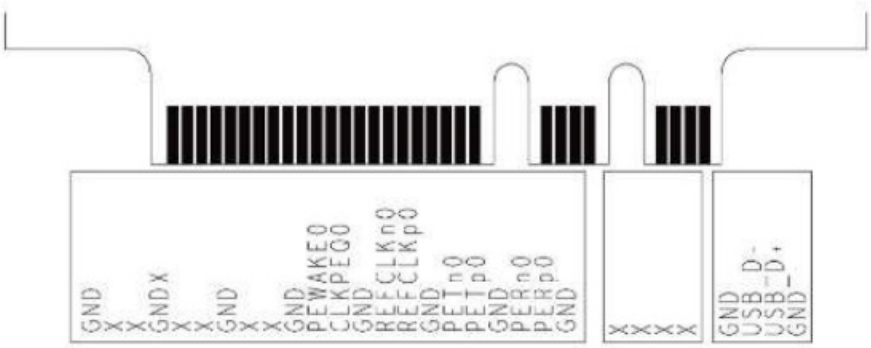
Mechanical Dimensions



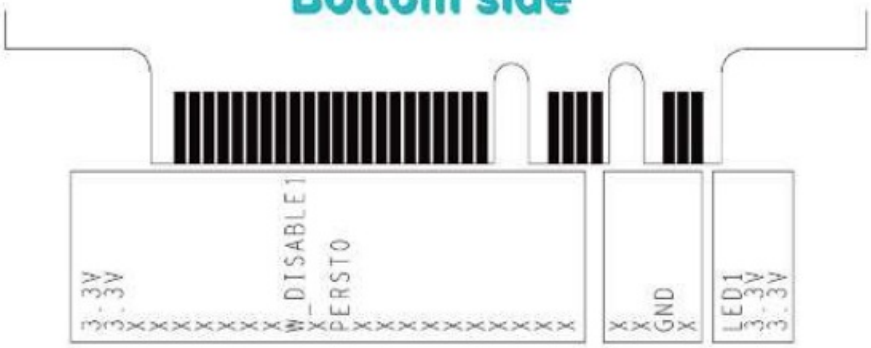
All dimensions are in mm

Pins define

Top side



Bottom side



Packing information

- Use an antistatic tray.
- One tray for 35 pcs 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:

Compliance Information

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, according 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 per 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,
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.

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.

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.
This radio transmitter [IC: 9968A-AW7915NPD] 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	ANT010-DAU	PCB	2.4GHz: 5.2 5GHz: 5.5
	ANT003	PCB	2.4GHz: 2.5 5GHz: 2.5
	A245005N	PCB	2.4GHz: 4 5GHz: 5.1
2400-2483.5MHz	A2405N	PCB	2.4GHz: 5.2
5150-5850MHz	A5005N	PCB	5GHz: 5
2400-2483.5MHz; 5150-5850MHz	A245004	Dipole	2.4GHz: 4 5GHz: 5.1
	A245002	Dipole	2.4GHz: 2 5GHz: 2

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 a minimum distance of 20cm between the radiator & your body.
- The transmitter module may not be co-located with any other transmitter or antenna.
- For products available in the USA/Canada market, only channels 1~11 can be operated. Selection of other channels is not 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 for performing 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 the module.
2. This module is certified under Part 15 rules section 15.247, 15.407 and RSS-247.
3. The antenna listed below must include 0.3 dB cable loss compensation.

Frequency Band	Model Number	Antenna Type	Gain(dBi)
2400-2483.5MHz; 5150-5850MHz	ANT010-DAU	PCB	2.4GHz: 5.2 5GHz: 5.5
	ANT003	PCB	2.4GHz: 2.5 5GHz: 2.5
	A245005N	PCB	2.4GHz: 4 5GHz: 5.1
2400-2483.5MHz	A2405N	PCB	2.4GHz: 5.2
5150-5850MHz	A5005N	PCB	5GHz: 5
2400-2483.5MHz; 5150- 5850MHz	A245004	Dipole	2.4GHz: 4 5GHz: 5.1
	A245002	Dipole	2.4GHz: 2 5GHz: 2

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: TKZAW7915-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 devices 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-AW7915NPD" or "Contains IC: 9968AAW7915NPD" 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 has been approved under a stand-alone configuration. The OEM integrator has limited the operation channels in channels 1-11 for the 2.4GHz band.
    - Separate approval is required for all other operating configurations, including portable configurations 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. The 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:** If 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/manufacturer.
    - 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. **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:
        - This device may not cause harmful interference,
        - 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.
    - The end-user manual shall include all required regulatory information/warnings as shown in this document.
8. **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.
    - 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.

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 a minimum distance of 20cm between the radiator & your body.
- The transmitter module may not be co-located with any other transmitter or antenna.
- For products available in the USA/Canada market, only channels 1~11 can be operated. Selection of other channels is not possible.
- This radio transmitter [IC: 9968A-AW7915NPD] 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	ANT010-DAU	PCB	2.4GHz: 5.2 5GHz: 5.5
	ANT003	PCB	2.4GHz: 2.5 5GHz: 2.5
	A245005N	PCB	2.4GHz: 4 5GHz: 5.1
2400-2483.5MHz	A2405N	PCB	2.4GHz: 5.2
5150-5850MHz	A5005N	PCB	5GHz: 5
2400-2483.5MHz; 5150- 5850MHz	A245004	Dipole	2.4GHz: 4 5GHz: 5.1
	A245002	Dipole	2.4GHz: 2 5GHz: 2

OEM integration instructions:

- This device is intended only for OEM integrators under the following conditions:
- The module is only limited to installation 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 transmit or antenna.
- The module shall be only used with the integral antenna(s) that has been originally tested and certified with this module.
- As long as the 3 conditions above are met, further transmitter tests 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:

- If these conditions cannot be met (for example, certain laptop configurations 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 authorised only for use in devices where the antenna may be installed such that 20 cm may be maintained between the antenna and users.

The end product must be labeled in a visible area with the following:

- **Contains Transmitter Module FCC ID:** TKZAW7915NP1 or Contains FCC ID: TKZAW7915NP1″

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 manual of the end product which integrates this module.
- The end-user manual shall include all required regulatory information/warnings as shown in this manual.

Customer Service

- www.asiarf.com
- **TEL: +886229407880**
- **FAX: +886229407800**

Frequently Asked Questions

- **Q: Does the mPCIe card support MU-MIMO technology?**
  - **A:** Yes, the AW7915-AED mPCIe card supports MU-MIMO with different configurations, allowing for simultaneous transmission to multiple clients.
- **Q: What is the power consumption in deep sleep mode?**
  - **A:** In deep sleep mode, the PMU can be configured to be in a low power state to save power consumption, ensuring efficient energy usage.
- **Q: How can I enhance PA performance with this mPCIe card?**
  - **A:** The mPCIe card supports digital pre-distortion to enhance PA (Power Amplifier) performance, improving overall signal quality.

Documents / Resources

	AsiaRF AW7915-AED WiFi6 Mini PCIe Dual Concurrents DBDC mPCIe Card [pdf] Owner's Manual AW7915-AED, AW7915-AED WiFi6 Mini PCIe Dual Concurrents DBDC mPCIe Card, WiFi6 Mini PCIe Dual Concurrents DBDC mPCIe Card, Mini PCIe Dual Concurrents DBDC mPCIe Card, Dual Concurrents DBDC mPCIe Card, Concurrents DBDC mPCIe Card, DBDC mPCIe Card

References

- AsiaRF | Global Leader In Wireless Connectivity
- User Manual