



Huawei AirEngine 5561-12 Access Point Datasheet

Product Overview

Huawei AirEngine 5561-12 is an indoor AP in compliance with Wi-Fi 6 (802.11ax). It can simultaneously provide services on 2.4 GHz (2x2 MIMO) and 5 GHz (2x2 MIMO) frequency bands, achieving a device rate of up to 1.775 Gbit/s. Built-in smart antennas of the AP enable always-on Wi-Fi signals for users, significantly enhancing users' wireless experiences. This AP features high bandwidth and high concurrency with compact size, facilitating flexible deployment and saving customers' investment. These strengths make the AirEngine 5561-12 ideal for scenarios requiring high bandwidth and high-quality network experience, such as small and midsize enterprise offices, education, and healthcare.



AirEngine 5561-12

- Dual-radio mode: 2.4 GHz (2x2 MIMO) + 5 GHz (2x2 MIMO), achieving rates of up to 575 Mbps and 1.2 Gbit/s, respectively, and 1.775 Gbit/s for the device.
- 2 x GE port.
- Built-in smart antennas to provide precise coverage for STAs, reduce interference, and improve signal quality.
- Built-in IoT slots (PCIe) and USB port for IoT expansion such as ZigBee and RFID.
- Supports Bluetooth serial interface-based O&M through built-in Bluetooth and CloudCampus APP.
- Supports the Fat, Fit, and cloud three working modes.

NOTE

- *The device rate is the theoretical speed of Wi-Fi and may vary based on different environments or devices.*

Feature Descriptions

Wi-Fi 6 (802.11ax) standards

- As the latest generation Wi-Fi standards of IEEE 802.11, 802.11ax improves user experience in high-density access scenarios and supports 2.4 GHz and 5 GHz frequency bands.
- MU-MIMO on both the 2.4 GHz and 5 GHz frequency bands, allowing an AP to transmit data to and receive data from multiple STAs simultaneously and multiplying the utilization of radio spectrum resources.
- 1024QAM modulation, improving data transmission efficiency by 25% compared with 802.11ac (256QAM).
- OFDMA scheduling enables multiple users to receive and send information at the same time, reducing latency and improving network efficiency.
- Spatial reuse (SR) technology uses basic service set (BSS) coloring to enable APs and STAs to distinguish BSSs, minimizing co-channel interference.
- The target wake time (TWT) allows APs and STAs to negotiate the sleep and wake time with each other, thereby improving the battery life of the STAs.

MU-MIMO

The AP supports MU-MIMO and supports a maximum of four spatial streams, two spatial streams at 2.4 GHz (2x2 MIMO) and two spatial streams at 5 GHz (2x2 MIMO). The MU-MIMO technology enables an AP to send data to multiple STAs simultaneously, which doubles the radio spectrum resource usage, increases the number of access users and bandwidth, and improves user experience in high-density access scenarios.

Smart antenna array technology

The AP equipped with the dual-band smart antenna array and intelligent switchover algorithm can intelligently detect the application environment and access density, achieving more accurate signal coverage and interference suppression. This design helps provide the optimal signal coverage direction and signal quality for each mobile access STA, bringing seamless and smooth wireless network access experience to the users.

High-speed access

New Wi-Fi 6 technologies such as 1024QAM modulation, more subcarriers, and more efficient Symbol scheduling enable the 2.4 GHz radio rate to reach 0.575 Gbit/s, the 5 GHz radio rate to reach 1.2 Gbit/s, and the device rate to reach 1.775 Gbit/s.

High Density Boost technology

Huawei uses the following technologies to address challenges in high-density scenarios, including access problems, data congestion, and poor roaming experience:

SmartRadio for air interface optimization

- Load balancing during smart roaming: The load balancing algorithm can work during smart roaming for load balancing detection among APs on the network after STA roaming to adjust the STA load on each AP, improving network stability.
- Intelligent DFA technology: The dynamic frequency assignment (DFA) algorithm is used to automatically detect adjacent-channel and co-channel interference, and identify any 2.4 GHz redundant radio. Through automatic inter-AP negotiation, the redundant radio is automatically switched to another mode (dual-5G AP models support 2.4G-to-5G switchover) or is disabled to reduce 2.4 GHz co-channel interference and increase the system capacity.
- Intelligent conflict optimization technology: The dynamic enhanced distributed channel access (EDCA) and airtime scheduling algorithms are used to schedule the channel occupation time and service priority of each user. This ensures that each user is assigned relatively equal time for using channel resources and user services are scheduled in an orderly manner, improving service processing efficiency and user experience.

