



# RG-AP680-AR

## Wi-Fi 6 Quad-radio Enhanced High-density and Industrial Access Point



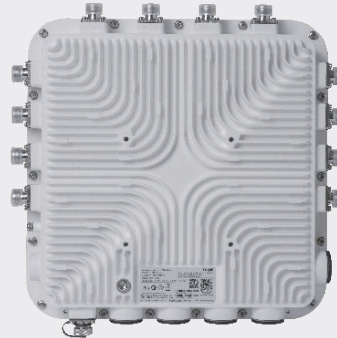
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## Product Pictures



Front View



Rear View



Left Top View



Right Top View

## Product Overview

The RG-AP680-AR is a Wi-Fi 6, quad-radio, enhanced, and industrial wireless access point (AP) provided by Ruijie Networks for higher education, wireless city, energy, business mall, rail transit, and other scenarios.

The RG-AP680-AR supports the 802.11ax, 802.11ac Wave2, 802.11ac Wave1, and 802.11n protocols. With hardware-independent quad-radio design, the AP can provide up to 11.617 Gbps access rate. The ultra-fast wireless network makes performance no longer a bottleneck.

Important factors such as the wireless network security, radio control, mobile access, Quality of Service (QoS), seamless roaming, and expansion of the Internet of Things (IoT) module are fully taken into account for this product. Therefore, this AP can be used in combination with Ruijie Access Controllers (ACs) and WIS to implement STA data forwarding, security, access control, and IoT application extension.

Thanks to its IP68 rated housing, the RG-AP680-AR is suitable for use in extreme indoor and outdoor environments and capable of effectively withstanding harsh weather and environments. It is highly adaptable to colder climates in Northern China and wet climates in Southern China, allowing for easier installation and maintenance.

The RG-AP680-AR supports the local 100 to 240 V AC power supply and standard power over Ethernet (PoE). Customers can select the power supply mode based on the site environment. The RG-AP680-AR can switch between the built-in and external antennas to meet Wi-Fi network coverage and networking requirements in most environments.

# Product Features

## Independent Multi-functional AI Radio

The RG-AP680-AR in the line of AR series released by Ruijie Networks is equipped with a hardware-independent intelligent radio card, which enhances user experience in a Wi-Fi 6 environment from multiple dimensions.

### Intelligent Security Guard

As an independent radio card, AI Radio can, without impairing wireless experience, guard the security of 2.4 GHz/5 GHz full-band wireless networks in 24/7 mode and carry out radar scanning on the wireless networks to eliminate hidden risks. It applies to finance, education, government, business, enterprise, and other scenarios.

## Simplified Optical Ethernet Solution

The RG-AP680-AR supports Ruijie Simplified Optical Ethernet solution.

This solution uses optical fiber lines instead of traditional Ethernet lines. It features a flattened network architecture, simple implementation, and neat cabling, supports elastic network upgrade, and has obvious advantages compared with the traditional Ethernet solution.

## Ruijie Wi-Fi 6 Train-to-Ground Wireless Network Solution

The RG-AP680-AR supports Ruijie Wi-Fi 6 train-to-ground wireless network solution.

In this solution, the RG-AP680-AR serves as the trackside AP and establishes a wireless bridge with the vehicle-mounted AP to ensure high-speed data transmission over the train-to-ground communication link.

## Multiple Service Ports

The RG-AP680-AR supports a maximum wired access rate of 26 Gbps. It has four multi-functional network ports.

One adaptive Ethernet electrical port provides a wired access rate of up to 5 Gbps.

Two adaptive Ethernet optical ports provide a wired access rate of up to 20 Gbps, to implement high-speed transmission and

conversion between wireless networks and wired networks.

One adaptive Ethernet electrical port can be connected to the Ruijie IoT module and other modules so that the AP is applicable to more scenarios.

## High-Speed Wireless Access, Higher Energy Efficiency, and Higher Reliability

### 1024-QAM High-Speed Access

The RG-AP680-AR adopts the quad-radio design and complies with the next-generation Wi-Fi standard 802.11ax. When the four radios are all enabled, the AP can provide a maximum wireless access rate of 11.617 Gbps, bringing high-speed access experience.

