

# AWK-3191

## Quick Installation Guide

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Moxa Airworks

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### Technical Support Contact Information

[www.moxa.com/support](http://www.moxa.com/support)

Moxa Americas:

Toll-free: 1-888-669-2872

Tel: 1-714-528-6777

Fax: 1-714-528-6778

Moxa China (Shanghai office):

Toll-free: 800-820-5036

Tel: +86-21-5258-9955

Fax: +86-21-5258-5505

Moxa Europe:

Tel: +49-89-3 70 03 99-0

Fax: +49-89-3 70 03 99-99

Moxa Asia-Pacific:

Tel: +886-2-8919-1230

Fax: +886-2-8919-1231

Moxa India:

Tel: +91-80-4172-9088

Fax: +91-80-4132-1045

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P/N: 1802031910012



## Overview

The AWK-3191 900 MHz radio is Moxa's answer to the need for long distance wireless communication for industrial applications. By combining the characteristics of the 33-centimeter band, and the proven 802.11 standard, Moxa is able to provide a reliable long distance wireless solution. Unlike traditional point-to-point 900 MHz radios, the AWK-3191 also provides reliable point-to-multi-point communication for higher flexibility and lower total cost of ownership. Furthermore, the AWK-3191 is designed for simple deployment, but in case of external interference, engineers can adjust their 900 MHz central frequency and bandwidth (5/10 MHz and 20 MHz) to optimize their wireless communication. With industrial grade standards and wide-temperature models, the AWK-3191 is the most reliable solution for industrial long distance communication.

## Package Checklist

Moxa's AWK-3191 is shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.

- AWK-3191
- Cable holder with one screw
- 2 protective caps
- Documentation and software CD
- Quick installation guide (printed)
- Warranty card

## Installation and Configuration

Before installing the AWK-3191, make sure that all items in the package checklist are in the box. In addition, you will need access to a notebook computer or PC equipped with an Ethernet port. The AWK-3191 has a default IP address that you must use when connecting to the device for the first time.

### **Step 1: Select the power source**

The AWK-3191 can be powered by a DC power input or PoE. (Hardware Rev. 3.0.0 supports PoE; hardware Rev. 2.0.0 does not support PoE.) The AWK-3191 will use whichever power source you choose.

### **Step 2: Connect the AWK-3191 to a notebook or PC**

Since the AWK-3191 supports MDI/MDI-X auto-sensing, you can use either a straight-through cable or crossover cable to connect the AWK-3191 to a computer. If the LED indicator on the AWK-3191's LAN port lights up, it means a connection has been established.

### **Step 3: Set up the computer's IP address**

Set an IP address on the same subnet as the AWK-3191. Since the AWK-3191's default IP address is 192.168.127.253, and the subnet mask is 255.255.255.0, you should set the IP address of the computer to 192.168.127.xxx and subnet mask to 255.255.255.0.

#### **Step 4: Use the web-based manager to configure the AWK-3191**

Open your computer's web browser and type **http://192.168.127.253** in the address field to access the homepage of the web-based management system. Before the homepage opens, you will need to enter the user name and password. For first-time configuration, enter the default user name and password and then click on the Login button:

User name: admin

Password: root



#### **ATTENTION**

For security reasons, we strongly recommend changing the password. To do so, select **Maintenance** → **Username/Password**, and then follow the on-screen instructions.

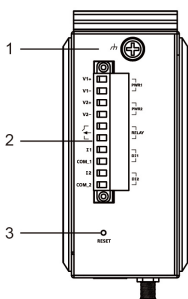
#### **Step 5: Select the operation mode for the AWK-3191**

By default, the AWK-3191's operation mode is set to AP. You can change the setting in **Wireless Settings** → **Basic Wireless Settings** if you would like to use Client mode.

**NOTE** For the change to take effect, you must click Save Configuration to save the change, or Restart (clicking the Save and Restart buttons will save all changes).

