AWK-3251A-RCC Series

Wi-Fi 5 railway wireless access points/clients

Features and Benefits

- IEEE 802.11a/b/g/n/ac Wave 2 AP/client

- Concurrent dual-band Wi-Fi with aggregated data rates up to 1.267 Gbps

- Latest WPA3 encryption for enhanced wireless network security

- Designed specifically for rail carriage-to-carriage communication

- Millisecond-level Client-based Turbo Roaming[1]

- Built-in 2.4 GHz and 5 GHz band pass filter for more reliable wireless connections

- -40 to 75°C wide operating temperature range (-T models)

Certifications

c(UL)us LISTED   CE   FC   EN 50155

Introduction

The AWK-3251A-RCC Series industrial wireless AP/client is designed to meet the growing need for faster data transmission speeds through IEEE 802.11ac technology. The Auto Carriage Connection (ACC) feature enables easy deployment of wireless devices and increases the reliability of wireless carriage backbone networks. The AWK-3251A-RCC Series is also optimized for passenger Wi-Fi services and supports up to 120 client connections. The AWK-3251A-RCC Series complies with sections of the EN 50155 standard specifications covering operating temperature, power input voltage, surge, ESD, and vibration, making the product suitable for a variety of industrial applications. The AWK-3251A-RCC Series can be powered via PoE to facilitate flexible deployment and can operate concurrently on both the 2.4 and 5 GHz bands in AP mode.

Advanced 802.11ac Industrial Wireless Solution

- 802.11a/b/g/n/ac compliant railway dual-band access point with aggregated data rates of up to 1.267 Gbps
- WPA3 encryption for enhanced wireless network security
- Supports ACC technology for wireless inter-carriage connections
- Supports up to 120 device connections and client isolation

Advanced Wireless Technology

- Seamless roaming with client-based Turbo Roaming[1] for < 150 ms roaming recovery time between APs (Client Mode)

Industrial Ruggedness

- Integrated antenna isolation designed to provide protection against external electrical interference
- -40 to 75°C wide operating temperature models (-T) for smooth wireless communication in harsh environments

Specifications

WLAN Interface

WLAN Standards	2.4 GHz: 802.11b/g/n with 256 QAM support 5 GHz: 802.11a/n/ac Wave 2 with 256 QAM support
Frequency Band for US (20 MHz operating channels)	AWK-3251A-RCC US Models Only: 2.412 to 2.462 GHz (11 channels) 5.180 to 5.240 GHz (4 channels) 5.260 to 5.320 GHz (4 channels)[2] 5.500 to 5.700 GHz (11 channels)[2] 5.745 to 5.825 GHz (5 channels)

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1. The Turbo Roaming recovery time indicated herein is an average of test results documented, in optimized conditions, across APs configured with interference-free 20-MHz RF channels, WPA2-PSK security, and default Turbo Roaming parameters. The clients are configured with 3-channel roaming at 100 Kbps traffic load. Other conditions may also impact roaming performance. For more information about Turbo Roaming parameter settings, refer to the product manual.
2. DFS (Dynamic Frequency Selection) channel support: In AP mode, when a radar signal is detected, the device will automatically switch to another channel. However, according to regulations, after switching channels, a 60-second availability check period is required before starting the service.