### OFDMA High-Density User Access

The Orthogonal Frequency Division Multiple Access (OFDMA) feature in 802.11ax enables the RG-AP680-AR to divide a WLAN channel into a plurality of narrower subchannels, with each user occupying one or more subchannels. The AP can conduct scheduling to allow multiple users to receive and send packets concurrently, which reduces user contention and backoff, shortens the network delay, and improves network efficiency.

In a high-density deployment and access environment, the average rate per STA can be raised to four times that of IEEE 802.11ac.

### Environment Protection and Lower Power Consumption

The RG-AP680-AR incorporates various new energy saving technologies, including the single-antenna standby technology, dynamic MIMO power saving technology, enhanced automatic power saving transmission technology, and packet-based power control technology. With these technologies as well as high-performance power design, the RG-AP680-AR is energy-efficient while providing high-speed wireless access service.

### Intelligent Recognition Function

The RG-AP680-AR is capable of identifying smart mobile terminals (such as iOS and Android terminals) and PCs. The RG-AP680-AR can be correlated with Ruijie's WIS to implement visualized wireless network management based on the wireless terminal type and network optimization in one-click mode.

### Intelligent Local Forwarding

The RG-AP680-AR integrates intelligent local forwarding technology of Ruijie Networks and breaks through the bottleneck in the traffic of ACs. The data forwarding mode of the RG-AP680-AR can be flexibly pre-configured through Ruijie AC. Then, this AP determines whether data needs to be forwarded by the AC or be sent to a wired network for data exchange based on the SSID name or user VLAN.

The local forwarding technology forwards data that is sensitive to delay and requires real-time high-performance transmission through a wired network. This greatly reduces the traffic pressure of ACs for better adaption to heavy-traffic transmission of IEEE 802.11ax networks.

### Abundant QoS Policies

The RG-AP680-AR provides abundant QoS policies. It supports WLAN/AP/STA-based bandwidth limitation as well as Wi-Fi Multimedia (WMM) that defines priorities for different service data. Therefore, the AP authentically implements timely and quantitative transmission of audio and video, and guarantees smooth application of multimedia services.

The multicast-to-unicast technology supported by the RG-AP680-AR solves the video lagging problem caused by packet loss or long delay in Video on Demand (VoD) and other multicast applications on wireless networks, and enhances the experience in the use of multicast video services on wireless networks.

## Comprehensive Security Protection and Ease of Use

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### Secure User Access

The RG-AP680-AR supports a wide range of user access authentication modes, including Web authentication, 802.1x authentication, MAC Address Bypass (MAB) authentication, and local authentication. It also fully supports Ruijie Global Security Network (GSN) solution. Complying with the standard network access control standard, the AP strictly defines a set of network access control policies in terms of user access, authorization, host compliance check, network behavior monitoring, and network attack prevention. These control measures guarantee high network security for authenticated users.

### Comprehensive Wireless Security Protection

Working with Ruijie integrated network management system

RG-SNC and RG-WS series ACs, the RG-AP680-AR is capable of offering a wide range of wireless security protection features, including the Wireless Intrusion Detection System (WIDS), radio interference tracking, rogue AP containment, anti-ARP spoofing, and DHCP protection. With these features, an authentically secure and reliable wireless network can be built for users.

### Multiple Easy-to-Use Authentication Modes

When used together with Ruijie's authentication system or multi-service ACs, the AP supports multiple efficient and convenient authentication modes such as MAB authentication, SM-based authentication, and QR code-based visitor authentication.

Users need to enter their usernames and passwords only for the first time when accessing a network by using STAs via MAB authentication. They can directly access the network with no need to enter the usernames and passwords again in their future access.

When visitors access a wireless network via SM-based authentication, an authentication page pops up, on which visitors can register accounts by using their mobile numbers and access the Internet by using the usernames and passwords in their received SMSs.

QR code-based authentication is another convenient way for visitors to access the Internet. After accessing a wireless network, visitors can receive a QR code prompt. They can access the network after being authorized by the visited employees. Visitor behaviors are directly linked with the visited employees, providing better security.

### Roaming Access

Cooperated with the RG-WS series AC, the RG-AP680-AR ensures seamless rooming of wireless users between L2 and L3 networks. Wireless users will not feel data access interruption when they move between RG-AP680-AR APs.

