

TAP-213 系列

軌道用車載 802.11n IP68 無線 AP / 用戶端



特色與優點

- 符合 IEEE 802.11a/b/g/n 規範
- 可由冗餘雙直流電源輸入或 PoE 供電
- QoS (WMM) 和 VLAN 提供有效率的網路傳輸
- 基於控制器的 Turbo Roaming (小於 50 毫秒)¹
- 符合所有 EN 50155 規範強制性測試項目²
- IP68 等級堅固外殼，支援 -40 至 75°C 的操作溫度
- 無線網路冗餘加上 AeroLink 保護

認證



簡介

TAP-213 無線 Ap/用戶端對於軌道車載系統和列車對地通訊應用（例如 CCTV 和 CBTC 通訊）來說，是理想的堅固型無線方案。TAP-213 的防塵防風雨設計達到 IP68 等級，讓您將無線網路延伸至戶外地點與嚴苛環境。兩組直流電源 (DC) 輸入增加了電源供應器的可靠度，裝置也可透過 PoE 供電，讓現場布線更方便。TAP-213 符合 EN 50155 標準的強制性測試項目，確保適合軌道車輛應用。TAP-213 具備許多強化的工業級功能，提供穩定可靠的無線連線能力，特別適用於軌道車載環境。

針對嚴苛環境的特點

- IP68 等級金屬外殼，支援 -40 至 75°C 的寬操作溫度
- M12 防震設計，同時具備防水防塵特性
- PoE 及雙直流電源輸入
- 高功率 400 mW (最大值) 無線發射率
- 介於 24 至 110 直流電壓 (VDC) 的寬廣電源輸入範圍
- 若為用戶端，Turbo Roaming 快速漫遊在 3 個頻道及 WPA2 時，切換時間少於 150 毫秒
- 若為控制端，Turbo Roaming 快速漫遊 (僅限和 WAC-1001 或 WAC-2004 用時) 在 3 個頻道及 WPA2 時，切換時間少於 50 毫秒
- 多種漫遊參數，適用於不同的安裝架構和天線類型

規格

WLAN Interface

Channel Bandwidth	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)

1. 此處所指的 Turbo Roaming 快速漫遊復原時間是在最佳狀態下，配置無干擾 20 MHz RF 頻道、WPA2-PSK 安全性和預設的 Turbo Roaming 快速漫遊參數，所得到的測試結果平均值。用戶端設定為在 100 Kbps 流量負載下 3 個頻道漫遊。其他情況也有可能影響漫遊的效能。若想了解更多關於 Turbo Roaming 快速漫遊的參數設定，請參閱產品手冊。

2. 此產品適用於符合 EN 50155 標準所定義的所有軌道車輛應用。若需更詳細的說明，請參照：www.moxa.com/doc/specs/EN_50155_Compliance.pdf

	<p>5.180 to 5.240 GHz (4 channels) 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)</p>
Receiver Sensitivity for 802.11a (measured at 5.680 GHz)	<p>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</p> <p>Note: 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.</p>
Receiver Sensitivity for 802.11n (5 GHz; measured at 5.680 GHz)	<p>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</p> <p>Note: 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.</p>
Receiver Sensitivity for 802.11b (measured at 2.437 GHz)	<p>Typ. -93 dBm @ 1 Mbps Typ. -93 dBm @ 2 Mbps Typ. -93 dBm @ 5.5 Mbps Typ. -88 dBm @ 11 Mbps</p>
Receiver Sensitivity for 802.11g (measured at 2.437 GHz)	<p>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</p>
Receiver Sensitivity for 802.11n (2.4 GHz; measured at 2.437 GHz)	<p>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</p>

3. 支援 DFS (動態頻率選擇) 頻道：在 AP 模式下，當設備偵測到一個雷達信號，會自動切換到另一個頻道。然而，根據規定，當頻道切換後，若要重啟服務，需要 60 秒的可用性檢查期。

	<p>Typ. -74 dBm @ MCS5 20 MHz Typ. -72 dBm @ MCS6 20 MHz 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</p>

	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
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Ethernet Interface

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 802.3u for 100BaseT(X) IEEE 802.3at for PoE
Total Port Count	2
Highest Speed	1G
Connections	PoE M12 Fiber
10/100/1000BaseT(X) Ports (M12 X-coded 8-pin female connector)	1

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
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USB Interface

