TAP-213 Series

Rail onboard 802.11n IP68 wireless AP/client



Features and Benefits

- IEEE 802.11a/b/g/n compliant
- Can be powered by redundant dual DC power inputs or PoE
- QoS (WMM) and VLAN for efficient network traffic
- Controller-based Turbo Roaming (less than 50 ms)[1]
- Complies with all EN 50155 mandatory test items[2]
- Rugged IP68-rated housing and -40 to 75°C operating temperature
- Wireless network redundancy with AeroLink Protection

Certifications

EN 50155

Introduction

The TAP-213 outdoor wireless AP/client is the ideal ruggedized wireless solution for railway onboard and train-to-ground applications such as CCTV and CBTC communications. The TAP-213's dust-tight, weatherproof design is IP68-rated, allowing you to extend wireless networks to outdoor locations and critical environments. The two redundant DC power inputs increase the reliability of the power supply and the device can also be powered via PoE for easier deployment. The TAP-213 is compliant with the mandatory test items of the EN 50155 standard to ensure suitability for rolling stock applications. With many hardened industrial-grade features, the TAP-213 will provide stable and reliable wireless connectivity, especially for rail onboard environments.

Features for Critical Environments

- IP68-rated metal housing and -40 to 75°C wide operating temperature
- Anti-vibration M12 design with waterproof and dustproof connectors
- PoE and dual DC power inputs
- High-power 400 mW (max.) radio
- Wide range power input from 24 to 110 VDC
- Client-based Turbo Roaming handover time less than 150 ms with 3 channels and WPA2
- Controller-based Turbo Roaming handover time (available only when used with the WAC-1001 or WAC-2004) less than 50 ms with 3 channels and WPA2
- Multiple roaming parameters for different installation structures and antenna types

Specifications

WLAN Interface

Channel Bandwidth	5 MHz, 10 MHz, 20 MHz, 40 MHz
Frequency Band for EU (20 MHz operating channels)	2.412 to 2.472 GHz (13 channels) 5.180 to 5.240 GHz (4 channels) 5.260 to 5.320 GHz (4 channels) 5.500 to 5.700 GHz (11 channels)
Frequency Band for JP (20 MHz operating channels)	2.412 to 2.484 GHz (14 channels) 5.180 to 5.240 GHz (4 channels) 5.260 to 5.320 GHz (4 channels) 5.500 to 5.700 GHz (11 channels)
Frequency Band for US (20 MHz operating channels)	2.412 to 2.462 GHz (11 channels) 5.180 to 5.240 GHz (4 channels)

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. This product is suitable for rolling stock railway applications, as defined by the EN 50155 standard. For a more detailed statement, click here: www.moxa.com/doc/specs/EN_50155_Compliance.pdf