#### 3.6.5 Outstanding Environmental Adaptability

The housing of the RG-AP680-AR utilizes sealed waterproof, dustproof, moisture-proof, and fire retardant design and meets IP68 rating requirements. It can be placed in an outdoor environment for a long time and work properly in harsh environments, such as wind, rain, and damp environments. When normal working is guaranteed, the lifespan of the AP is greatly improved and the subsequent device maintenance costs are reduced.

### Wide Operating Temperature Range

The RG-AP680-AR adopts components and housing that have a wide operating temperature range. It can work properly in a range of -40°C to +70°C without affecting the stability or lifespan. It meets requirements in colder climates in Northern China and wet climates in Southern China.

## Flexible Device Management Modes

### Flexible Switching Between Fit Mode and Fat Mode

The RG-AP680-AR can switch between the fat mode and fit mode flexibly. Zero configuration can be achieved under the fit mode, and complete remote management also enhances the O&M management efficiency of wireless network substantially.

### Web GUI-based Management

The RG-AP680-AR provides web GUIs for AC and AP management. O&M personnel can complete wireless configuration easily and manage the wireless network in an all-round manner. On the AC Web GUIs, O&M personnel can manage APs as well as STAs connected to the APs, restrict the rates and network access behaviors of the STAs, and plan, manage, and maintain wireless networks conveniently.

### Correlation with the Network Management Software

The RG-AP680-AR can be correlated with RG-SNC, which can manage all ACs and APs throughout the network,

including device configuration backup and device status query. RG-SNC provides a wireless thermal map to show the wireless signal distribution of APs in the actual environment.

## All-in-One Design for Small Branch Offices

In small branch office scenarios, the RG-AP680-AR not only serves as an AP to provide the wireless access service for the office area but also serves as a VPN gateway. This all-in-one design simplifies network deployment and saves building costs for users.

### PPPoE

The RG-AP680-AR can function as a PPPoE client and connects to the Internet via PPPoE. Then, no gateway needs to be set up in the branch office area for Internet access.

### NAT

The RG-AP680-AR supports the NAT function, which provides NAT service between the LAN in the branch office and the Internet.

### IPSec VPN

The RG-AP680-AR can establish IPSec VPN tunnels between the branch office area and the headquarters to implement their LAN interconnection.

# Technical Specifications

## Hardware Specifications

### Dimensions and Weight

Dimensions and Weight	RG-AP680-AR
Dimensions (W × D × H)	300 mm × 300 mm × 94 mm
Weight	AP: ≤ 4.5 kg Mounting bracket: ≤ 1.5 k
Installation	Wall-mounted or pole-mounted

