



Huawei

AP9131DN&AP9132DN

Access Point

Datasheet



Product Overview

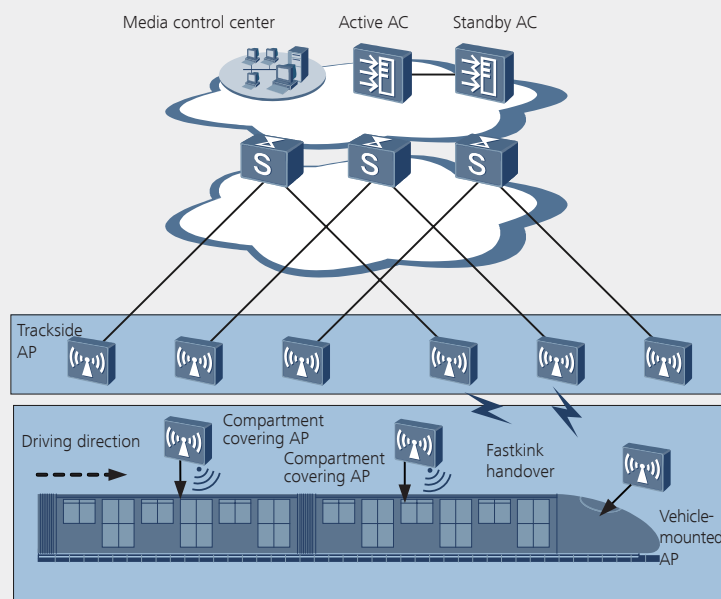
Huawei AP9131DN&AP9132DN is the latest-generation 802.11ac access point (AP) specially designed for use in rail transportation scenarios. It is compatible with IEEE 802.11a/b/g/n standards, supports 3x3 MIMO and three spatial streams, and offers a rate of up to 1.75 Gbit/s, enabling a gigabit network bandwidth. The AP9131DN&AP9132DN can work independently as a Fat AP. It uses industrial anti-vibration M12 ports, complies with EN50155 vehicle-mounted electronic equipment standards, and supports fast handover, meeting train-ground backhaul network deployment requirements. In Fit AP mode, the AP9131DN&AP9132DN can implement dual-band coverage in compartments, and the AP9132DN supports wireless bridging between compartments, providing stable wireless services for passengers.



AP9131DN&AP9132DN

- 802.11ac Wave 1 standards compliance, delivering services simultaneously on 2.4G and 5G radios; 450 Mbit/s at 2.4 GHz; 1.3 Gbit/s at 5 GHz; and 1.75 Gbit/s for the device
- External dual-band antenna (2.4 GHz and 5 GHz) with considerable flexibility in coordinating antenna directions, ensuring full coverage
- Soft handover technology that sets up links before link handovers to implement train-ground fast link handover and minimize packet loss during the handover
- Uses high-level materials, an overall heat dissipation design, and industrial M12 anti-vibration connectors for power and Ethernet ports and can work in a wide temperature range from -40° C to +65° C, meeting water- and dust-proof, and anti-vibration requirements of vehicle-mounted deployment scenarios.

Typical Networking



Train-ground communications and compartment coverage

On the preceding network, the AP9131DN&AP9132DN can work as a trackside AP, vehicle-mounted AP, and compartment-coverage AP.

- AP9131DN&AP9132DNs can work as trackside APs in Fit AP mode to communicate with vehicle-mounted APs, and are uniformly managed on the access controller.
- Placed at the front and rear of a train, AP9131DN&AP9132DNs can work as vehicle-mounted APs in Fat AP mode. They support fast link handover within 50 ms, enabling a high-speed and stable train-ground backhaul network.
- The AP9131DN&AP9132DNs can also work in Fit AP mode to provide signal coverage in compartments, offering passengers WLAN access on 2.4 and 5 GHz frequency bands.
- In Fit AP mode, the AP9132DNs can use the 2.4 GHz frequency band for signal coverage in compartments and the 5 GHz frequency band for wireless bridging, facilitating deployment.

Feature Description..... //

802.11ac GE access

- The AP supports the 80-MHz bandwidth mode. Frequency bandwidth increase brings extended channels and more sub-carriers for data transmission, and a 2.16 times higher rate. High Quadrature Amplitude Modulation (HQAM) at 256-QAM increases the 5 GHz radio rate to 1.3 Gbit/s. The throughput of 802.11ac APs is twice that of traditional APs.