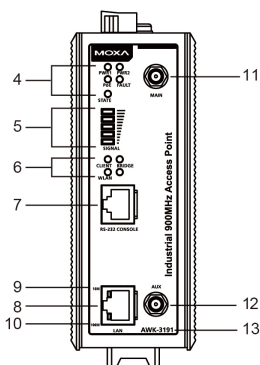
# Panel Layout of the AWK-3191

Top Panel View

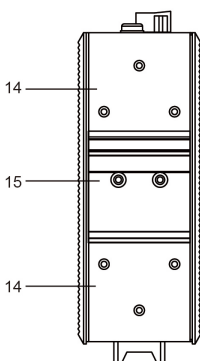


1. Grounding screw
2. Terminal block for PWR1, PWR2, relay, DI1, and DI2
3. Reset button
4. PWR1, PWR2, PoE (Hardware Rev. 3.0.0 supports PoE; hardware Rev. 2.0.0 does not support PoE.), FAULT, and STATE LEDs
5. LEDs for signal strength
6. WLAN LEDs: CLIENT, BRIDGE, and WLAN LEDs
7. RS-232 console port
8. 10/100BaseT(X) RJ45 Port
9. 10M LED
10. 100M LED
11. MAIN antenna port
12. AUX antenna port
13. Model name
14. Screw hole for wall-mounting kit
15. DIN-rail mounting kit

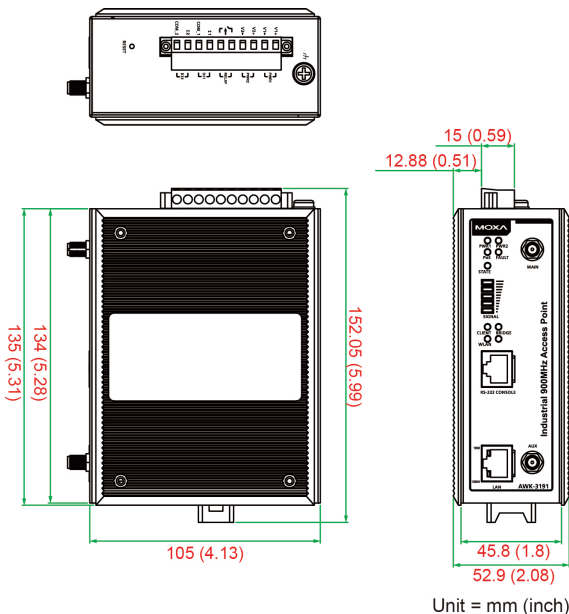
Front Panel View



Rear Panel View

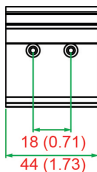


## Mounting Dimensions



## DIN-Rail Mounting

DIN-Rail Kit Dimensions:



Unit = mm (inch)

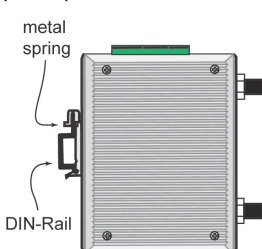
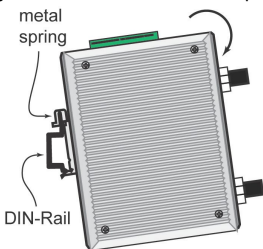
The aluminum DIN-rail attachment plate should be fixed to the back panel of the AWK-3191 when you take it out of the box. If you need to reattach the DIN-rail attachment plate to the AWK-3191, make sure the stiff metal spring is situated towards the top, as shown in the figures below:

### STEP 1:

Insert the top of the DIN rail into the slot just below the stiff metal spring.

### STEP 2:

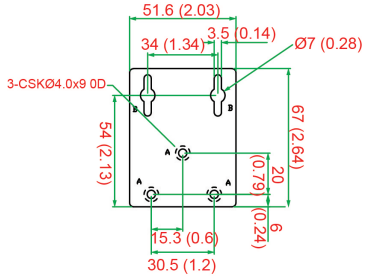
The DIN-rail attachment unit will snap into place as shown below.



To remove the AWK-3191 from the DIN rail, simply reverse Steps 1 and 2.

## Wall Mounting (optional)

Wall-Mount Kit Dimensions:

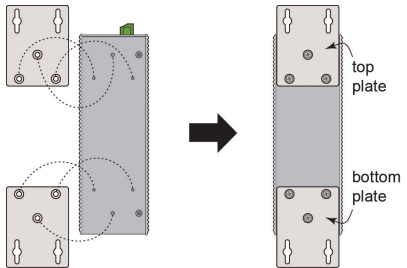


Unit = mm (inch)

For some applications, it may be more convenient to mount the AWK-3191 to a wall, as illustrated below:

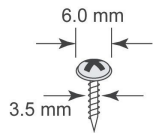
### STEP 1:

Remove the aluminum DIN-rail attachment plate from the AWK-3191, and then attach the wall-mount plates with M3 screws, as shown in the adjacent diagram.