Air interface performance optimization

- In high-density scenarios where many users access the network, increased number of low-rate STAs consumes more resources on the air interface, reduces the AP capacity, and lowers user experience. Therefore, Huawei APs will check the signal strength of STAs during access and rejects access from weak-signal STAs. At the same time, the APs monitor the rate of online STAs in real time and forcibly disconnect low-rate STAs so that the STAs can reassociate with APs that have stronger signals. The terminal access control technology can increase air interface use efficiency and allow access from more users.

5G-prior access (band steering)

- The APs support both 2.4 GHz and 5 GHz frequency bands. The 5G-prior access function enables an AP to steer STAs to the 5 GHz frequency band first, which reduces load and interference on the 2.4 GHz frequency band, improving the user experience.

Wired and wireless dual security guarantee

To ensure data security, Huawei APs integrate wired and wireless security measures and provide comprehensive security protection.

Authentication and encryption for wireless access

- The APs support WEP, WPA/WPA2-PSK, WPA3-SAE, WPA/WPA2-PPSK, WPA/WPA2/WPA3-802.1x, and WAPI authentication/encryption modes to ensure security of the wireless network. The authentication mechanism is used to authenticate user identities so that only authorized users can access network resources. The encryption mechanism is used to encrypt data transmitted over wireless links to ensure that the data can only be received and parsed by expected users.

Analysis on non-Wi-Fi interference sources

- Huawei APs can analyze the spectrum of non-Wi-Fi interference sources and identify them, including baby monitors, Bluetooth devices, digital cordless phones (at 2.4 GHz frequency band only), wireless audio transmitters (at both the 2.4 GHz and 5 GHz frequency bands), wireless game controllers, and microwave ovens. Coupled with Huawei NCE-Campus, the precise locations of the interference sources can be detected, and the spectrum of them displayed, enabling the administrator to remove the interference in a timely manner.

Rogue device monitoring

- Huawei APs support WIDS/WIPS, and can monitor, identify, defend, counter, and perform refined management on the rogue devices, to provide security guarantees for air interface environment and wireless data transmission.

Wired access authentication and encryption for the AP

- The AP access control ensures validity of APs. The CAPWAP link protection, DTLS/IPsec encryption and hardware encryption provide security assurance, improving data transmission security between the AP and the AC.

Automatic radio calibration

Automatic radio calibration allows an AP to collect signal strength and channel parameters of surrounding APs and generate an AP topology according to the collected data. Based on the interference caused by authorized APs, rogue APs, and No Wi-Fi APs and their loads, each AP automatically adjusts its transmit power and working channel to make the network operate at the optimal performance. In this way, network reliability and user experience are improved.

Automatic application identification

Huawei APs support smart application control technology and can implement visualized control on Layer 4 to Layer 7 applications.

Traffic identification

- Coupled with Huawei WLAN ACs, the APs can identify over 6000 common applications in various office scenarios. Based on the identification results, policy control can be implemented on user services, including priority adjustment, scheduling, blocking, and rate limiting to ensure efficient bandwidth resource and improve quality of key services.

Traffic statistics collection

- Traffic statistics of each application can be collected globally, by SSID, or by user, enabling the network administrator to know application use status on the network. The network administrator or operator can implement visualized control on service applications on smart terminals to enhance security and ensure effective bandwidth control.

Leader AP

The leader AP integrates some WLAN AC functions and can be used to manage Fit APs in small- and medium-sized enterprises and stores, implementing WLAN AC-free access not requiring licenses and saving customer investment.