Train-ground fast link handover

- Huawei Wi-Fi-based train-ground fast link handover offers many technology advantages, including low latency, high reliability, large bandwidth, and zero packet loss.
- **Low latency**
 - The vehicle-mounted AP9131DN&AP9132DN sets up links with multiple trackside APs simultaneously and chooses the optimal link as data backhaul link. The corresponding trackside AP works as the data backhaul AP. During the link handover, the vehicle-mounted AP does not need to associate or negotiate keys with the trackside AP to switch to because a link is already established between them. This greatly reduces the link handover delay.
- **High reliability**
 - The implementation of Huawei AP9131DN&AP9132DN's fast link handover is similar to soft handover, where multiple links are set up simultaneously to ensure that data can be backhauled over another link when the current backhaul link deteriorates. To ensure reliable signals, Huawei's link handover algorithm introduces the filtering algorithm to process signals and the P/N criterion to help determine link handovers. In addition, the signal lower and upper RSSI limits can be specified, based on which the algorithm controls the signal RSSI of the backhaul link within the allowed range, so that the signals do not fluctuate too much.
- **High bandwidth**
 - Huawei's AP9131DN&AP9132DN supports IEEE 802.11ac, provides a rate of up to 1.3 Gbit/s at the 5G frequency band and 1.75 Gbit/s for the entire device, and complies with IEEE 802.11a/b/g/n.
- **Zero packet loss**
 - Huawei's fast link handover technology achieves almost zero packet loss during link handovers. After routing multicast traffic to the new trackside AP, the vehicle-mounted AP9131DN&AP9132DN replaces the back-end network to send an IGMP Leave packet. That is, before receiving multicast data from the new trackside AP, the vehicle-mounted AP still receives multicast data from the original trackside AP. Before a link handover, the AP9131DN&AP9132DN transmits unicast packets with the originally associated AP; after the link handover, the AP9131DN&AP9132DN transmits unicast packets with the newly associated AP.

Basic Specifications..... //**Hardware specifications**

	Item	Description
Technical specifications	Dimensions (H xW x D)	40 mm x 180 mm x 100 mm
	Weight	1.2 kg
	Interface type	1 x 10/100/1000M self-adaptive Ethernet interface (M12, PoE) 1 x 100/1000M Ethernet optical interface (eSFP) 1 x Management console interface (RJ45)
	LED indicator	SYS indicator: indicates the power-on, startup, running, alarm, and fault status of the system. Link/ACT indicator: indicates the Ethernet interface connection status and data transmission status. Wireless indicator: indicates the signal strength or service traffic.
Power specifications	Power input	DC power supply: 48 V rated voltage; voltage range: 33.6 V to 60 V PoE power: -48 V DC (in compliance with IEEE 802.3at) NOTE The AP does not support AC power supply. If AC power supply is required, use a PoE adapter. Ensure that the installation position of the PoE adapter meets requirements.
	Maximum power consumption	AP9131DN: Compartment coverage scenarios: 17.5W Trackside single-5G scenarios: 12.5W AP9132DN: Compartment coverage scenarios: 17.5W Trackside single-5G scenarios: 12.5W NOTE: The actual maximum power consumption depends on local laws and regulations.
Environmental specifications	Operating temperature	-40°C to +65°C
	Storage temperature	-40°C to +70°C
	Operating humidity	5% to 95% (non-condensing)
	Dustproof and waterproof grade	IP41
	Altitude	-60 m to +5000 m
	Atmospheric pressure	70 kPa to 106 kPa
Radio specifications	Antenna type	AP9131DN: external antennas, 3 x QMA female connectors (2.4G/5G combined) AP9132DN: external antennas, 6 x QMA female radio interfaces (three 2.4G/5G dual-band interfaces and three 2.4G interfaces)
	Maximum number of VAPs for each radio	16
	Maximum number of users	≤ 256

