

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 items²
- Rugged IP68-rated housing and -40 to 75°C operating temperature
- Wireless network redundancy with AeroLink Protection

Certifications



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

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|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 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_Combpliance.pdf

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| | 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.

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| | <p>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</p> |
| Modulation Type | <p>DSSS MIMO-OFDM OFDM</p> |
| Transmission Rate | <p>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)</p> |
| Transmitter Power for 802.11a | <p>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</p> |
| Transmitter Power for 802.11n (5 GHz) | <p>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</p> |

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| | 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

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|-----------------|------------------------------------------------------------------------------------------------------------------------------|
| 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

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|---------------|---------------|
| VLAN ID Range | VID 1 to 4094 |
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USB Interface

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

Firewall

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|--------|--------------------------------|
| Filter | IP address, MAC address, Ports |
|--------|--------------------------------|

NAT

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|----------|-----------------|
| Features | Port forwarding |
|----------|-----------------|

Serial Interface

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|--------------|------------------------------------------------------|
| 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

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|-----------------------------|--------------------------------------|
| 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) |

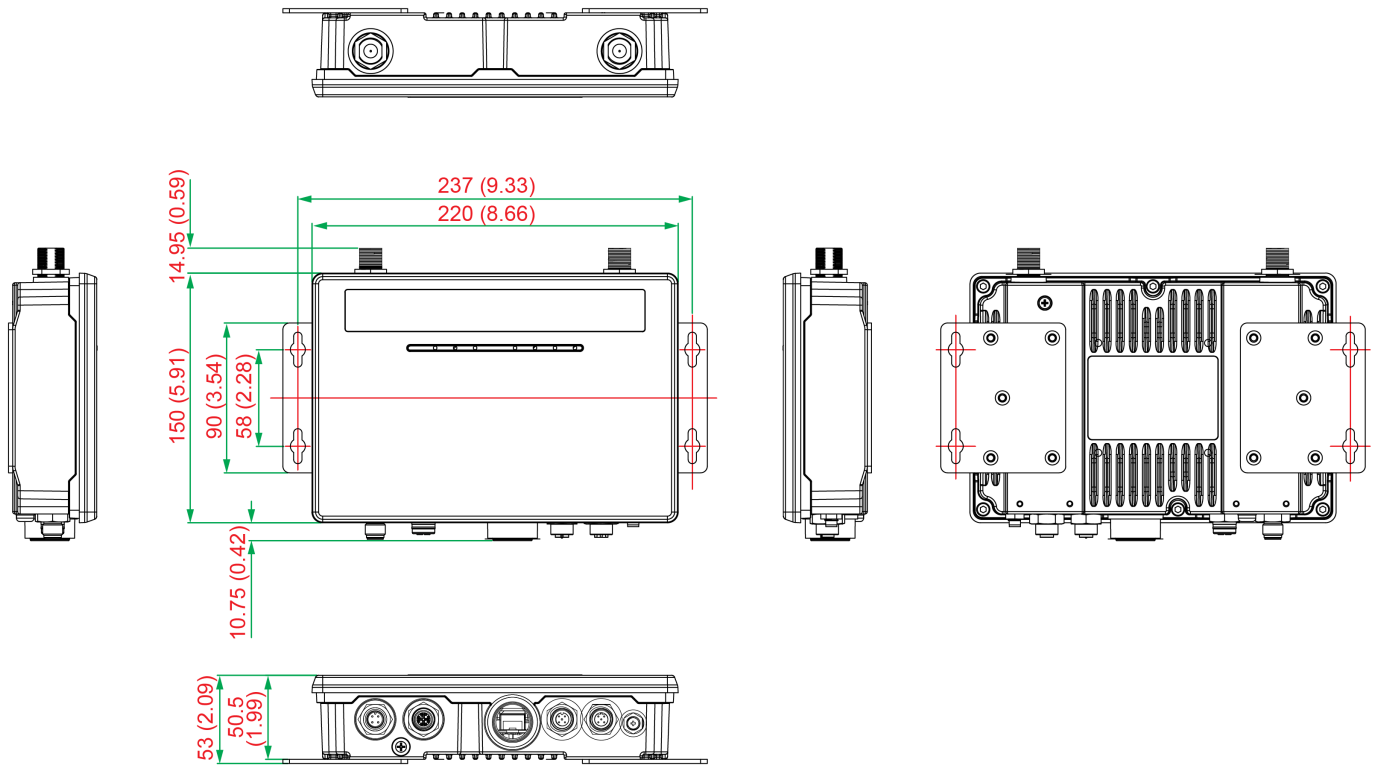
Physical Characteristics

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|-----------|-------|
| 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

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

Wireless AP Connector Cables

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

Wireless Connector Caps

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

Wireless Terminating Resistors

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|-------------|--------------------------------------------|
| 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

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

Wireless AP Mounting Kits

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| DK-DC50131 | DIN-rail mounting kit |
|------------|-----------------------|

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