Frequency Band for UN (20 MHz operating channels)	AWK-3251A-RCC UN Models Only: 2.412 to 2.472 GHz (13 channels) 5.180 to 5.240 GHz (4 channels) 5.260 to 5.320 GHz (4 channels)[3] 5.500 to 5.700 GHz (11 channels)[3] 5.745 to 5.825 GHz (5 channels) Available channels change depending on the selected country or region code.
Wireless Security	WEP encryption (64-bit and 128-bit) WPA/WPA2/WPA3-Enterprise (IEEE 802.1X/RADIUS, TKIP, AES) WPA/WPA2/WPA3-Personal
Transmission Rate	2.4 GHz: 802.11b: 1 to 11 Mbps 802.11g: 6 to 54 Mbps 802.11n: 6.5 to 300 Mbps 802.11ac: 6.5 to 400 Mbps 5 GHz: 802.11a: 6 to 54 Mbps 802.11n: 6.5 to 300 Mbps 802.11ac: 6.5 to 867 Mbps
Transmitter Power for 802.11a	22±1.5 dBm @ 6 Mbps 22±1.5 dBm @ 9 Mbps 22±1.5 dBm @ 12 Mbps 20.5±1.5 dBm @ 18 Mbps 20.5±1.5 dBm @ 24 Mbps 20.5±1.5 dBm @ 36 Mbps 20±1.5 dBm @ 48 Mbps 20±1.5 dBm @ 54 Mbps
Transmitter Power for 802.11n (5 GHz)	22±1.5 dBm @ MCS0 20 MHz 22±1.5 dBm @ MCS1 20 MHz 22±1.5 dBm @ MCS2 20 MHz 20±1.5 dBm @ MCS3 20 MHz 19.5±1.5 dBm @ MCS4 20 MHz 19.5±1.5 dBm @ MCS5 20 MHz 19.5±1.5 dBm @ MCS6 20 MHz 19±1.5 dBm @ MCS7 20 MHz 22±1.5 dBm @ MCS8 20 MHz 22±1.5 dBm @ MCS9 20 MHz 22±1.5 dBm @ MCS10 20 MHz 20±1.5 dBm @ MCS11 20 MHz 19.5±1.5 dBm @ MCS12 20 MHz 19.5±1.5 dBm @ MCS13 20 MHz 19.5±1.5 dBm @ MCS14 20 MHz 19±1.5 dBm @ MCS15 20 MHz 21±1.5 dBm @ MCS0 40 MHz 21±1.5 dBm @ MCS1 40 MHz 21±1.5 dBm @ MCS2 40 MHz 19.5±1.5 dBm @ MCS3 40 MHz 19±1.5 dBm @ MCS4 40 MHz 19±1.5 dBm @ MCS5 40 MHz 19.5±1.5 dBm @ MCS6 40 MHz 19±1.5 dBm @ MCS7 40 MHz 21±1.5 dBm @ MCS8 40 MHz 21±1.5 dBm @ MCS9 40 MHz 21±1.5 dBm @ MCS10 40 MHz 19.5±1.5 dBm @ MCS11 40 MHz 19±1.5 dBm @ MCS12 40 MHz 19±1.5 dBm @ MCS13 40 MHz 19±1.5 dBm @ MCS14 40 MHz 19±1.5 dBm @ MCS15 40 MHz
Transmitter Power for 802.11ac (5 GHz, Dual Chain)	21.5±1.5 dBm @ MCS0 20 MHz 21.5±1.5 dBm @ MCS1 20 MHz 21±1.5 dBm @ MCS2 20 MHz 20±1.5 dBm @ MCS3 20 MHz 19.5±1.5 dBm @ MCS4 20 MHz

3. DFS (Dynamic Frequency Selection) channel support: In AP mode, when a radar signal is detected, the device will automatically switch to another channel. However, according to regulations, after switching channels, a 60-second availability check period is required before starting the service.