Item	Description
Radio specifications	AP9131DN: 2.4G: 25dBm(combined power); 5G: 25dBm(combined power) AP9132DN: 2.4G: 26dBm(combined power); 5G: 25dBm(combined power) NOTE <ul style="list-style-type: none"> The 2.4 GHz radio does not support the 40 MHz channel bandwidth in FCC compliance regions (including America). The actual transmit power depends on local laws and regulations. You can adjust the transmit power from the maximum transmit power to 1 dBm, with a step of 1 dB
	Power increment
Channel rate	802.11a: 6, 9, 12, 18, 24, 36, 48, and 54 Mbit/s
	802.11b: 1, 2, 5.5, and 11 Mbit/s
	802.11g: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, and 54 Mbit/s
	802.11n: 6.5 to 450 Mbit/s
	802.11ac: 6.5 to 1300 Mbit/s
Receiver sensitivity	2.4 GHz 802.11b (CCK): -93 dBm @ 1 Mb/s; -86 dBm @ 11 Mb/s
	2.4 GHz 802.11g (non-HT20): -83 dBm @ 6 Mb/s; -71 dBm @ 54 Mb/s
	2.4 GHz 802.11n (HT20): -83 dBm @ MCS0/8; -68 dBm @ MCS7/15
	2.4 GHz 802.11n (HT40): -81 dBm @ MCS0/8; -65 dBm @ MCS7/15
	5 GHz 802.11a (non-HT20): -87 dBm @ 6 Mb/s; -70 dBm @ 54 Mb/s
	5 GHz 802.11n (HT20): -88 dBm @ MCS0/8; -67 dBm @ MCS7/15
	5 GHz 802.11n (HT40): -85 dBm @ MCS0/8; -64 dBm @ MCS7/15
	5 GHz 802.11ac (VTH20): -88 dBm @ MCS0NSS1; -63 dBm @ MCS8NSS1
	5 GHz 802.11ac (VTH40): -85 dBm @ MCS0NSS1; -57 dBm @ MCS9NSS1
	5 GHz 802.11ac (VTH80): -82 dBm @ MCS0NSS1; -57 dBm @ MCS9NSS1

Software specifications

Item	Description
WLAN features	<ul style="list-style-type: none"> • Compliance with IEEE 802.11a/b/g/n/ac • 3x3 MIMO; maximum rate of 1.75 Gbit/s • Maximum Ratio Combining (MRC) • Cyclic Delay Diversity (CDD)/Cyclic Shift Diversity (CSD) • Space Time Block Code (STBC) • 802.11n Beamforming • Low-Density Parity-Check (LDPC) • Maximum Likelihood Detection (MLD) • Data unit aggregation, including A-MPDU (Tx/Rx) and A-MSDU (Rx only) • 802.11 Dynamic Frequency Selection (DFS) • Short Guard Interval (GI) in 20 MHz, 40 MHz, and 80 MHz modes • Priority mapping and packet scheduling based on a Wi-Fi Multimedia (WMM) profile to implement priority-based data processing and forwarding • Automatic and manual rate adjustment (the rate is adjusted automatically by default) • WLAN channel management and channel rate adjustment • Automatic channel scanning and interference avoidance • Service Set Identifier (SSID) hiding, support for SSIDs in Chinese • Signal Sustain Technology (SST) • Unscheduled Automatic Power Save Delivery (U-APSD) • Mesh link fast handover • Dual-MPP Mesh networking in Fit AP mode • Hotspot2.0 in Fit AP mode • 802.11k and 802.11v smart roaming in Fit AP mode • Fast roaming (≤ 50 ms)
Network features	<ul style="list-style-type: none"> • Compliance with IEEE 802.3u • Auto-negotiation of the rate and duplex mode; automatic switchover between the Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDI-X) • SSID-based VLAN assignment • 4094 VLAN IDs (1 to 4094) and a maximum of 16 virtual APs (VAPs) for each radio • AP control channel in tagged and untagged mixed mode • STA isolation in the same VLAN • Multicast Domain Name Service (mDNS) gateway protocol: supports AirPlay and AirPrint service sharing between users of different VLANs • Access control lists (ACLs) • Link Layer Discovery Protocol (LLDP) • Network Address Translation (NAT) • Soft Generic Routing Encapsulation (GRE) • IPv6 Portal • IPv6 Source Address Validation Improvements (SAVI) • IPv4/IPv6 ACL • Network Address Translation (NAT)