Cloud-based Management

The AP can be managed via cloud, then no need to deploy a WLAN AC and an authentication server. In cloud-based management mode, abundant authentication functions, such as pre-shared key (PSK) authentication, Portal authentication, SMS authentication, and social media authentication, can be implemented. This mode significantly simplifies the networking and reduces the capital expenditure (CAPEX). In addition, multiple advanced functions, such as online cloud-based network planning, cloud-based deployment, cloud-based inspection, and cloud-based O&M, can be implemented through Huawei cloud management platform. In multi-branch deployment scenarios, cloud APs are pre-configured on the cloud management platform firstly. Then on site, you only need to power on the cloud APs and connect them to switch ports, then scan the QR code to implement AP plug-and-play. Pre-configurations are automatically delivered to devices, greatly shortening the network deployment time. The cloud management platform can monitor the network status, device status, and terminal connection status of all sites of a tenant in a comprehensive and intuitive manner to learn the network and service running status in real time.

Basic Specifications

Fat/Fit AP mode

Item	Description
WLAN features	<p>Compliance with IEEE 802.11ax and compatibility with IEEE 802.11a/b/g/n/ac/ac Wave 2</p> <p>Maximum ratio combining (MRC)</p> <p>Space time block code (STBC)</p> <p>Cyclic Delay Diversity (CDD)/Cyclic Shift Diversity (CSD)</p> <p>Beamforming</p> <p>Multi-user multiple-input multiple-output (MU-MIMO)</p> <p>Orthogonal frequency division multiple access (OFDMA)</p> <p>Compliance with 1024-quadrature amplitude modulation (QAM) and compatibility with 256-QAM, 64-QAM, 16-QAM, 8-QAM, quadrature phase shift keying (QPSK), and binary phase shift keying (BPSK)</p> <p>Target wake time (TWT)</p> <p>Low-density parity-check (LDPC)</p> <p>Frame aggregation, including A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx)</p> <p>802.11 dynamic frequency selection (DFS)</p> <p>Short guard interval (GI) in 20 MHz, 40 MHz, 80 MHz modes</p> <p>Priority mapping and scheduling that are compliant with Wi-Fi multimedia (WMM) to implement priority-based data processing and forwarding. Automatic and manual rate adjustment (the rate is adjusted automatically by default)</p> <p>WLAN channel management and channel rate adjustment</p> <p>NOTE</p> <p><i>For detailed management channels, see the Country Code & Channel Compliances.</i></p> <p>Automatic channel scanning and interference avoidance</p> <p>Service set identifier (SSID) hiding</p> <p>Signal sustain technology (SST)</p> <p>Unscheduled automatic power save delivery (U-APSD)</p> <p>Control and Provisioning of Wireless Access Points (CAPWAP) in Fit AP mode</p> <p>Extended Service Set (ESS) in Fit AP mode</p> <p>Multi-user call admission control (CAC)</p> <p>Advanced cellular coexistence (ACC), minimizing the impact of interference from cellular networks</p> <p>802.11k and 802.11v smart roaming</p> <p>802.11r fast roaming (≤ 50 ms)</p>
Network features	<p>Compliance with IEEE 802.3ab</p> <p>Auto-negotiation of the rate and duplex mode and automatic switchover between the Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDI-X)</p> <p>Compliance with IEEE 802.1q</p> <p>SSID-based VLAN assignment</p> <p>VLAN trunk on uplink Ethernet ports</p> <p>Management channel of the AP uplink port in tagged and untagged mode</p> <p>DHCP client, obtaining IP addresses through DHCP</p> <p>Tunnel data forwarding and direct data forwarding</p> <p>Application identification and QoS classification when AP local forwarding (also called direct forwarding), which can significantly improve voice quality for applications such as Skype, QQ, and WeChat</p>