	5.260 to 5.320 GHz (4 channels)[3] 5.500 to 5.700 GHz (8 channels) Excludes 5.600 to 5.640 [3] 5745 to 5825 GHz (5 channels)
Receiver Sensitivity for 802.11a (measured at 5.680 GHz)	Typ. -90 @ 6 Mbps Typ. -88 @ 9 Mbps Typ. -88 @ 12 Mbps Typ. -85 @ 18 Mbps Typ. -81 @ 24 Mbps Typ. -78 @ 36 Mbps Typ. -74 @ 48 Mbps Typ. -74 @ 54 Mbps Note[4]
Receiver Sensitivity for 802.11n (5 GHz; measured at 5.680 GHz)	Typ. -88 dBm @ MCS0 20 MHz Typ. -85 dBm @ MCS1 20 MHz Typ. -82 dBm @ MCS2 20 MHz Typ. -79 dBm @ MCS3 20 MHz Typ. -76 dBm @ MCS4 20 MHz Typ. -71 dBm @ MCS5 20 MHz Typ. -70 dBm @ MCS6 20 MHz Typ. -69 dBm @ MCS7 20 MHz Typ. -95 dBm @ MCS8 20 MHz Typ. -91 dBm @ MCS9 20 MHz Typ. -87 dBm @ MCS10 20 MHz Typ. -80 dBm @ MCS11 20 MHz Typ. -78 dBm @ MCS12 20 MHz Typ. -74 dBm @ MCS13 20 MHz Typ. -72 dBm @ MCS14 20 MHz Typ. -71 dBm @ MCS15 20 MHz Typ. -84 dBm @ MCS0 40 MHz Typ. -81 dBm @ MCS1 40 MHz Typ. -77 dBm @ MCS2 40 MHz Typ. -75 dBm @ MCS3 40 MHz Typ. -71 dBm @ MCS4 40 MHz Typ. -67 dBm @ MCS5 40 MHz Typ. -64 dBm @ MCS6 40 MHz Typ. -63 dBm @ MCS7 40 MHz Typ. -90 dBm @ MCS8 40 MHz Typ. -85 dBm @ MCS9 40 MHz Typ. -82 dBm @ MCS10 40 MHz Typ. -81 dBm @ MCS11 40 MHz Typ. -77 dBm @ MCS12 40 MHz Typ. -73 dBm @ MCS13 40 MHz Typ. -71 dBm @ MCS14 40 MHz Typ. -68 dBm @ MCS15 40 MHz Note[4]
Receiver Sensitivity for 802.11b (measured at 2.437 GHz)	Typ. -93 dBm @ 1 Mbps Typ. -93 dBm @ 2 Mbps Typ. -93 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. -88 dBm @ 9 Mbps Typ. -88 dBm @ 12 Mbps Typ. -85 dBm @ 18 Mbps Typ. -81 dBm @ 24 Mbps Typ. -78 dBm @ 36 Mbps Typ. -74 dBm @ 48 Mbps Typ. -74 dBm @ 54 Mbps
Receiver Sensitivity for 802.11n (2.4 GHz; measured at 2.437 GHz)	Typ. -89 dBm @ MCS0 20 MHz Typ. -85 dBm @ MCS1 20 MHz Typ. -85 dBm @ MCS2 20 MHz Typ. -82 dBm @ MCS3 20 MHz Typ. -78 dBm @ MCS4 20 MHz Typ. -74 dBm @ MCS5 20 MHz Typ. -72 dBm @ MCS6 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.
4. Due to a limitation in the receiver sensitivity performance for channels 153 and 161, it is recommended to avoid using these channels in your critical applications.

	Typ. -70 dBm @ MCS7 20 MHz Typ. -95 dBm @ MCS8 20 MHz Typ. -90 dBm @ MCS9 20 MHz Typ. -87 dBm @ MCS10 20 MHz Typ. -83 dBm @ MCS11 20 MHz Typ. -80 dBm @ MCS12 20 MHz Typ. -74 dBm @ MCS13 20 MHz Typ. -71 dBm @ MCS14 20 MHz Typ. -69 dBm @ MCS15 20 MHz Typ. -87 dBm @ MCS0 40 MHz Typ. -83 dBm @ MCS1 40 MHz Typ. -83 dBm @ MCS2 40 MHz Typ. -80 dBm @ MCS3 40 MHz Typ. -76 dBm @ MCS4 40 MHz Typ. -73 dBm @ MCS5 40 MHz Typ. -69 dBm @ MCS6 40 MHz Typ. -67 dBm @ MCS7 40 MHz Typ. -93 dBm @ MCS8 40 MHz Typ. -88 dBm @ MCS9 40 MHz Typ. -85 dBm @ MCS10 40 MHz Typ. -82 dBm @ MCS11 40 MHz Typ. -78 dBm @ MCS12 40 MHz Typ. -73 dBm @ MCS13 40 MHz Typ. -69 dBm @ MCS14 40 MHz Typ. -67 dBm @ MCS15 40 MHz
Modulation Type	DSSS MIMO-OFDM OFDM
Transmission Rate	802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps 802.11n HT20: 6.5 to 144.4 Mbps (MCS0 to MCS15) 802.11n HT40: 13.5 to 300 Mbps (MCS0 to MCS15)
Transmitter Power for 802.11a	23±1.5 dBm @ 6 Mbps 23±1.5 dBm @ 12 Mbps 23±1.5 dBm @ 24 Mbps 21±1.5 dBm @ 36 Mbps 20±1.5 dBm @ 48 Mbps 18±1.5 dBm @ 54 Mbps
Transmitter Power for 802.11n (5 GHz)	23±1.5 dBm @ MCS0 20 MHz 20±1.5 dBm @ MCS1 20 MHz 20±1.5 dBm @ MCS2 20 MHz 20±1.5 dBm @ MCS3 20 MHz 19±1.5 dBm @ MCS4 20 MHz 18±1.5 dBm @ MCS5 20 MHz 18±1.5 dBm @ MCS6 20 MHz 18±1.5 dBm @ MCS7 20 MHz 23±1.5 dBm @ MCS8 20 MHz 20±1.5 dBm @ MCS9 20 MHz 20±1.5 dBm @ MCS10 20 MHz 20±1.5 dBm @ MCS11 20 MHz 19±1.5 dBm @ MCS12 20 MHz 19±1.5 dBm @ MCS13 20 MHz 18±1.5 dBm @ MCS14 20 MHz 18±1.5 dBm @ MCS15 20 MHz 23±1.5 dBm @ MCS0 40 MHz 20±1.5 dBm @ MCS1 40 MHz 20±1.5 dBm @ MCS2 40 MHz 20±1.5 dBm @ MCS3 40 MHz 19±1.5 dBm @ MCS4 40 MHz 18±1.5 dBm @ MCS5 40 MHz 18±1.5 dBm @ MCS6 40 MHz 18±1.5 dBm @ MCS7 40 MHz 23±1.5 dBm @ MCS8 40 MHz 20±1.5 dBm @ MCS9 40 MHz 20±1.5 dBm @ MCS10 40 MHz 20±1.5 dBm @ MCS11 40 MHz 19±1.5 dBm @ MCS12 40 MHz 19±1.5 dBm @ MCS13 40 MHz 18±1.5 dBm @ MCS14 40 MHz