	19.5±1.5 dBm @ MCS5 20 MHz 19.5±1.5 dBm @ MCS6 20 MHz 19±1.5 dBm @ MCS7 20 MHz 19±1.5 dBm @ MCS8 20 MHz 21±1.5 dBm @ MCS0 40 MHz 21±1.5 dBm @ MCS1 40 MHz 21±1.5 dBm @ MCS2 40 MHz 19.5±1.5 dBm @ MCS3 40 MHz 19±1.5 dBm @ MCS4 40 MHz 19±1.5 dBm @ MCS5 40 MHz 19±1.5 dBm @ MCS6 40 MHz 19±1.5 dBm @ MCS7 40 MHz 18.5±1.5 dBm @ MCS8 40 MHz 18±1.5 dBm @ MCS9 40 MHz 20±1.5 dBm @ MCS0 80 MHz 20±1.5 dBm @ MCS1 80 MHz 20±1.5 dBm @ MCS2 80 MHz 17±1.5 dBm @ MCS3 80 MHz 17±1.5 dBm @ MCS4 80 MHz 17±1.5 dBm @ MCS5 80 MHz 17±1.5 dBm @ MCS6 80 MHz 17±1.5 dBm @ MCS7 80 MHz 17±1.5 dBm @ MCS8 80 MHz 17±1.5 dBm @ MCS9 80 MHz
Transmitter Power for 802.11b	25.5±1.5 dBm @ 1 Mbps 25.5±1.5 dBm @ 2 Mbps 26±1.5 dBm @ 5.5 Mbps 26±1.5 dBm @ 11 Mbps
Transmitter Power for 802.11g	26±1.5 dBm @ 6 Mbps 26±1.5 dBm @ 9 Mbps 26±1.5 dBm @ 12 Mbps 25±1.5 dBm @ 18 Mbps 25±1.5 dBm @ 24 Mbps 24.5±1.5 dBm @ 36 Mbps 23.5±1.5 dBm @ 48 Mbps 23±1.5 dBm @ 54 Mbps
Transmitter Power for 802.11n (2.4 GHz)	24.5±1.5 dBm @ MCS0 20 MHz 24.5±1.5 dBm @ MCS1 20 MHz 24±1.5 dBm @ MCS2 20 MHz 24±1.5 dBm @ MCS3 20 MHz 23.5±1.5 dBm @ MCS4 20 MHz 23.5±1.5 dBm @ MCS5 20 MHz 22.5±1.5 dBm @ MCS6 20 MHz 22±1.5 dBm @ MCS7 20 MHz 24±1.5 dBm @ MCS8 20 MHz 24.5±1.5 dBm @ MCS9 20 MHz 24±1.5 dBm @ MCS10 20 MHz 24±1.5 dBm @ MCS11 20 MHz 23.5±1.5 dBm @ MCS12 20 MHz 23±1.5 dBm @ MCS13 20 MHz 22±1.5 dBm @ MCS14 20 MHz 21.5±1.5 dBm @ MCS15 20 MHz 24±1.5 dBm @ MCS0 40 MHz 24±1.5 dBm @ MCS1 40 MHz 24±1.5 dBm @ MCS2 40 MHz 24±1.5 dBm @ MCS3 40 MHz 23.5±1.5 dBm @ MCS4 40 MHz 23.5±1.5 dBm @ MCS5 40 MHz 22.5±1.5 dBm @ MCS6 40 MHz 22±1.5 dBm @ MCS7 40 MHz 24±1.5 dBm @ MCS8 40 MHz 24±1.5 dBm @ MCS9 40 MHz 24±1.5 dBm @ MCS10 40 MHz 24±1.5 dBm @ MCS11 40 MHz 23.5±1.5 dBm @ MCS12 40 MHz 23±1.5 dBm @ MCS13 40 MHz 22.5±1.5 dBm @ MCS14 40 MHz 21.5±1.5 dBm @ MCS15 40 MHz

