

# AWK-3121-RTG Series

## Industrial IEEE 802.11a/b/g wireless AP/client



- > IEEE 802.11a/b/g compliant
- > M12 anti-vibration connectors (AWK-3121-M12-RTG and AWK-3121-M12-HP-RTG)
- > QoS (WMM) and VLAN for efficient network traffic
- > Controller-based Turbo Roaming (handover time < 50 ms @ 3 channels, WPA2); available only when used with the WAC-1001 or WAC-2004
- > Supports long-distance data transfer (AWK-3121-M12-HP-RTG)
- > Complies with a portion of EN 50155 specifications
- > -40 to 75°C operating temperature range (T models)



### Introduction

The AWK-3121-RTG 3-in-1 industrial AP/client devices are designed specifically for train-to-ground communication while moving at speeds of up to 120 km/h. The AWK-3121-RTG complies with a portion of EN 50155 specifications, covering operating temperature, power input voltage, surge, ESD, and vibration, making the products suitable for a variety of industrial applications. Installation is easy, with either DIN-rail mounting or distribution boxes, and the DIN-rail mounting capability, wide operating temperature range, and IP30 housing with LED indicators make the AWK-3121-RTG a convenient yet reliable solution for any rolling stock application.

### Advanced Security

- 64-bit and 128-bit WEP (Wired Equivalent Privacy)

- Enable/disable SSID broadcasts
- WPA/WPA2 (Wi-Fi Protected Access) and 802.11i support
- IEEE802.1X/RADIUS support
- Powerful filters for access control

### Specifications for Train-to-Ground Applications

- Client-based Turbo Roaming handover time
  - < 150 ms @ 1 channel with WPA2
  - < 350 ms @ 3 channels with WPA2
- Controller-based Turbo Roaming handover time (available only when used with the WAC-1001 or WAC-2004)
  - < 50 ms @ 3 channels with WPA2
- Multiple roaming parameters for different installation structures and antenna types

### Specifications

#### WLAN Interface

##### Standards:

- IEEE 802.11a/b/g for Wireless LAN
- IEEE 802.11i for Wireless Security
- IEEE 802.3 for 10BaseT
- IEEE 802.3u for 100BaseTX
- IEEE 802.3af for Power-over-Ethernet\*
- \*Hardware Rev. 3.0.0 supports PoE; hardware Rev. 2.0.0 does not support PoE.

##### Spread Spectrum and Modulation (typical):

- DSSS with DBPSK, DQPSK, CCK
- OFDM with BPSK, QPSK, 16QAM, 64QAM
- 802.11b: CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps, DBPSK @ 1 Mbps
- 802.11a/g: 64QAM @ 54/48 Mbps, 16QAM @ 36/24 Mbps, QPSK @ 18/12 Mbps, BPSK @ 9/6 Mbps

##### Operating Channels (central frequency):

- US:
  - 2.412 to 2.462 GHz (11 channels)
  - 5.18 to 5.24 GHz (4 channels)
  - 5.26 to 5.825 GHz (optional)
- EU:
  - 2.412 to 2.472 GHz (13 channels)
  - 5.18 to 5.24 GHz (4 channels)
  - 5.26 to 5.825 GHz (optional)

\*Special bands, such as 5.9 GHz, are customizable.

#### 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)

#### Transmission Rates:

- 802.11b: 1, 2, 5.5, 11 Mbps
- 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps

#### TX Transmit Power:

- AWK-3121-M12-RTG and AWK-3121-SSC-RTG:
  - 802.11b: Typ. 23±1.5 dBm @ 1 to 11 Mbps
  - 802.11g: Typ. 20±1.5 dBm @ 6 to 24 Mbps, Typ. 19±1.5 dBm @ 36 Mbps, Typ. 18±1.5 dBm @ 48 Mbps, Typ. 17±1.5 dBm @ 54 Mbps
  - 802.11a: Typ. 18±1.5 dBm @ 6 to 24 Mbps, Typ. 16±1.5 dBm @ 36 to 48 Mbps, Typ. 15±1.5 dBm @ 54 Mbps
- AWK-3121-M12-HP-RTG:
  - 802.11b: Typ. 26±1.5 dBm @ 1 to 11 Mbps
  - 802.11g: Typ. 26±1.5 dBm @ 6 to 24 Mbps, Typ. 25±1.5 dBm @ 36 Mbps, Typ. 24±1.5 dBm @ 48 Mbps, Typ. 23±1.5 dBm @ 54 Mbps

802.11a:

Typ. 26±1.5 dBm @ 6 to 24 Mbps, Typ. 25±1.5 dBm @ 36 Mbps, Typ. 24±1.5 dBm @ 48 Mbps, Typ. 23±1.5 dBm @ 54 Mbps

**RX Sensitivity:**

802.11b:

-97 dBm @ 1 Mbps, -94 dBm @ 2 Mbps, -92 dBm @ 5.5 Mbps, -90 dBm @ 11 Mbps

802.11g:

-93 dBm @ 6 Mbps, -91 dBm @ 9 Mbps, -90 dBm @ 12 Mbps, -88 dBm @ 18 Mbps, -84 dBm @ 24 Mbps, -80 dBm @ 36 Mbps, -76 dBm @ 48 Mbps, -74 dBm @ 54 Mbps

802.11a:

-90 dBm @ 6 Mbps, -89 dBm @ 9 Mbps, -89 dBm @ 12 Mbps, -85 dBm @ 18 Mbps, -83 dBm @ 24 Mbps, -79 dBm @ 36 Mbps, -75 dBm @ 48 Mbps, -74 dBm @ 54 Mbps

**Protocol Support**

**General Protocols:** Proxy ARP, DNS, HTTP, HTTPS, IP, ICMP, SNMP, TCP, UDP, RADIUS, SNMP, PPPoE, DHCP

**Interface**

**Connector for External Antennas:**

AWK-3121-SSC-RTG: RP-SMA (female)

AWK-3121-M12-RTG and AWK-3121-M12-HP-RTG: QMA (female)

**Fiber Ports:** 1, 100BaseFX port (SC connector, AWK-3121-SSC-RTG only)

**M12 Ports:** 1, 10/100BaseT(X) auto negotiation speed, D-coded, F/H duplex mode, and auto MDI/MDI-X connection (AWK-3121-M12-RTG and AWK-3121-M12-HP-RTG only)

**Console Port:** RS-232 (RJ45-type)

**LED Indicators:** PWR1, PWR2, PoE\*, FAULT, STATE, signal strength, CLIENT MODE, WLAN, 10/100 (M12 port), 100M (fiber port)

\*PoE is only available for the AWK-3121-M12-RTG and AWK-3121-M12-HP-RTG (Hardware Rev. 3.0.0 supports PoE; hardware Rev. 2.0.0 does not support PoE.)

**Alarm Contact:** 1 relay output with current carrying capacity of 1 A @ 24 VDC

**Digital Inputs:** 2 electrically isolated inputs

- +13 to +30 V for state "1"
- +3 to -30 V for state "0"
- Max. input current: 8 mA

**Default Antennas\*:**

2 dual-band omni-directional antennas, 2 dBi, RP-SMA (male)

\*Only available with the AWK-3121-SSC-RTG models.

**Optical Fiber\***

	100BaseFX
	Single Mode
Wavelength	1310 nm
Max. TX	0 dBm
Min. TX	-5 dBm
RX Sensitivity	-34 dBm
Link Budget	29 dB
Typical Distance	40 km
Saturation	-3 dBm

\*Only available for AWK-3121-SSC models

**Physical Characteristics**

**Housing:** Metal, IP30 protection

**Weight:** 850 g (1.87 lb)

**Dimensions:** 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)

**Installation:** DIN-rail mounting, wall mounting (optional)

**Environmental Limits**

**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:** 12 to 48 VDC, 0.121 to 0.494 A (max.)

AWK-3121-M12-RTG: Max. 7.9 watts

AWK-3121-M12-HP-RTG: Max. 7.9 watts

AWK-3121-SSC-RTG: Max. 8.1 watts

**Connector:** 10-pin removable terminal block

**Reverse Polarity Protection:** Present

**Standards and Certifications**

**Safety:** UL 60950-1, IEC 60950-1(CB)

**EMC:** EN 55032/24

**EMI:** CISPR 32, FCC Part 15B Class B

**ESD:**

IEC 61000-4-2 ESD: Contact: 8 kV; Air: 15 kV

IEC 61000-4-3 RS: 80 MHz to 1 GHz: 20 V/m

IEC 61000-4-4 EFT: Power: 2 kV; Signal: 2 kV

IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV

IEC 61000-4-6 CS: 10 V

IEC 61000-4-8

**Radio:** EN 301 489-1/17, EN 300 328, EN 301 893, FCC ID SLE-WAPA003 (AWK-3121-M12-RTG), FCC ID SLE-WAPA004 (AWK-3121-M12-HP-RTG)

**Rail Traffic:** EN 50155\*, EN45545-2, EN 50121-4

\*Complies with a portion of EN 50155 specifications.