Item	Description
QoS features	<ul style="list-style-type: none"> • Priority mapping and packet scheduling based on a WMM profile to implement priority-based data processing and forwarding • WMM parameter management for each radio • WMM power saving • Priority mapping for upstream packets and flow-based mapping for downstream packets • Queue mapping and scheduling • User-based bandwidth limiting • Adaptive bandwidth management (the system dynamically adjusts bandwidth based on the number of users and radio environment to improve user experience) • Airtime scheduling • Support for Microsoft Lync APIs and high voice call quality through Lync API identification and scheduling
Security features	<ul style="list-style-type: none"> • Open system authentication • WEP authentication/encryption • WPA/WPA2-PSK authentication and encryption • WPA/WPA2-802.1x authentication and encryption • WPA-WPA2 authentication • WAPI authentication and encryption • WIDS including rogue AP and STA detection, attack detection, STA/AP blacklist and whitelist • 802.1x authentication, MAC address authentication, and Portal authentication • 802.11w Protected Management Frames (PMFs)
Maintenance features	<ul style="list-style-type: none"> • Local AP management through the serial port or using Telnet • Real-time configuration monitoring and fast fault location using the NMS • System status alarm • STelnet using Secure Shell (SSH) v2 • Secure File Transfer Protocol (SFTP) using SSH v2 • Web local AP management through HTTP or HTTPS in Fat AP mode • Simple Network Management Protocol (SNMP) v1/v2/v3 in Fat AP mode • Network Time Protocol (NTP) in Fat AP mode • Unified management and maintenance on the AC in Fit AP mode • Automatic login and configuration loading, and plug-and-play (PnP) in Fit AP mode • WDS zero-configuration deployment in Fit AP mode • Mesh network zero-configuration deployment in Fit AP mode • Batch upgrade in Fit AP mode

Standards compliance

Item	Description
Vehicle-mounted electronic equipment standards	EN 50155
Safety standards	UL 60950-1 UL 60950-22 CAN/CSA 22.2 No.60950-1 CAN/CSA 22.2 No.60950-22 EN 60950-1 EN 60950-22 IEC 60950-1 IEC 60950-22 GB 4943
Radio standards	ETSI EN 300 328 ETSI EN 301 893 FCC Part 15C: 15.247 FCC Part 15C: 15.407 RSS-210 AS/NZS 4268 FCC Part 15.107 and 15.109
EMC standards	EN 301 489-1 EN 301 489-17 ETSI EN 60601-1-2 FCC Part 15 ICES-003 YD/T 1312.2-2004 ITU k.21 GB 9254 GB 17625.1 AS/NZS CIPSR22 EN 55022 EN 55024 CISPR 22 CISPR 24 IEC61000-4-6 IEC61000-4-2

Item	Description
IEEE standards	IEEE 802.11a/b/g IEEE 802.11n IEEE 802.11ac IEEE 802.11h IEEE 802.11d IEEE 802.11e IEEE 802.11k IEEE 802.11u IEEE 802.11v IEEE 802.11w
Security standards	802.11i, Wi-Fi Protected Access 2 (WPA2), WPA 802.1x Advanced Encryption Standards (AES), Temporal Key Integrity Protocol (TKIP), and Extensible Authentication Protocol (EAP) types: <ul style="list-style-type: none"> • EAP-Transport Layer Security (TLS) • EAP-Tunneled TLS (TTLS) or Microsoft Challenge Handshake Authentication Protocol Version 2 (MSCHAPv2) • Protected EAP (PEAP) v0 or EAP-MSCHAPv2 • EAP-Flexible Authentication via Secure Tunneling (FAST) • PEAP v1 or EAP-Generic Token Card (GTC) EAP-Subscriber Identity Module (SIM)
Environmental standards	ETSI 300 019-2-1 ETSI 300 019-2-2 ETSI 300 019-2-4 IEC 60068-2-52 ETSI 300 019-1-1 ETSI 300 019-1-2 ETSI 300 019-1-4
EMF	CENELEC EN 62311 CENELEC EN 50385 OET65 RSS-102 FCC Part 1&2 FCC KDB series
RoHS	Directive 2002/95/EC & 2011/65/EU
Reach	Regulation 1907/2006/EC
WEEE	Directive 2002/96/EC & 2012/19/EU
Certifications	Wi-Fi Alliance (WFA) certified 802.11a/b/g/n/ac

Professional Service and Support

Huawei WLAN planning tools deliver expert network design and optimization services using the most professional simulation platform in the industry. Backed by fifteen years of continuous investment in wireless technologies, extensive network planning and optimization experience, and rich expert resources, Huawei helps customers:

- Design, deploy, and operate a high-performance network that is reliable and secure.
- Maximize return on investment and reduce operating expenses.

More Information

For more information, please visit <http://e.huawei.com/en/> or contact your local Huawei office.



Enterprise Services



Product Overview





Marketing Documentation

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HUAWEI TECHNOLOGIES CO.,LTD.
Huawei Industrial Base
Bantian Longgang
Shenzhen 518129,P.R.China
Tel: +86 755 28780808

www.huawei.com