### STEP 2:

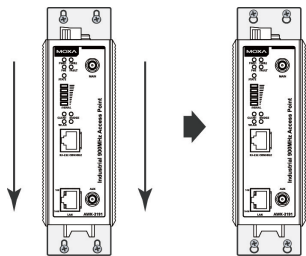
Mounting the AWK-3191 to a wall requires 4 screws. Use the AWK-3191 device, with wall mount plates attached as a guide, to mark the correct locations of the 4 screws. The heads of the screws should be less than 6.0 mm in diameter, and the shafts should be less than 3.5 mm in diameter, as shown in the figure at the right.



**NOTE** Test the screw head and shank size by inserting the screws into one of the keyhole shaped apertures of the wall-mounting plates before attaching the plate to the wall.

### STEP 3:

Once the screws are fixed into the wall, insert the four screw heads through the large opening of the keyhole-shaped apertures of the wall-mounting plate, and then slide the AWK-3191 downwards, as indicated in the accompanying diagram. Tighten the four screws for added stability.





## WARNING

- This equipment is intended to be used in a Restricted Access Location, such as a dedicated computer room, where access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the fact that the metal chassis of the equipment is extremely hot and may cause burns.
- Service persons or users should pay special attention and take special precautions before handling this equipment.
- Only authorized, well-trained professionals should be allowed to access the restricted access location. Access should be controlled by the authority responsible for the location with lock and key or a security identity system.
- **External metal parts are hot!!** Pay special attention or use special protection before handling this equipment.

## Wiring Requirements



## WARNING

### Safety First!

Be sure to disconnect the power cord before installing and/or wiring your Moxa AWK-3191.

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowed for each wire size. If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

You should also pay attention to the following items:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.  
**NOTE:** Do not run signal or communications wiring and power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.
- You can use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring with similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separate.
- It is strongly advised that you label wiring to all devices in the system when necessary.



## ATTENTION

This product is intended to be supplied by a Listed Power Unit marked "Class 2" or "LPS" and rated O/P: 5.76 W



## ATTENTION

Make sure the external power adapter (includes power cords and plug assemblies) provided with the unit is certified and suitable for use in your country.

## Grounding the Moxa AWK-3191

Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the ground screw to the grounding surface prior to connecting devices.

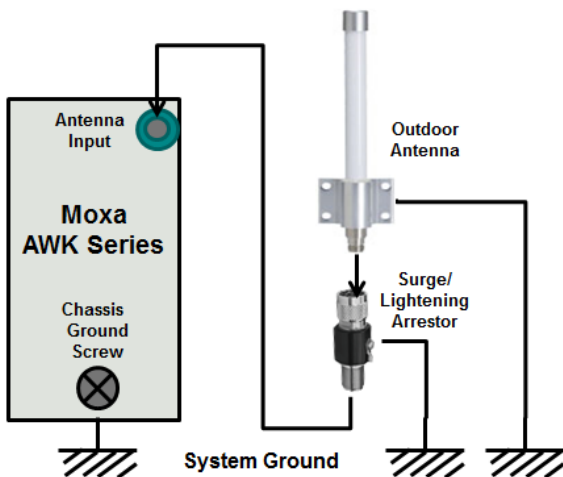


## ATTENTION

This product is intended to be mounted to a well-grounded mounting surface, such as a metal panel. There must be no potential difference between two ground potentials; otherwise there is a risk that the device could be destroyed.

## Installations with Cable Extended Antennas for Outdoor Applications

If the antenna or the AWK device is installed outdoors or in an open-air setting, proper lightning protection is required to prevent direct lightning strikes on the AWK device. In order to prevent coupling currents from nearby lightning strikes, a lightning arrester should be installed as part of your antenna system. Ground the device, antenna, as well as the arrester properly to provide maximum outdoor protection for the device.