**MTBF** (mean time between failures)

**Time:**

AWK-3121-M12-RTG: 480,831 hrs

AWK-3121-M12-HP-RTG: 447,861 hrs

AWK-3121-SSC-RTG: 445,913 hrs

**Standard:** Telcordia SR332

**Warranty**

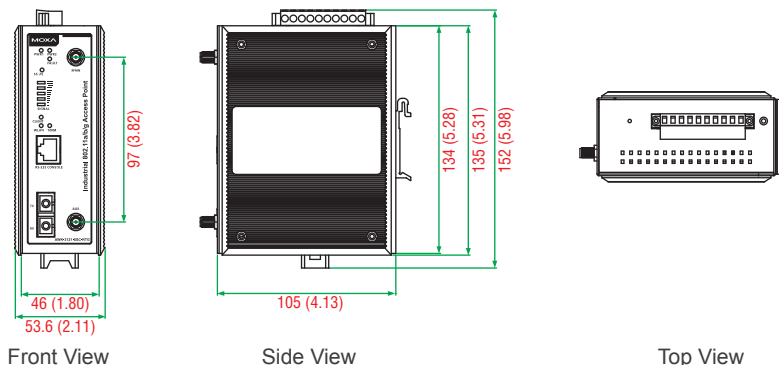
**Warranty Period:** 5 years

**Details:** See [www.moxa.com/warranty](http://www.moxa.com/warranty)

**Dimensions**

**AWK-3121-SSC-RTG**

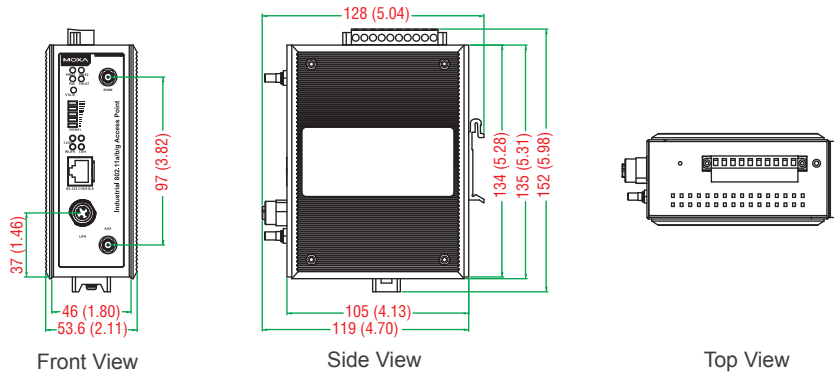
Unit: mm (inch)



**Dimensions**

**AWK-3121-M12-RTG and AWK-3121-M12-HP-RTG**

Unit: mm (inch)



**Ordering Information**

Model Name	Available Models		Port Interface		Antenna Interface		Conformal Coating	High Power
	Standard Temperature (-25 to 60°C)	Wide Temperature (-40 to 75°C)	PoE*, 10/100 BaseT(X)	100BaseFX	RP-SMA	QMA		
<b>AWK-3121-M12-RTG</b>								
AWK-3121-M12-RTG-US	✓	-	✓	-	-	✓	-	-
AWK-3121-M12-RTG-EU	✓	-	✓	-	-	✓	-	-
AWK-3121-M12-RTG-US-T	-	✓	✓	-	-	✓	-	-
AWK-3121-M12-RTG-EU-T	-	✓	✓	-	-	✓	-	-
AWK-3121-M12-RTG-US-CT	✓	-	✓	-	-	✓	✓	-
AWK-3121-M12-RTG-EU-CT	✓	-	✓	-	-	✓	✓	-
AWK-3121-M12-RTG-US-CT-T	-	✓	✓	-	-	✓	✓	-
AWK-3121-M12-RTG-EU-CT-T	-	✓	✓	-	-	✓	✓	-
<b>AWK-3121-M12-HP-RTG</b>								
AWK-3121-M12-HP-RTG-US	✓	-	✓	-	-	✓	-	✓
AWK-3121-M12-HP-RTG-EU	✓	-	✓	-	-	✓	-	✓
AWK-3121-M12-HP-RTG-US-T	-	✓	✓	-	-	✓	-	✓
AWK-3121-M12-HP-RTG-EU-T	-	✓	✓	-	-	✓	-	✓
AWK-3121-M12-HP-RTG-US-CT	✓	-	✓	-	-	✓	✓	✓
AWK-3121-M12-HP-RTG-EU-CT	✓	-	✓	-	-	✓	✓	✓
AWK-3121-M12-HP-RTG-US-CT-T	-	✓	✓	-	-	✓	✓	✓
AWK-3121-M12-HP-RTG-EU-CT-T	-	✓	✓	-	-	✓	✓	✓
<b>AWK-3121-SSC-RTG</b>								
AWK-3121-SSC-RTG-US	✓	-	-	✓	✓	-	-	-
AWK-3121-SSC-RTG-EU	✓	-	-	✓	✓	-	-	-
AWK-3121-SSC-RTG-US-T	-	✓	-	✓	✓	-	-	-
AWK-3121-SSC-RTG-EU-T	-	✓	-	✓	✓	-	-	-

**Note:**

- US: USA band
- EU: Europe band
- HP: high power
- CT: conformal coating

\*Hardware Rev. 3.0.0 supports PoE; hardware Rev. 2.0.0 does not support PoE.

Note: Please visit Moxa's website for a complete list of optional wireless accessories and antennas available for Moxa's wireless products.

**Package Checklist**

- AWK-3121-RTG wireless AP/bridge/client
- DIN-rail kit
- 1 plastic RJ45 protective cap for console port
- 1 plastic protective cap for fiber port (AWK-3121-SSC-RTG only)
- 2 2.4/5 GHz antennas: ANT-WDB-ARM-02 (AWK-3121-SSC-RTG only)
- Cable holder with 1 screw
- Documentation and software CD
- Quick installation guide (printed)
- Warranty card