Transmitter Power for 802.11ac (2.4 GHz, Dual Chain)	25±1.5 dBm @ MCS0 20 MHz 25±1.5 dBm @ MCS1 20 MHz 25±1.5 dBm @ MCS2 20 MHz 25±1.5 dBm @ MCS3 20 MHz 24±1.5 dBm @ MCS4 20 MHz 23.5±1.5 dBm @ MCS5 20 MHz 22.5±1.5 dBm @ MCS6 20 MHz 22±1.5 dBm @ MCS7 20 MHz 21.5±1.5 dBm @ MCS8 20 MHz 25±1.5 dBm @ MCS0 40 MHz 25±1.5 dBm @ MCS1 40 MHz 25±1.5 dBm @ MCS2 40 MHz 25±1.5 dBm @ MCS3 40 MHz 24±1.5 dBm @ MCS4 40 MHz 23.5±1.5 dBm @ MCS5 40 MHz 22.5±1.5 dBm @ MCS6 40 MHz 22±1.5 dBm @ MCS7 40 MHz 21.5±1.5 dBm @ MCS8 40 MHz 21±1.5 dBm @ MCS9 40 MHz
Receiver Sensitivity for 802.11a (measured at 5.680 GHz)	Typ. -88 @ 6 Mbps Typ. -88 @ 9 Mbps Typ. -85 @ 12 Mbps Typ. -84 @ 18 Mbps Typ. -81 @ 24 Mbps Typ. -77 @ 36 Mbps Typ. -74 @ 48 Mbps Typ. -72 @ 54 Mbps
Receiver Sensitivity for 802.11n (5 GHz; measured at 5.680 GHz)	Typ. -88 dBm @ MCS0 20 MHz Typ. -84 dBm @ MCS1 20 MHz Typ. -83 dBm @ MCS2 20 MHz Typ. -80 dBm @ MCS3 20 MHz Typ. -76 dBm @ MCS4 20 MHz Typ. -72 dBm @ MCS5 20 MHz Typ. -70 dBm @ MCS6 20 MHz Typ. -68 dBm @ MCS7 20 MHz Typ. -89 dBm @ MCS8 20 MHz Typ. -87 dBm @ MCS9 20 MHz Typ. -85 dBm @ MCS10 20 MHz Typ. -81 dBm @ MCS11 20 MHz Typ. -78 dBm @ MCS12 20 MHz Typ. -74 dBm @ MCS13 20 MHz Typ. -73 dBm @ MCS14 20 MHz Typ. -71 dBm @ MCS15 20 MHz Typ. -85 dBm @ MCS0 40 MHz Typ. -82 dBm @ MCS1 40 MHz Typ. -79 dBm @ MCS2 40 MHz Typ. -77 dBm @ MCS3 40 MHz Typ. -73 dBm @ MCS4 40 MHz Typ. -69 dBm @ MCS5 40 MHz Typ. -68 dBm @ MCS6 40 MHz Typ. -66 dBm @ MCS7 40 MHz Typ. -87 dBm @ MCS8 40 MHz Typ. -84 dBm @ MCS9 40 MHz Typ. -82 dBm @ MCS10 40 MHz Typ. -79 dBm @ MCS11 40 MHz Typ. -75 dBm @ MCS12 40 MHz Typ. -72 dBm @ MCS13 40 MHz Typ. -70 dBm @ MCS14 40 MHz Typ. -69 dBm @ MCS15 40 MHz
Receiver Sensitivity for 802.11ac (5 GHz, Dual Chain)	Typ. -89 dBm @ MCS0 20 MHz Typ. -86 dBm @ MCS1 20 MHz Typ. -84 dBm @ MCS2 20 MHz Typ. -81 dBm @ MCS3 20 MHz Typ. -78 dBm @ MCS4 20 MHz Typ. -74 dBm @ MCS5 20 MHz Typ. -72 dBm @ MCS6 20 MHz Typ. -71 dBm @ MCS7 20 MHz Typ. -67 dBm @ MCS8 20 MHz Typ. -86 dBm @ MCS0 40 MHz Typ. -84 dBm @ MCS1 40 MHz