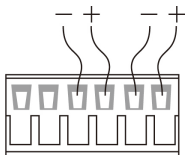
### Arrester Accessories

- **SA-NMNF-01:** Surge arrester, N-type (male) to N-type (female)
- **SA-NFNF-01:** Surge arrester, N-type (female) to N-type (female)

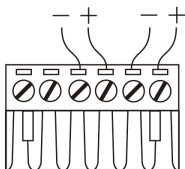


## Wiring the Redundant Power Inputs

The top two pairs of contacts of the 10-contact terminal block connector on the AWK-3191's top panel are used for the AWK-3191's two DC inputs. Top and front views of the terminal block connector are shown here.



Top View



Front View

**STEP 1:** Insert the negative/positive DC wires into the V-/V+ terminals.

**STEP 2:** To keep the DC wires from pulling loose, use a small flat-blade screwdriver to tighten the wire-clamp screws on the front of the terminal block connector.

**STEP 3:** Insert the plastic terminal block connector prongs into the terminal block receptor, which is located on the AWK-3191's top panel.



### ATTENTION

Before connecting the AWK-3191 to the DC power inputs, make sure that the DC power source voltage is stable.

## Wiring the Relay Contact

The AWK-3191 has one relay output, which consists of the two contacts of the terminal block on the AWK-3191's top panel. Refer to the previous section for detailed instructions on how to connect the wires to the terminal block connector, and how to attach the terminal block connector to the terminal block receptor. These relay contacts are used to indicate user-configured events. The two wires attached to the Relay contacts form an open circuit when a user-configured event is triggered. If a user-configured event does not occur, the Relay circuit will be closed.

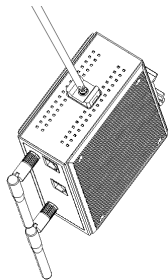
## Wiring the Digital Inputs

The AWK-3191 has two sets of digital inputs—DI1 and DI2. Each DI comprises two contacts of the 10-pin terminal block connector on the AWK-3191's top panel. Refer to the "Wiring the Redundant Power Inputs" section for detailed instructions on how to connect the wires to the terminal block connector, and how to attach the terminal block connector to the terminal block receptor.

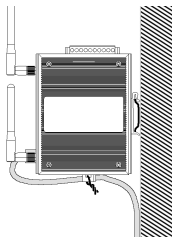
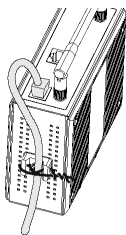
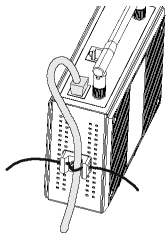
## Cable Holder Installation (Optional)

Attach the cable holder to the bottom of the AWK-3191 to help keep cables neat and avoid accidents that result from untidy cables.

**STEP 1:** Screw the cable holder onto the bottom of the AWK-3191.



**STEP 2:** After mounting the AWK-3191 and plugging in the LAN cable, tighten the cable along the device and wall.



## Communication Connections

### 10/100BaseT(X) Ethernet Port Connection

The 10/100BaseT(X) ports located on the AWK-3191's front panel are used to connect to Ethernet-enabled devices.

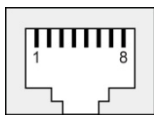
Below we show pinouts for both MDI (NIC-type) ports and MDI-X (HUB/Switch-type) ports.

**MDI Port Pinouts**

**MDI-X Port Pinouts**

**8-pin RJ45**

Pin	Signal	Pin	Signal
1	Tx+	1	Rx+
2	Tx-	2	Rx-
3	Rx+	3	Tx+
6	Rx-	6	Tx-

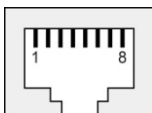


### RS-232 Connection

The AWK-3191 has one RS-232 (8-pin RJ45) console port located on the front panel. Use either an RJ45-to-DB9 or RJ45-to-DB25 cable to connect the Moxa AWK-3191's console port to your PC's COM port. You may then use a console terminal program to access the AWK-3191 for console configuration.