	18±1.5 dBm @ MCS15 40 MHz
Transmitter Power for 802.11b	26±1.5 dBm @ 1 Mbps 26±1.5 dBm @ 2 Mbps 26±1.5 dBm @ 5.5 Mbps 25±1.5 dBm @ 11 Mbps
Transmitter Power for 802.11g	23±1.5 dBm @ 6 Mbps 23±1.5 dBm @ 12 Mbps 23±1.5 dBm @ 24 Mbps 21±1.5 dBm @ 36 Mbps 20±1.5 dBm @ 48 Mbps 18±1.5 dBm @ 54 Mbps
Transmitter Power for 802.11n (2.4 GHz)	23±1.5 dBm @ MCS0 20 MHz 21±1.5 dBm @ MCS1 20 MHz 21±1.5 dBm @ MCS2 20 MHz 21±1.5 dBm @ MCS3 20 MHz 20±1.5 dBm @ MCS4 20 MHz 19±1.5 dBm @ MCS5 20 MHz 18±1.5 dBm @ MCS6 20 MHz 18±1.5 dBm @ MCS7 20 MHz 23±1.5 dBm @ MCS8 20 MHz 21±1.5 dBm @ MCS9 20 MHz 21±1.5 dBm @ MCS10 20 MHz 21±1.5 dBm @ MCS11 20 MHz 20±1.5 dBm @ MCS12 20 MHz 19±1.5 dBm @ MCS13 20 MHz 18±1.5 dBm @ MCS14 20 MHz 18±1.5 dBm @ MCS15 20 MHz 23±1.5 dBm @ MCS0 40 MHz 20±1.5 dBm @ MCS1 40 MHz 20±1.5 dBm @ MCS2 40 MHz 20±1.5 dBm @ MCS3 40 MHz 19±1.5 dBm @ MCS4 40 MHz 19±1.5 dBm @ MCS5 40 MHz 18±1.5 dBm @ MCS6 40 MHz 17±1.5 dBm @ MCS7 40 MHz 23±1.5 dBm @ MCS8 40 MHz 20±1.5 dBm @ MCS9 40 MHz 20±1.5 dBm @ MCS10 40 MHz 20±1.5 dBm @ MCS11 40 MHz 20±1.5 dBm @ MCS12 40 MHz 19±1.5 dBm @ MCS13 40 MHz 18±1.5 dBm @ MCS14 40 MHz 17±1.5 dBm @ MCS15 40 MHz
Wireless Security	WEP encryption (64-bit and 128-bit) WPA/WPA2-Enterprise (IEEE 802.1X/RADIUS, TKIP, AES) WPA/WPA2-Personal
WLAN Antenna Connector	2 N-type female
WLAN Operation Mode	Access point, Client, Client-Router, Sniffer
WLAN Standards	802.11a/b/g/n 802.11i Wireless Security
Frequency Band	2.4 GHz 5 GHz