Item	Description
	STA isolation in the same VLAN IPv4/IPv6 access control lists (ACLs) Link Layer Discovery Protocol (LLDP) Uninterrupted service forwarding upon CAPWAP channel disconnection in Fit AP mode Unified authentication on the AC in Fit AP mode AC dual-link backup in Fit AP mode Network Address Translation (NAT) in Fat AP mode IPv6 in Fit AP mode Telemetry in Fit AP mode, quickly collecting AP status and application experience parameters IPv6 Source Address Validation Improvements (SAVI) Multicast Domain Name Service (mDNS) gateway protocol
QoS features	Priority mapping and scheduling that are compliant with Wi-Fi multimedia (WMM) 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 (automatic bandwidth adjustment based on the user quantity and radio environment) to improve user experience Airtime scheduling Air interface HQoS scheduling Intelligent multimedia scheduling
Security features	Open system authentication WEP authentication/encryption using a 64-bit, 128-bit, 152-bit or 192-bit encryption key WPA2-PSK authentication and encryption (WPA2-Personal) WPA2-802.1X authentication and encryption (WPA2-Enterprise) WPA3-SAE authentication and encryption (WPA3-Personal) WPA3-802.1X authentication and encryption (WPA3-Enterprise) WPA-WPA2 hybrid authentication WPA2-WPA3 hybrid authentication WPA2-PPSK authentication and encryption in Fit AP mode WAPI authentication and encryption Wireless intrusion detection system (WIDS) and wireless intrusion prevention system (WIPS), including rogue device detection and containment, attack detection and dynamic blacklist, and STA/AP blacklist and whitelist 802.1x authentication, MAC address authentication, and Portal authentication DHCP snooping Dynamic ARP Inspection (DAI) IP Source Guard (IPSG) 802.11w Protected Management Frames (PMF) IPsec/DTLS hardware encryption
Maintenance features	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 Batch upgrade in Fit AP mode

Item	Description
	<p>Telnet</p> <p>STelnet using SSHv2</p> <p>SFTP using SSHv2</p> <p>Remote wireless O&M through the Bluetooth serial interface</p> <p>Web-based local AP management through HTTP or HTTPS in Fat AP mode</p> <p>Real-time configuration monitoring and fast fault locating using the NMS</p> <p>SNMP v1/v2/v3 in Fat AP mode</p> <p>System status alarm</p> <p>Network Time Protocol (NTP) in Fat AP mode</p>
BYOD	<p>NOTE</p> <p><i>The AP supports bring your own device (BYOD) only in Fit AP mode.</i></p> <p>Identifies the device type according to the organizationally unique identifier (OUI) in the MAC address</p> <p>Identifies the device type according to the user agent (UA) information in an HTTP packet</p> <p>Identifies the device type according to DHCP options</p> <p>The RADIUS server delivers packet forwarding, security, and QoS policies according to the device type carried in the RADIUS authentication and accounting packets</p>
Location service	<p>NOTE</p> <p><i>The AP supports the locating service only in Fit AP mode.</i></p> <p>Wi-Fi terminal location</p> <p>Working with the location server to locate rogue devices</p> <p>Bluetooth location</p>
Spectrum analysis	<p>NOTE</p> <p><i>The AP supports spectrum analysis only in Fit AP mode.</i></p> <p>Identification of multiple interference sources including Bluetooth devices, microwave ovens, cordless phones, ZigBee devices, game controllers, 2.4 GHz/5 GHz wireless video and audio devices, and baby monitors</p> <p>Working with a location server to locate interference sources and perform spectrum analysis on them</p>

Cloud-based management mode

Item	Description
WLAN features	<p>Compliance with IEEE 802.11ax and compatibility with IEEE 802.11a/b/g/n/ac/ac Wave 2</p> <p>Maximum ratio combining (MRC)</p> <p>Space time block code (STBC)</p> <p>Cyclic Delay Diversity (CDD)/Cyclic Shift Diversity (CSD)</p> <p>Beamforming</p> <p>Multi-user multiple-input multiple-output (MU-MIMO)</p> <p>Orthogonal frequency division multiple access (OFDMA)</p> <p>Compliance with 1024-quadrature amplitude modulation (QAM) and compatibility with 256-QAM, 64-QAM, 16-QAM, 8-QAM, quadrature phase shift keying (QPSK), and binary phase shift keying (BPSK)</p> <p>Low-density parity-check (LDPC)</p> <p>Frame aggregation, including A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx)</p> <p>802.11 dynamic frequency selection (DFS)</p>