## Console Pinouts for 10-pin or 8-pin RJ45

10-Pin	Description	8-Pin
1	–	
2	DSR	1
3	RTS	2
4	GND	3
5	TxD	4
6	RxD	5
7	DCD	6
8	CTS	7
9	DTR	8
10	–	



- NOTE**
1. The pin numbers for the DB9 and DB25 male connectors, and hole numbers for the DB9 and DB25 female connectors are labeled on the connectors. However, the numbers are typically quite small, so you may need to use a magnifying glass to see the numbers clearly.
  2. The pin numbers for both the 8-pin and 10-pin RJ45 connectors (and ports) are typically not labeled on the connector (or port). Refer to the pinout diagram above for details.

## LED Indicators

The front panel of the Moxa AWK-3191 contains several LED indicators. The function of each LED is described in the table below.

LED	Color	State	Description
<b>Front Panel LED Indicators (System)</b>			
<b>PWR1</b>	Green	On	Power is on (power input 1)
		Off	Power is <b>not</b> being supplied
<b>PWR2</b>	Green	On	Power is on (power input 2)
		Off	Power is <b>not</b> being supplied
<b>PoE</b> (Hardware Rev. 3.0.0 supports PoE; hardware Rev. 2.0.0 does not support PoE.)	Amber	On	Power is being supplied via PoE
		Off	Power is <b>not</b> being supplied via PoE
<b>FAULT</b>	Red	Blinking (slow at 1-sec intervals)	Cannot get an IP address from the DHCP server
		Blinking (fast at 0.5-sec intervals)	IP address conflict
		Off	Error condition does not exist

LED	Color	State	Description
STATE	Green/ Red	Green	System booted up correctly and in operation
		Green Blinking at 1-sec intervals	The AWK has been located by the Wireless Search Utility
		Red	System boot up failure
SIGNAL (5 LEDs)	Green	On	Signal level(for <b>Client/Slave</b> mode only)
		Off	
BRIDGE	Green	On	WLAN function is in wireless-bridge (master/slave) mode.
		Off	WLAN is not in wireless-bridge (master/slave) mode.
CLIENT	Green	On	WLAN function is in client/slave mode and the AWK has established a link with an AP.
		Blink	WLAN data communication is running in client/slave mode.
		Off	WLAN is not in client mode or the AWK has not established a link with an AP.
WLAN	Amber	On	WLAN is in AP/master mode.
		Blink	WLAN's data communication is running in AP/master mode
		Off	WLAN is not in use or not working properly
<b>TP Port LED Indicators (Port Interface)</b>			
100M	Green	On	TP port's 100 Mbps link is <b>active</b> .
		Blink	Data is being transmitted at 100 Mbps.
		Off	TP port's 100 Mbps link is <b>inactive</b> .
10M	Amber	On	TP port's 10 Mbps link is <b>active</b> .
		Blink	Data is being transmitted at 10 Mbps.
		Off	TP port's 10 Mbps link is <b>inactive</b> .

## Specifications

WLAN Interface	
Standards	IEEE 802.11i for Wireless Security IEEE 802.1Q for VLAN IEEE 802.3af for Power-over-Ethernet*
<b>*Hardware Rev. 3.0.0 supports PoE; hardware Rev. 2.0.0 does not support PoE.</b>	
Security	SSID broadcast enable/disable Firewall for MAC/IP/Protocol/Port-based filtering 64-bit and 128-bit WEP encryption, WPA/WPA2-Personal and Enterprise (IEEE 802.1X/RADIUS, TKIP, and AES)
Spread Spectrum and Modulation (typical)	OFDM with BPSK, QPSK, 16QAM, 64QAM 64QAM @ 54/48 Mbps, 16QAM @ 36/24 Mbps, QPSK @ 18/12 Mbps, BPSK @ 9/6 Mbps
Channel Band Width	US: 5 MHz; 10 MHz; 20 MHz