Input/Output Interface

Buttons	Reset button

Ethernet Interface

10/100/1000BaseT(X) Ports (M12 A-coded 8-pin female connector)	1
1000BaseSFP Slots	1

Standards	IEEE 802.1p for Class of Service IEEE 802.1Q for VLAN Tagging IEEE 802.1X for authentication IEEE 802.3 for 10BaseT IEEE 802.3ab for 1000BaseT(X) IEEE 802.3af for PoE IEEE 802.3u for 100BaseT(X)
Total Port Count	2
Highest Speed	1G
Connections	PoE M12 Fiber

Ethernet Software Features

Management	SNMPv1/v2c/v3, DHCP Server/Client, IPv4, LLDP, SMTP, Syslog, TCP/IP, Telnet, TFTP, UDP, Web Console, Wireless Search Utility
Security	HTTPS/SSL, RADIUS, SSH
Time Management	NTP Client, SNTP
Unicast Routing	Static Route

Switch Properties

VLAN ID Range	VID 1 to 4094

USB Interface

M12 Connector	M12 A-coded 5-pin female (for ABC-02 USB storage)

Firewall

Filter	IP address, MAC address, Ports

NAT

Features	Port forwarding

Serial Interface

Console Port	USB-M12 console (M12 B-coded 5-pin female connector)
Flow Control	RTS/CTS, XON/XOFF
Parity	None, Even, Odd, Space, Mark

Power Parameters

Input Current	0.65 A @ 24 VDC, 0.16 A @ 110 VDC
Input Voltage	24 to 110 VDC, Redundant dual inputs
Power Connector	M12 A-coded 4-pin male connector
Power Consumption	17.6 W (max.)
Reverse Polarity Protection	Supported
Source of Input Power	PoE (IEEE 802.3af)

Physical Characteristics

Housing	Metal
IP Rating	IP68

Dimensions (without ears)	220 x 150 x 50.5 mm (8.66 x 5.91 x 1.99 in)
Weight	1,500 g (3.31 lb)
Installation	Wall mounting (standard), DIN-rail mounting (optional), Pole mounting (optional)
Protection	PCB conformal coating

Environmental Limits

Operating Temperature	-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 61000-6-2/-6-4
EMI	CISPR 32, FCC Part 15B Class A
EMS	IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 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 PFMF
Radio Frequency	EN 300 328, EN 301 489-1/17, EN 301 893, FCC, IC, WPC
Railway	EN 50121-4, EN 50155
Railway Fire Protection	EN 45545-2
Safety	EN 60950-1, UL 60950-1, IEC 60950-1

MTBF

Time	758,369 hrs
Standards	Telcordia SR332

Warranty

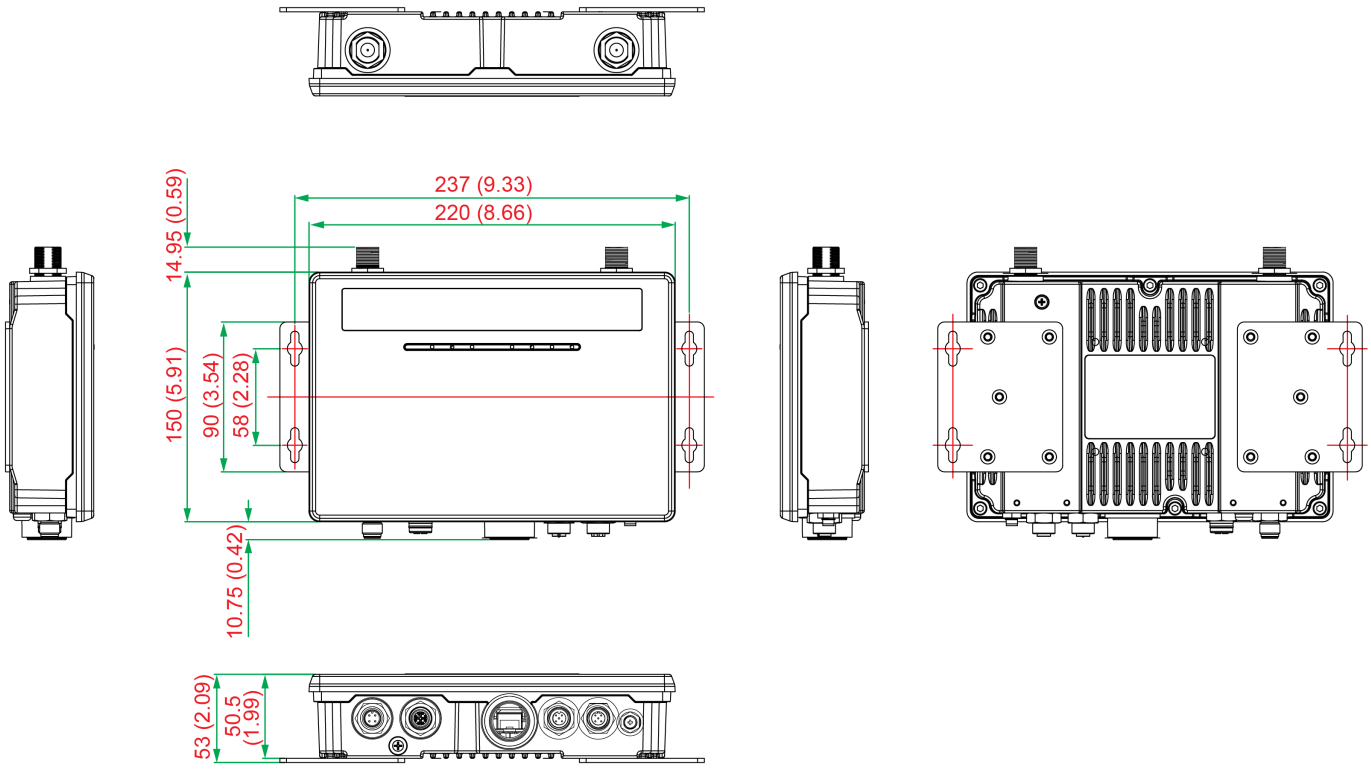
Warranty Period	5 years
Details	See www.moxa.com/warranty

