# Huawei AirEngine 8776-X6THP Access Point Datasheet

# Product Overview

Huawei AirEngine 8776-X6THP is an indoor access point (AP) in compliance with Wi-Fi 7 (802.11be). They can simultaneously provide services on 2.4 GHz, 5 GHz, and 5 GHz frequency bands, achieving a device rate of up to 12.90 Gbit/s. They are empowered by brand-new Wi-Fi 7 technologies, significantly enhancing users' wireless network experience. These strengths make the AirEngine 8776-X6THP ideal for indoor coverage scenarios such as enterprise office, education, and healthcare.

AirEngine 8776-X6THP

- Provides services simultaneously on the 2.4 GHz (4x4 MIMO), 5 GHz (4x4 MIMO) frequency bands, and 5 GHz(4x4 MIMO) frequency bands achieving rates of up to 1.376 Gbit/s, 5.765 Gbit/s and 5.765 Gbit/s, respectively, and a maximum rate of 12.90 Gbit/s for the device.
- Built-in dynamic-zoom smart antennas that can flexibly work in omnidirectional coverage mode (for wider coverage) or high-density coverage mode (for better network performance and user experience).
- USB port can be used for external IoT expansion (supporting protocols such as ZigBee, and RFID).
- Supports Bluetooth serial interface-based O&M through built-in Bluetooth and CloudCampus APP.
- Supports Fit，Fat and cloud management working modes, and enables Huawei cloud management platform to manage and operate APs and services on the APs, reducing network O&M costs.

# Feature Descriptions

## Wi-Fi 7 (802.11be) standard

Wi-Fi 7 (802.11be) is the Wi-Fi standard, also known as IEEE 802.11be or extremely high throughput (EHT). Based on Wi-Fi 6, Wi-Fi 7 introduces technologies such as 4096-quadrature amplitude modulation (QAM), multi-resource unit (MRU), multi-link operation (MLO), enhanced multi-user multiple-input multiple-output (MU-MIMO). Drawing on these cutting-edge technologies, Wi-Fi 7 delivers a higher data transmission rate and lower latency than Wi-Fi 6.

## New Features in Wi-Fi 7

### Multi-RU

In Wi-Fi 6, each user can send or receive frames only on the RUs allocated to them, which greatly limits the flexibility of spectrum resource scheduling. To resolve this problem and further improve spectrum efficiency, Wi-Fi 7 defines a mechanism for allocating multiple RUs to a single user. To balance the implementation complexity and spectrum utilization, the standard specifications impose certain restrictions on RU combination. That is, small RUs (containing fewer than 242 tones) can be combined only with small RUs, and large RUs (containing greater than or equal to 242 tones) can be combined only with large RUs. Small RUs and large RUs can be combined together.

### Higher-Order 4096-QAM

The highest order modulation supported by Wi-Fi 6 is 1024-QAM, which allows each modulation symbol to carry up to 10 bits. To further improve the rate, Wi-Fi 7 introduces 4096-QAM so that each modulation symbol can carry 12 bits. With the same coding, 4096-QAM in Wi-Fi 7 can achieve a 20% rate increase compared with 1024-QAM in Wi-Fi 6.

### Multi-Link Mechanism

To efficiently utilize all available spectrum resources, the industry is in urgent need to introduce new spectrum management, coordination, and transmission mechanisms on the 2.4 GHz, 5 GHz, and 5 GHz frequency bands. The TGbe defines multi-link

aggregation technologies, including the MAC architecture of enhanced multi-link aggregation, multi-link channel access, and multi-link transmission.

There are two modes as for MLO:

- High-concurrency mode, multiple links send different data to improve bandwidth.
- High-reliability mode, multiple links send the same data, improving reliability.

### Wi-Fi Shield

Wi-Fi Shield is an innovative wireless security technology developed by Huawei. It transmits extra interference signals to ensure that only the target terminal can accurately receive data packets and signals, preventing malicious users from listening. The Wi-Fi shield function is supported. Eavesdropping terminals cannot capture packets over the air interface.

### Wi-Fi CSI Sensing

Wi-Fi CSI sensing is a cutting-edge technology for implementing sensing by using channel state information (Channel State Information, CSI) generated during radio signal propagation. Based on the Wi-Fi 7 standard, Huawei innovatively introduces Wi-Fi CSI to sense the presence of personnel, so that Wi-Fi signals can be sensed wherever they are. Compared with cameras, it protects user privacy and applies to scenarios such as energy saving, health care, and smart security.

### iCSSR

Intelligent coordinated scheduling and spatial reuse (iCSSR) enables multiple APs to collaboratively schedule transmission timeslots and parameters, allowing them to operate on the same channel. This significantly improves spectrum efficiency and boosts overall network performance.