## Radio Specifications

Radio Specifications	RG-AP680-AR
Radio Design	<p>Quad-radio design, four RF ports, and the fourth RF port supports flexible switching between 2.4 GHz and 5 GHz</p> <p>Up to 14 spatial streams</p> <p>Radio 1: 2.4 GHz, 4 spatial streams: 4 × 4, MU-MIMO</p> <p>Radio 2: 5 GHz, 4 spatial streams: 4 × 4, MU-MIMO</p> <p>Radio 3: 5 GHz, 4 spatial streams: 4 × 4, MU-MIMO</p> <p>Radio 4: 2.4/5 GHz, 2 spatial streams: 2 × 2, MIMO</p>
Operating Frequencies	<p>Radio 1: 802.11b/g/n/ax, 2.400 GHz–2.483 GHz</p> <p>Radio 2: 802.11a/n/ac/ax, 5.150 GHz–5.350 GHz, 5.470 GHz–5.725 GHz, 5.725 GHz–5.850 GHz</p> <p>Radio 3: 802.11a/n/ac/ax, 5.150 GHz–5.350 GHz</p> <p>Radio 4:</p> <p>802.11b/g/n, 2.400 GHz–2.483 GHz</p> <p>802.11a/n/ac, 5.150 GHz–5.350 GHz, 5.470 GHz–5.725 GHz, 5.725 GHz–5.850 GHz</p> <p>Note: The operating bands vary in different countries.</p>
Data Rate	<p>Radio 1: 2.4 GHz, 1.15 Gbps</p> <p>Radio 2: 5 GHz, 4.8 Gbps</p> <p>Radio 3: 5 GHz, 4.8 Gbps</p> <p>Radio 4: 2.4 GHz/5 GHz, 300 Mbps/867 Mbps</p> <p>Max. Access Rate of the AP</p> <p>2.4 GHz + 5 GHz + 5 GHz + 2.4 GHz, 11.05 Gbps</p> <p>2.4 GHz + 5 GHz + 5 GHz + 5 GHz, 11.617 Gbps</p>
Antenna Type	Built-in smart antenna, supporting switchover between the built-in and external antennas
Antenna Gain	<p>2.4 GHz: 3 dBi</p> <p>5 GHz: 3 dBi</p>
Maximum Transmit Power	<p>29 dBm</p> <p>Note: The transmit power varies based on the regulations in different countries and regions.</p>
Power Adjustment	Configurable in increments of 1 dBm
Modulation	<p>OFDM: BPSK@6/9 Mbps, QPSK@12/18 Mbps, 16-QAM@24 Mbps, 64-QAM@48/54 Mbps</p> <p>DSSS: DBPSK@1 Mbps, DQPSK@2 Mbps, and CCK@5.5/11 Mbps</p> <p>MIMO-OFDM: BPSK, QPSK, 16QAM, 64QAM, 256QAM, and 1024QAM</p> <p>OFDMA</p>
Receiver Sensitivity	<p>802.11b: –96 dBm (1 Mbps), –93 dBm (5 Mbps), –89 dBm (11 Mbps)</p> <p>802.11a/g: –91 dBm (6 Mbps), –85 dBm (24 Mbps), –80 dBm (36 Mbps), –74 dBm (54 Mbps)</p> <p>IEEE 802.11n: –90 dBm (MCS0), –70 dBm (MCS7), –89 dBm (MCS8), –68 dBm (MCS15)</p> <p>802.11ac: 20 MHz: –88 dBm (MCS0), –63 dBm (MCS9)</p> <p>802.11ac: 40 MHz: –85 dBm (MCS0), –60 dBm (MCS9)</p> <p>802.11ac: 80 MHz: –85 dBm (MCS0), –60 dBm (MCS9)</p> <p>802.11ac: 160 MHz: –80 dBm (MCS0), –55 dBm (MCS9)</p> <p>802.11ax: 80 MHz: –82 dBm (MCS0), –57 dBm (MCS9), –52 dBm (MCS11)</p> <p>802.11ax: 160 MHz: –80 dBm (MCS0), –49 dBm (MCS11)</p>

## Interface Specifications

Interface Specifications	RG-AP680-AR
Bluetooth	<p>Bluetooth 5.1</p> <p>The Bluetooth serial port management mode is used by default. Apple iBeacon protocol is supported, through which rich Bluetooth applications such as shake can be extended.</p> <p>Support for the Zigbee, RFID, and other IoT protocols via software upgrade</p>
Fixed Service Port	<p>Uplink: One 100/1000/2500/5000Base-T adaptive Ethernet port, supporting IEEE 802.3af/at/bt-compliant PoE</p> <p>Two 10 Gbps SFP+ adaptive Ethernet optical ports, which are compatible with 2.5 Gbps/1 Gbps optical ports</p> <p>Downlink: One 10/100/1000Base-T adaptive Ethernet port, which allows the PSE to power external devices (802.3af, 15.4 W) and can connect to Ruijie IoT module</p>
Fixed Management Port	One RJ45 console port
Status LED	<p>One system status LED</p> <p>Three RSSI LEDs</p>
Button	One reset button

## Power Supply and Consumption

Power Supply and Consumption	RG-AP680-AR
Power Type	<ol style="list-style-type: none"> <li>100–240 V AC power supply (equipped with the RG-PL-M16-3M cable, and 1 A current must be guaranteed)</li> <li>PoE/PoE+/PoE++ (IEEE 802.3af/at/bt-compliant)</li> </ol>
Power Supply to External Devices	Supported. The AP can connect to and supply power to an IoT module through an Ethernet port.
Maximum Power Consumption	≤ 50 W



## Environment and Reliability

Environment and Reliability	RG-AP680-AR
Temperature	Working temperature: -40°C to 70°C Storage temperature: -40°C to 85°C At a height between 3000 m and 5000 m above the sea level, every time the altitude increases by 220 m, the maximum temperature decreases by 1°C.
Humidity	Operating humidity: 0% to 100% RH (non-condensing) Storage humidity: 0% to 100% RH (non-condensing)
IP Rating	IP68
Anti-corrosion Rating	GB/T 2423.17
Safety Regulations	GB 4943.1, EN 60601-1-2 (medical), UL/CSA 60950-1, EN/IEC 60950-1, and EN/IEC 60950-22
EMC Regulations	GB/T 9254.1, EN301 489, EN 55022, FCC Part15, RSS-210, GB/T 24338.5, and EN 50121