Item	Description
	<p>Priority mapping and scheduling that are compliant with WMM to implement priority-based data processing and forwarding. Automatic and manual rate adjustment (the rate is adjusted automatically by default)</p> <p>WLAN channel management and channel rate adjustment</p> <p>NOTE</p> <p><i>For detailed management channels, see the Country Code & Channel Compliances.</i></p> <p>Automatic channel scanning and interference avoidance</p> <p>Service set identifier (SSID) hiding</p> <p>Signal sustain technology (SST)</p> <p>Unscheduled automatic power save delivery (U-APSD)</p>
Network features	<p>Compliance with IEEE 802.3ab</p> <p>Auto-negotiation of the rate and duplex mode and automatic switchover between the Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDI-X)</p> <p>Compliance with IEEE 802.1q</p> <p>SSID-based VLAN assignment</p> <p>DHCP client, obtaining IP addresses through DHCP</p> <p>STA isolation in the same VLAN</p> <p>Access control lists (ACLs)</p> <p>Unified authentication on the Cloud management platform</p> <p>Network Address Translation (NAT)</p>
QoS features	<p>Priority mapping and scheduling that are compliant with WMM to implement priority-based data processing and forwarding</p> <p>WMM parameter management for each radio</p> <p>WMM power saving</p> <p>Priority mapping for upstream packets and flow-based mapping for downstream packets</p> <p>Queue mapping and scheduling</p> <p>User-based bandwidth limiting</p> <p>Airtime scheduling</p> <p>Air interface HQoS scheduling</p>
Security features	<p>Open system authentication</p> <p>WEP authentication/encryption using a 64-bit, 128-bit, 152-bit or 192-bit encryption key</p> <p>WPA2-PSK authentication and encryption (WPA2-Personal)</p> <p>WPA2-802.1X authentication and encryption (WPA2-Enterprise)</p> <p>WPA3-SAE authentication and encryption (WPA3-Personal)</p> <p>WPA3-802.1X authentication and encryption (WPA3-Enterprise)</p> <p>WPA-WPA2 hybrid authentication</p> <p>WPA2-WPA3 hybrid authentication</p> <p>802.1x authentication, MAC address authentication, and Portal authentication</p> <p>DHCP snooping</p> <p>Dynamic ARP Inspection (DAI)</p> <p>IP Source Guard (IPSG)</p>
Maintenance features	<p>Unified management and maintenance on the Cloud management platform</p> <p>Automatic login and configuration loading, and plug-and-play (PnP)</p> <p>Batch upgrade</p>

Item	Description
	Telnet STelnet using SSHv2 SFTP using SSH v2 Remote wireless O&M through the Bluetooth console port Web-based local AP management through HTTP or HTTPS Real-time configuration monitoring and fast fault locating using the NMS System status alarm Network Time Protocol (NTP)

Technical Specifications

Item	Description	
Technical specifications	Dimensions (Diameter x Height)	Φ220 mm x 51 mm
	Weight	1.09 kg
	Interface type	1 x 10M/100M/1GE (RJ45, PoE in) 1 x 10M/100M/1GE (RJ45) 1 x USB2.0
	IoT expansion	Built-in IoT slots (PCIe, two small cards or one large card), supporting IoT expansion such as ZigBee, RFID, and Thread
	Bluetooth	BLE 5.2
	LED indicator	Indicates the power-on, startup, running, alarm, and fault states of the system.
Power specifications	Power input	<ul style="list-style-type: none"> DC: 12 V ± 10% PoE power supply: in compliance with 802.3af NOTE <i>In 802.3af power supply mode, some functions of the AP may be restricted, for example, the USB port is unavailable. For details, see Info-Finder.</i>
	Maximum power consumption	12.63 W (excluding USB) NOTE <i>The actual maximum power consumption depends on local laws and regulations.</i>
Environmental specifications	Operating temperature	-10°C to +50°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	53 kPa to 106 kPa
Radio specifications	Antenna type	Built-in smart antennas