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	Typ. -81 dBm @ MCS2 40 MHz Typ. -78 dBm @ MCS3 40 MHz Typ. -75 dBm @ MCS4 40 MHz Typ. -71 dBm @ MCS5 40 MHz Typ. -70 dBm @ MCS6 40 MHz Typ. -69 dBm @ MCS7 40 MHz Typ. -64 dBm @ MCS8 40 MHz Typ. -63 dBm @ MCS9 40 MHz Typ. -84 dBm @ MCS0 80 MHz Typ. -81 dBm @ MCS1 80 MHz Typ. -79 dBm @ MCS2 80 MHz Typ. -76 dBm @ MCS3 80 MHz Typ. -73 dBm @ MCS4 80 MHz Typ. -69 dBm @ MCS5 80 MHz Typ. -67 dBm @ MCS6 80 MHz Typ. -65 dBm @ MCS7 80 MHz Typ. -61 dBm @ MCS8 80 MHz Typ. -60 dBm @ MCS9 80 MHz
Receiver Sensitivity for 802.11b (measured at 2.437 GHz)	Typ. -96 dBm @ 1 Mbps Typ. -92 dBm @ 2 Mbps Typ. -91 dBm @ 5.5 Mbps Typ. -88 dBm @ 11 Mbps
Receiver Sensitivity for 802.11g (measured at 2.437 GHz)	Typ. -90 dBm @ 6 Mbps Typ. -89 dBm @ 9 Mbps Typ. -88 dBm @ 12 Mbps Typ. -86 dBm @ 18 Mbps Typ. -82 dBm @ 24 Mbps Typ. -79 dBm @ 36 Mbps Typ. -75 dBm @ 48 Mbps Typ. -73 dBm @ 54 Mbps
Receiver Sensitivity for 802.11n (2.4 GHz; measured at 2.437 GHz)	Typ. -89 dBm @ MCS0 20 MHz Typ. -86 dBm @ MCS1 20 MHz Typ. -84 dBm @ MCS2 20 MHz Typ. -81 dBm @ MCS3 20 MHz Typ. -77 dBm @ MCS4 20 MHz Typ. -73 dBm @ MCS5 20 MHz Typ. -72 dBm @ MCS6 20 MHz Typ. -70 dBm @ MCS7 20 MHz Typ. -91 dBm @ MCS8 20 MHz Typ. -88 dBm @ MCS9 20 MHz Typ. -86 dBm @ MCS10 20 MHz Typ. -82 dBm @ MCS11 20 MHz Typ. -80 dBm @ MCS12 20 MHz Typ. -75 dBm @ MCS13 20 MHz Typ. -74 dBm @ MCS14 20 MHz Typ. -73 dBm @ MCS15 20 MHz Typ. -87 dBm @ MCS0 40 MHz Typ. -84 dBm @ MCS1 40 MHz Typ. -82 dBm @ MCS2 40 MHz Typ. -78 dBm @ MCS3 40 MHz Typ. -75 dBm @ MCS4 40 MHz Typ. -71 dBm @ MCS5 40 MHz Typ. -70 dBm @ MCS6 40 MHz Typ. -68 dBm @ MCS7 40 MHz Typ. -88 dBm @ MCS8 40 MHz Typ. -85 dBm @ MCS9 40 MHz Typ. -83 dBm @ MCS10 40 MHz Typ. -80 dBm @ MCS11 40 MHz Typ. -77 dBm @ MCS12 40 MHz Typ. -73 dBm @ MCS13 40 MHz Typ. -71 dBm @ MCS14 40 MHz Typ. -70 dBm @ MCS15 40 MHz
Receiver Sensitivity for 802.11ac (2.4 GHz, Dual Chain)	Typ. -90 dBm @ MCS0 20 MHz Typ. -87 dBm @ MCS1 20 MHz Typ. -85 dBm @ MCS2 20 MHz Typ. -82 dBm @ MCS3 20 MHz Typ. -79 dBm @ MCS4 20 MHz Typ. -75 dBm @ MCS5 20 MHz Typ. -73 dBm @ MCS6 20 MHz

	Typ. -72 dBm @ MCS7 20 MHz
	Typ. -68 dBm @ MCS8 20 MHz
	Typ. -88 dBm @ MCS0 40 MHz
	Typ. -85 dBm @ MCS1 40 MHz
	Typ. -83 dBm @ MCS2 40 MHz
	Typ. -80 dBm @ MCS3 40 MHz
	Typ. -77 dBm @ MCS4 40 MHz
	Typ. -72 dBm @ MCS5 40 MHz
	Typ. -71 dBm @ MCS6 40 MHz
	Typ. -70 dBm @ MCS7 40 MHz
	Typ. -66 dBm @ MCS8 40 MHz
	Typ. -64 dBm @ MCS9 40 MHz
WLAN Operation Mode	Access point
	Client
	Client-Router
	Master
	Slave
	Sniffer
	ACC
Antenna Connectors	QMA

Ethernet Interface

Standards	IEEE 802.3 for 10BaseT
	IEEE 802.3u for 100BaseT(X)
	IEEE 802.3ab for 1000BaseT(X)
	IEEE 802.3at for PoE
	IEEE 802.1Q for VLAN Tagging
	IEEE 802.1X for authentication
10/100/1000BaseT(X) Ports (M12 X-coded 8-pin female connector)	1
	Supports IEEE 802.3at PoE

Ethernet Software Features

Management	DHCP Server/Client
	DNS
	HTTP
	IPv4
	LLDP
	SMTP
	SNMPv1/v2c/v3
	Syslog
	TCP/IP
	Telnet
	UDP
	VLAN
	MXconfig
Security	HTTPS/SSL
	RADIUS
	SSH
Time Management	SNTP Client