## Software Specifications

Software Specifications	RG-AP680-AR	
WLAN Functions	Maximum number of allowed connected STAs	1536
	Virtual AP service	A maximum of 48 virtual APs can be classified.
	SSID hiding	Supported
	Separate authentication mode, encryption mechanism, and VLAN attributes for each SSID	Supported
	Remote Intelligent Perception Technology (RIPT)	Supported
	Intelligent terminal recognition technology	Supported
	Intelligent load balancing based on STA quantity or traffic	Supported
	STA limit	SSID-based STA limit Radio card-based STA limit
	Bandwidth limit	STA/SSID/AP-based rate limit
Security Functions	PSK and web authentication	Supported

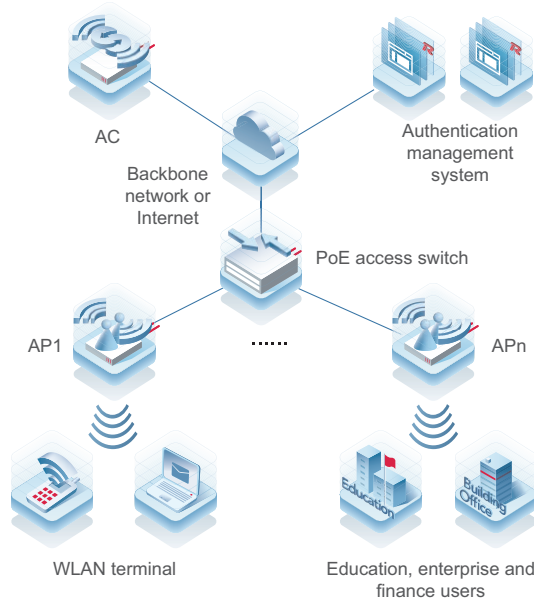


Software Specifications	RG-AP680-AR	
Security Functions	Data encryption	WPA (TKIP), WPA-PSK, WPA2 (AES), WPA3, WEP (64/128 bits)
	WeChat-based authentication	Supported
	QR code-based visitor authentication	Supported
	SM-based authentication	Supported
	MAB authentication	Supported
	Data frame filtering	Whitelist, static blacklist, dynamic blacklist
	User isolation	Supported
	Rogue AP detection and containment	Supported
	Dynamic ACL assignment	Supported
	RADIUS	Supported
	CPP	Supported
NFPP	Supported	
Routing Switching Functions	IPv4 address	Static IP address or dynamic IP address obtained via DHCP
	Multicast	Multicast-to-unicast conversion
	PPPoE	PPPoE client
	VPN	IPSec VPN
	NAT	Supported (including FTP ALG/DNS ALG)
Management and Maintenance	Network management	Network management via Telnet or TFTP Web-based management
	Wireless positioning	RBIS
	Wireless marketing	WMC/MCP
	Fault detection and alarm	Supported
	Information statistics and logging	Supported
	Fat/Fit mode switching	When the AP works in fit mode, it can be switched to the fat mode via an AC. When the AP works in fat mode, it can be switched to the fit mode through the local control port or Telnet mode.