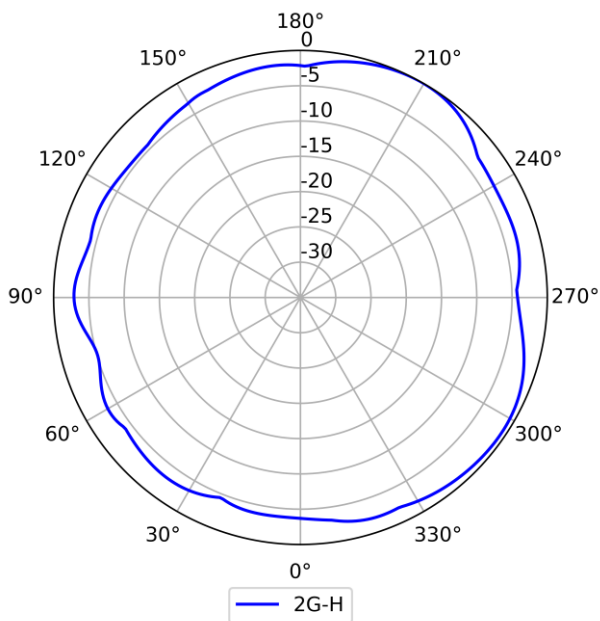
Item	Description
Antenna gain	2.4 GHz: 4 dBi 5 GHz: 5 dBi NOTE <ul style="list-style-type: none"> The gains above are the single-antenna peak gains. The equivalent antenna gain after all 2.4 GHz or 5 GHz antennas are combined is 2 dBi in 2.4 GHz or 3 dBi in 5 GHz.
Maximum number of SSIDs for each radio	≤ 16
Maximum number of users	≤ 1024 (512/Radio) NOTE <i>The actual number of users varies according to the environment.</i>
Maximum transmit power	2.4 GHz: 23 dBm (combined power) 5 GHz: 23 dBm (combined power) NOTE <i>The actual transmit power depends on local laws and regulations.</i>
Power increment	1 dBm
Maximum number of non-overlapping channels	2.4 GHz (2.412 GHz to 2.472 GHz) <ul style="list-style-type: none"> 802.11b/g <ul style="list-style-type: none"> 20 MHz: 3 802.11n <ul style="list-style-type: none"> 20 MHz: 3 40 MHz: 1 802.11ax <ul style="list-style-type: none"> 20 MHz: 3 40 MHz: 1 5 GHz (5.18 GHz to 5.825 GHz) <ul style="list-style-type: none"> 802.11a <ul style="list-style-type: none"> 20 MHz: 13 802.11n <ul style="list-style-type: none"> 20 MHz: 13 40 MHz: 6 802.11ac <ul style="list-style-type: none"> 20 MHz: 13 40 MHz: 6 80 MHz: 3 802.11ax <ul style="list-style-type: none"> 20 MHz: 13 40 MHz: 6 80 MHz: 3 NOTE <i>The table uses the number of non-overlapping channels supported by China as an example. The number of non-overlapping channels varies in different countries. For details,</i>

Item	Description
	see the Country Codes & Channels Compliance.