Firewall

Filter	ICMP
	MAC address
	IP protocol
	Port-based

Serial Interface

Console Port	RS-232
	8-pin RJ45

LED Interface

LED Indicators	PWR1, PWR2, PoE, System, LAN, 2.4GHz, 5GHz, SIG

Input/Output Interface

Digital Inputs	2 Max. input current: 8 mA +13 to +30 V for state 1 +3 to -30 V for state 0
Alarm Contact Channels	Relay output with current carrying capacity of 1 A @ 24 VDC
Buttons	Reset button

Physical Characteristics

Housing	Metal
IP Rating	IP30
Dimensions	45 x 130 x 118 mm (1.77 x 5.12 x 4.65 in)
Weight	800 g (1.76 lb)
Installation	DIN-rail mounting Wall mounting (with optional kit)

Power Parameters

Input Current	12-48 VDC, 2.01-0.5 A
Input Voltage	12 to 48 VDC Redundant dual inputs 48 VDC Power-over-Ethernet
Power Connector	1 removable 10-contact terminal block(s)
Power Consumption	24.12 W (max.)

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 (package included)	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5 to 95% (non-condensing)

Standards and Certifications

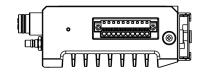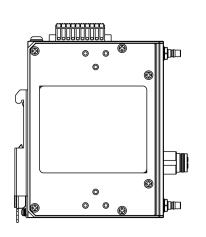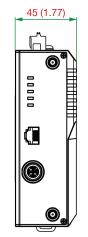|	
EMC	EN 55032/35
EMI	CISPR 32, FCC Part 15B Class A
EMS	IEC 61000-4-2 ESD: Contact: 8 kV; Air: 15 kV IEC 61000-4-3 RS: 80 MHz to 1 GHz: 20 V/m IEC 61000-4-4 EFT: Power: 2 kV; Signal: 2 kV IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV IEC 61000-4-6 CS: 10 V/m IEC 61000-4-8 PFMF: 30 A/m
Safety	IEC 60950-1 IEC 62368-1 UL 62368-1
Railway	EN 50121-4 EN 50155
Railway Fire Protection	EN 45545-2
Radio	EN 300 328, EN 301 489-1/17, EN 301 893, FCC, MIC, TELEC, NCC, RCM, SRRC, IC

MTBF

Time	838,684 hrs
Standards	Telcordia SR332

Warranty

Warranty Period	5 years
Details	See www.moxa.com/warranty

Package Contents

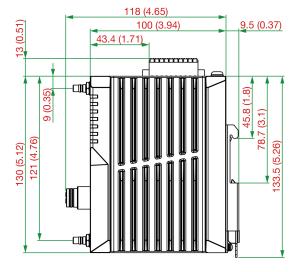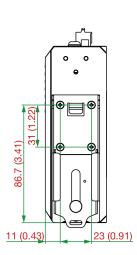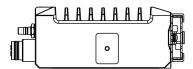|	
Device	1 x AWK-3251A-RCC Series wireless AP/client
Installation Kit	1 x cap, for RJ45 console port 1 x cap, for M12 Ethernet port 1 x cable holder with screw 1 x DIN-rail kit
Documentation	1 x quick installation guide 1 x warranty card

Dimensions

Unit: mm (inch)

Ordering Information

Model Name	Band	Operating Temp.	Conformal Coating
AWK-3251A-M12-RCC-US	US	-25 to 60°C	–
AWK-3251A-M12-RCC-US-T	US	-40 to 75°C	–
AWK-3251A-M12-RCC-US-CT-T	US	-40 to 75°C	✓
AWK-3251A-M12-RCC-UN	UN	-25 to 60°C	–

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Model Name	Band	Operating Temp.	Conformal Coating
AWK-3251A-M12-RCC-UN-T	UN	-40 to 75°C	–
AWK-3251A-M12-RCC-UN-CT-T	UN	-40 to 75°C	✓

Accessories (sold separately)

Wall-Mounting Kits

WK-35-01	Wall-mounting kit with 2 plates (35 x 44 x 2.5 mm) and 6 screws

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