# Typical Applications

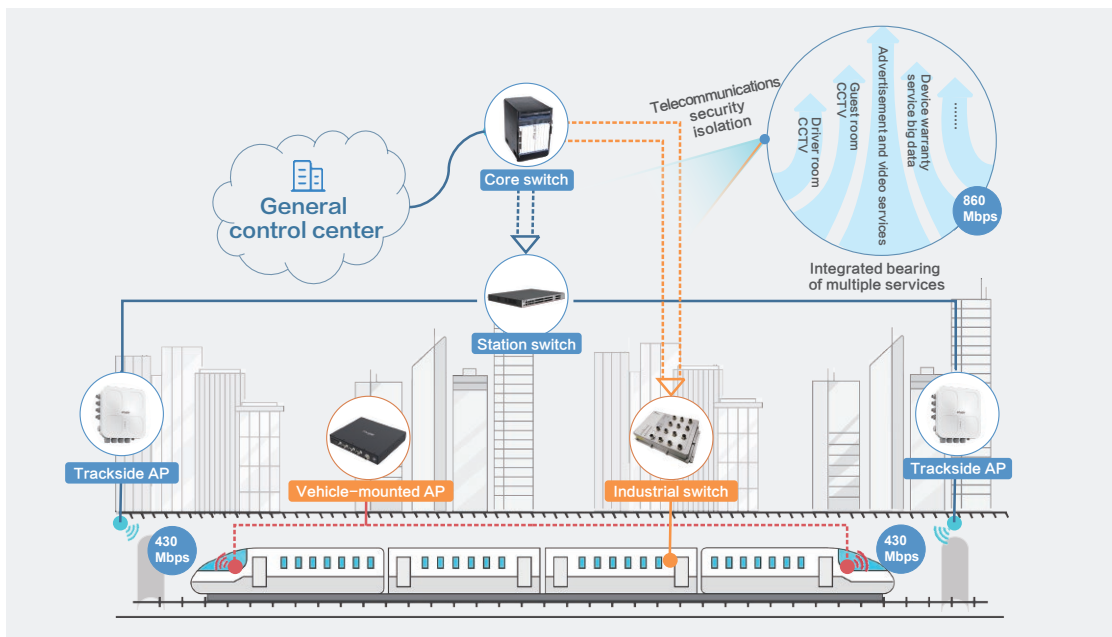
This AP is applicable to densely populated areas with simple building structures, no special obstructions, and a large capacity demand. Such areas include meeting rooms, libraries, classrooms, bars, and leisure centers. This AP can be flexibly deployed based on the environment.

The figure below shows the typical network topology of the RG-AP680-AR.



Typical Network Topology

## Integrated bearer network topology in subway coverage



Integrated Bearer Network Topology in Subway Coverage

**Application features:**

- The AP is designed for industrial environments with strong electromagnetic interference and meets the GB/T 24338.5-2018 EMI design requirements.
- For wall-mounted or pole-mounted installation, the AP is equipped with aviation plugs.
- The AP has metal housing, which meets the fireproofing and fire retardant requirements.
- The operating temperature is  $-40^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ , the operating humidity is 0% to 100% RH (non-condensing), and the AP meets the IP68 rating requirements.
- The AP supports 220 V AC power supply.

## Ordering Information

Model	Description	Remarks
RG-AP680-AR	Wi-Fi 6 quad-radio enhanced industrial wireless AP, supporting 14 spatial flows, maximum access rate of 11.617 Gbps, 802.11a/b/g/n/ac and 802.11ax, PoE/PoE+/PoE++ and 100 to 240 V AC power supply (PoE+ and local power adapters need to be purchased.)	Required
RG-ANTx4-2400D	External antenna used by the RG-AP680-AR, panel directional antenna, 2.4 GHz, 4 × 4 MIMO, antenna gain of 12 dBi, and built-in feeder set: 1 m, N-N, four feeders Each RG-AP680-AR can equipped with only one feeder set.	Optional
RG-ANTx4-5000D	External antenna used by the RG-AP680-AR switches, panel directional antenna, 5 GHz, 4 × 4 MIMO, antenna gain of 12 dBi, and built-in feeder set: 1 m, N-N, four feeders Each RG-AP680-AR can equipped with two feeder sets.	Optional
RG-PL-M16-3M	Selected when local 220 V AC mains supply is used. Local external cable, M16 power cable, power cable, 3020 mm, CRCC low smoke zero halogen power cable, red, white, black, 16M-3 A, 1 A, 220 V, RoHS	Optional
RG-E-160 (10GE)	Selected when the power adapter is used for power supply. Single-port Ethernet PoE adapter; Input: 100–240 V, 50/60 Hz, 1.5 A MAX; Output: 54 V DC, 1.11 A	Optional
RG-ANT-GP-N4M	MIMO cylindrical antenna, four N-type female connectors, support for 5 GHz, directional, less wind resistance, bracket installation; 5 GHz (5 GHz–6 GHz), 4 × 4 WLAN antenna, wind pressure level > 5-level wind and 120 km/h piston wind	Optional (rail transit scenarios)
RG-Cab-NJx8-3m	Trackside feeder, eight feeders with N-J connectors (internal thread and internal needle) at both ends, 3 m in length	Optional (rail transit scenarios)

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