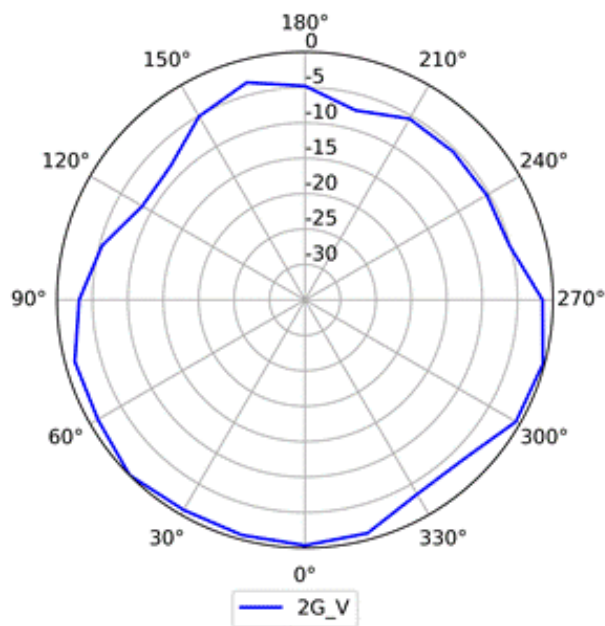
Standards Compliance

Item	Description
Safety standards	<ul style="list-style-type: none"> UL 60950-1 EN 60950-1 IEC 60950-1 UL 62368-1 EN 62368-1 IEC 62368-1 GB 4943.1 CAN/CSA 22.2 No.60950-1
Radio standards	<ul style="list-style-type: none"> ETSI EN 300 328 ETSI EN 301 893 AS/NZS 4268
EMC standards	<ul style="list-style-type: none"> EN 301 489-1 EN 301 489-17 EN 60601-1-2 EN 55024 EN 55032 EN 55035 GB 9254 GB 17625.1 GB 17625.2 AS/NZS CISPR32 CISPR 24 CISPR 32 CISPR 35 IEC/EN61000-4-2 IEC/EN 61000-4-3 IEC/EN 61000-4-4 IEC/EN 61000-4-5 IEC/EN61000-4-6 ICES-003
IEEE standards	<ul style="list-style-type: none"> IEEE 802.11a/b/g IEEE 802.11n IEEE 802.11ac IEEE 802.11ax IEEE 802.11h IEEE 802.11d IEEE 802.11e IEEE 802.11k IEEE 802.11v IEEE 802.11w IEEE 802.11r
Security standards	<ul style="list-style-type: none"> 802.11i, Wi-Fi Protected Access (WPA), WPA2, WPA2-Enterprise, WPA2-PSK, WPA3, WAPI 802.1X Advanced Encryption Standards(AES), Temporal Key Integrity Protocol(TKIP), WEP, Open EAP Type(s)
EMF	<ul style="list-style-type: none"> EN 62311 EN 50385
RoHS	<ul style="list-style-type: none"> Directive 2002/95/EC & 2011/65/EU (EU)2015/863
Reach	<ul style="list-style-type: none"> Regulation 1907/2006/EC
WEEE	<ul style="list-style-type: none"> Directive 2002/96/EC & 2012/19/EU

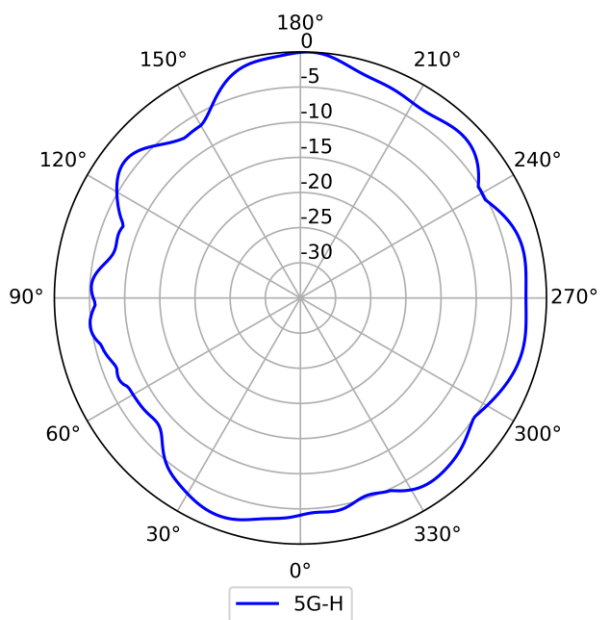
Antennas Pattern



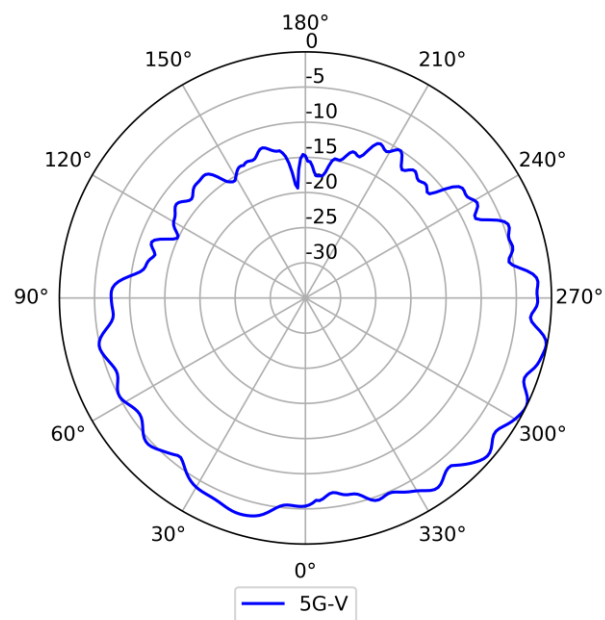
2.4G (Horizontal)



2.4G (Vertical)



5G (Horizontal)



5G (Vertical)

More Information

For more information about Huawei WLAN products, visit <http://www.huawei.com> or contact Huawei's local sales office.

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