Package Contents

Device	1 x TAP-213 Series wireless AP/client
Installation Kit	1 x cap, metal, for ABC-02 USB storage port 1 x cap, metal, for LAN fiber port 1 x cap, metal, for USB console port 1 x cap, plastic, for LAN X-coded port 1 x metal M12 male 4-pin A-coded screw-type crimp circular connector for power 1 x wall-mounting kit
Antenna	2 x ANT-WDB-ANM-0502 2.4/5 GHz antenna
Documentation	1 x quick installation guide 1 x warranty card

Dimensions

Unit: mm (inch)



Ordering Information

Model Name	Band	Wi-Fi Standard	Application	Operating Temp.	Indoor/Outdoor, IP Code	Single/Dual RF
TAP-213-EU-CT-T	EU	802.11a/b/g/n	Railway onboard AP/client	-40 to 75°C	Outdoor, IP68	Single RF
TAP-213-US-CT-T	US	802.11a/b/g/n	Railway onboard AP/client	-40 to 75°C	Outdoor, IP68	Single RF
TAP-213-JP-CT-T	JP	802.11a/b/g/n	Railway onboard AP/client	-40 to 75°C	Outdoor, IP68	Single RF

Accessories (sold separately)

Antennas

ANT-WDB-ANM-0502	2.4/5 GHz, omni-directional antenna, 5/2 dBi, N-type (male)
ANT-WDB-ARM-02	2.4/5 GHz, omni-directional rubber duck antenna, 2 dBi, RP-SMA (male)
ANT-WDB-PNF-1518	2.4/5 GHz, panel antenna, 15/18 dBi, N-type (female)

M12 Connector Caps

A-CAP-M12F-M	Metal cap for M12 female connector

Wireless AP Connector Cables

A-PLG-WPM30IP67-01	Field-Installation for M30 plug

Wireless Connector Caps

A-CAP-M30M-MIP67	Metal cap to cover M30 connector

Wireless Terminating Resistors

A-TRM-50-RM	Termination resistor, 50 ohms, N-type male

Wireless Antenna Cables

A-CRF-NMNM-LL4-900	N-type (male) to N-type (male), LMR-400 Lite cable, 9 m
A-CRF-NMNM-LL4-600	N-type (male) to N-type (male), LMR-400 Lite cable, 6 m
A-CRF-NMNM-LL4-300	N-type (male) to N-type (male), LMR-400 Lite cable, 3 m

Surge Arrestors

A-SA-NFNF-01	Surge arrestor, N-type (female) to N-type (female)

Wireless AP Mounting Kits

DK-DC50131	DIN-rail mounting kit

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