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

Filter	IP address, MAC address, Ports
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NAT

Features	Port forwarding
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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 802.3at)

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

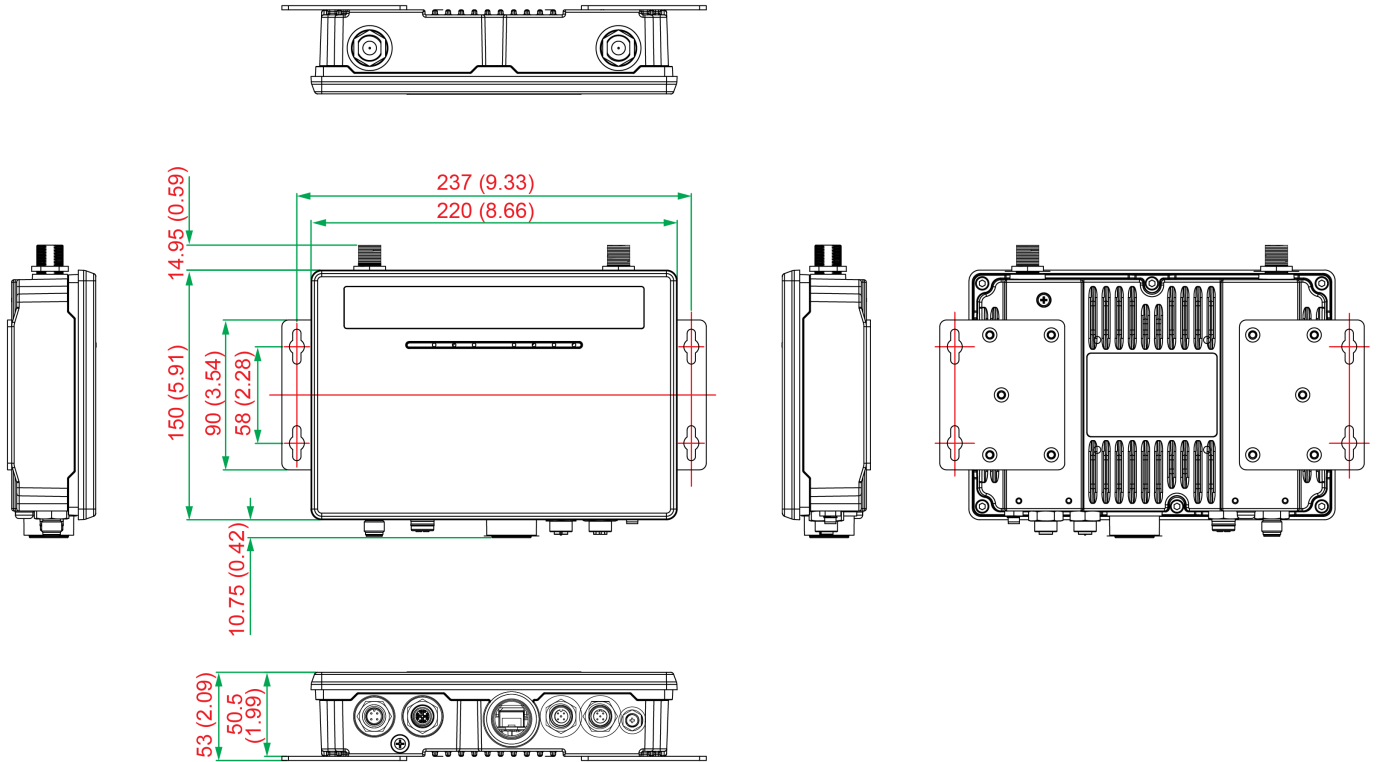
Warranty Period	5 years
Details	See www.moxa.com/tw/warranty

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

尺寸

單位：公釐（英吋）



訂購資訊

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

配件（選購）

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)

Wireless Antenna Cables

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

M12 Connector Caps

A-CAP-M12F-M	Metal cap for M12 female connector
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Wireless AP Connector Cables

A-PLG-WPM30IP67-01	Field-Installation for M30 plug
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Wireless Terminating Resistors

A-TRM-50-RM	50-ohm terminating resistor with RP-SMA male connector
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Wireless Connector Caps

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

A-SA-NFNF-01	N-type (female) to N-type (female) surge arrester
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Wireless AP Mounting Kits

DK-DC50131-01	DIN-rail mounting kit, 6 screws
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