Operating Channels (central frequency)	US: 902 to 928 MHz (ISM band) <ul style="list-style-type: none"> <li>• 915 MHz (BW = 20 MHz)</li> <li>• 908.5, 915, 921.5 MHz (BW = 10 MHz)</li> <li>• 905.25, 908.5, 911.75, 915, 918.25, 921.5, 924.75 MHz (BW = 5 MHz)</li> </ul>
Transmission Rates	6, 9, 12, 18, 24, 36, 48, 54 Mbps
Transmitter Power	<ul style="list-style-type: none"> <li>• Typ. 24±1.5 dBm @ 6 to 24 Mbps</li> <li>• Typ. 23±1.5 dBm @ 36 Mbps</li> <li>• Typ. 22±1.5 dBm @ 48 Mbps</li> <li>• Typ. 21±1.5 dBm @ 54 Mbps</li> </ul>
Receiver Sensitivity	<ul style="list-style-type: none"> <li>• -90 dBm @ 6 Mbps</li> <li>• -88 dBm @ 9 Mbps</li> <li>• -87 dBm @ 12 Mbps</li> <li>• -85dBm @ 18 Mbps</li> <li>• -81 dBm @ 24 Mbps</li> <li>• -77 dBm @ 36 Mbps</li> <li>• -73 dBm @ 48 Mbps</li> <li>• -71 dBm @ 54 Mbps</li> </ul>
<b>Protocol Support</b>	
General Protocols	Proxy ARP, DNS, HTTP, HTTPS, IP, ICMP, SNMP, TCP, UDP, RADIUS, SNMP, DHCP, VLAN, STP/RSTP
<b>Interface</b>	
Connector for External Antennas	RP-SMA (female), 500 V insulation
LAN Port	1, RJ45, 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
Console Port	RS-232 (RJ45-type)
Reset	Present
LED Indicators	PWR1, PWR2, PoE (Hardware Rev. 3.0.0 supports PoE; hardware Rev. 2.0.0 does not support PoE.), FAULT, STATE, SIGNAL*, CLIENT MODE, BRIDGE MODE, WLAN, 10M, 100M *signal strength indicator
Alarm Contact (digital output)	1 relay output with current carrying capacity of 1 A @ 24 VDC
Digital Inputs	2 electrically isolated inputs <ul style="list-style-type: none"> <li>• +13 to +30 V for state "1"</li> <li>• +3 to -30 V for state "0"</li> <li>• Max. input current: 8 mA</li> </ul>
<b>Physical Characteristics</b>	
Housing	Metal, providing IP30 protection
Weight	930 g (2.05 lb)
Dimensions	53 x 135 x 105 mm (2.08 x 5.31 x 4.13 in)
Installation	DIN-rail mounting (standard), wall mounting (optional)
<b>Environmental Limits</b>	
Operating Temperature	Standard Models: -25 to 60°C (-13 to 140°F) Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5% to 95% (non-condensing)

Power Requirements	
Input Voltage	12 to 48 VDC, redundant dual DC power inputs or 48 VDC Power-over-Ethernet* (IEEE 802.3af compliant)
*Hardware Rev. 3.0.0 supports PoE; hardware Rev. 2.0.0 does not support PoE.	
Input Current	0.4 A @ 12 VDC; 0.12 A @ 48 VDC
Connector	10-pin removable terminal block, 500 V insulation
Power Consumption	5.76 W
Reverse Polarity Protection	Present
Standards and Certifications	
Safety	UL 60950-1
EMI	CISPR 22, FCC Part 15B Class B
Radio	FCC ID SLE-WFS001
Note: Please check Moxa's website for the most up-to-date certification status.	
Reliability	
MTBF	484,469 hrs. (standard Telcordia SR332)
Warranty	
Warranty Period	5 years
Details	See <a href="http://www.moxa.com/support/warranty.aspx">www.moxa.com/support/warranty.aspx</a>



## ATTENTION

The AWK-3191 is **NOT** a portable mobile device and should be located at least 20 cm away from the human body.

The AWK-3191 is **NOT** designed for the general public. A well-trained technician is required to deploy the AWK-3191 units and safely establish a wireless network.



## ATTENTION

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.



## ATTENTION

Do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can come into contact with such circuits. When installing the antenna, take extreme care not to come into contact with such circuits, because they may cause serious injury or death. For proper installation and grounding of the antenna, refer to national and local codes (for example, U.S.: NFPA 70; National Electrical Code, Article 810; Canada: Canadian Electrical Code, Section 54).

**NOTE** For installation flexibility, either the MAIN antenna or the AUX antenna may be selected for use. Make sure the antenna connection matches the antenna configured in the AWK-3191 web interface.

To protect the connectors and RF module, all radio ports should be terminated by either an antenna or a terminator. We strongly recommend using resistive terminators for terminating the unused antenna ports.