### 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.

## Basic Specifications

### Fit AP mode

| Item | Description |
| --- | --- |
| WLAN features | Compliance with IEEE 802.11be and compatibility with IEEE 802.11a/b/g/n/ac/ax<br>Maximum ratio combining (MRC)<br>Space time block code (STBC)<br>Cyclic Delay Diversity (CDD)/Cyclic Shift Diversity (CSD)<br>Beamforming<br>Multi-user multiple-input multiple-output (MU-MIMO)<br>Orthogonal frequency division multiple access (OFDMA)<br>Preamble puncturing<br>BSS Color<br>TxBF<br>TWT<br>DPD<br>Compliance with 4096-quadrature amplitude modulation (QAM) and compatibility with 1024-QAM, 256-QAM, 64-QAM, 16-QAM, 8-QAM, quadrature phase shift keying (QPSK), and binary phase shift keying (BPSK)<br>Low-density parity-check (LDPC)<br>Frame aggregation, including A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx) |

| Item | Description |
| --- | --- |
| | 802.11 dynamic frequency selection (DFS)<br>Short guard interval (GI) in 20 MHz, 40 MHz, 80 MHz, 160 MHz modes<br>Wi-Fi multimedia (WMM) for priority-based data processing and forwarding<br>WLAN channel management and channel rate adjustment<br>**NOTE**<br>For detailed management channels, see the Country Codes & Channels Compliance.<br>Automatic channel scanning and interference avoidance<br>Service set identifier (SSID) hiding configuration for each AP, supporting Chinese SSIDs<br>Signal sustain technology (SST)<br>Unscheduled automatic power save delivery (U-APSD)<br>Multi-user call admission control (CAC)<br>Advanced cellular coexistence (ACC), minimizing the impact of interference from cellular networks<br>802.11k and 802.11v smart roaming<br>802.11r fast roaming (≤ 50 ms)<br>Spectrum analysis<br>Terminal location<br>FTM (Fine Timing Measurement) location<br>ASFN (Advanced Same Frequency Network) |
| Network features | Compliance with IEEE 802.3ab<br>Auto-negotiation of the rate and duplex mode, and automatic switchover between Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDI-X)<br>Compatibility with IEEE 802.1Q<br>SSID-based VLAN assignment<br>Eth-Trunk function<br>Management channel of the AP's uplink port in tagged and untagged modes<br>DHCP client, obtaining IP addresses through DHCP<br>Tunnel data forwarding and direct data forwarding<br>STA isolation in the same VLAN<br>IPv4/IPv6 access control list (ACL)<br>Link Layer Discovery Protocol (LLDP)<br>Service holding when CAPWAP link disconnection in direct data forwarding mode<br>Unified authentication on the AC<br>AC dual-link backup<br>Telemetry, quickly collecting AP status and application experience parameters<br>MESH<br>HotSpot2.0<br>IPv6 SAVI |
| QoS features | WMM power save<br>Priority mapping for upstream packets and flow-based mapping for downstream packets<br>Queue mapping and scheduling<br>User-based bandwidth limiting<br>Adaptive bandwidth management (automatic bandwidth adjustment based on the user quantity and radio environment) to improve user experience<br>Application identification and QoS classification to improve voice quality for popular applications, such as Zoom, QQ, and WeChat |

| Item | Description |
| --- | --- |
| | Airtime scheduling<br>Air interface HQoS scheduling<br>Intelligent multimedia scheduling<br>VIP bandwidth reservation<br>VIP FastPass, per-packet power control<br>Native-IP IFIT<br>iFlow<br>User-defined application |
| Security features | Open system authentication<br>WPA2-PSK authentication and encryption (WPA2-Personal)<br>WPA2-802.1X authentication and encryption (WPA2-Enterprise)<br>WPA3-SAE authentication and encryption (WPA3-Personal)<br>WPA3-802.1X authentication and encryption (WPA3-Enterprise)<br>WPA-WPA2 hybrid authentication<br>WPA2-WPA3 hybrid authentication<br>WPA/WPA2/WPA2-PPSK authentication and encryption<br>WPA/WPA2/WPA2-DPSK authentication and encryption<br>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<br>802.1X authentication, MAC address authentication, and Portal authentication<br>DHCP snooping<br>802.11w Protected Management Frames (PMF)<br>CAPWAP DTLS data encryption and decryption<br>URL filtering<br>MACsec@ Uplink Ethernet port<br>Wi-Fi Shield<br>Secure boot<br>Build-in TPM module<br>Dot1x client |
| EAP types | EAP-TLS, EAP-TTLS, EAP-PEAP, EAP-CHAP, EAP-SIM, EAP-AKA, EAP-GTC, EAP-FAST, EAP-PEAP, EAP-MD5, EAP-MSCHAPv2, PEAPv0, PEAPv1 |
| Maintenance features | Unified AP management and maintenance on the AC<br>Automatic AP onboarding, automatic configuration loading, and plug-and-play (PnP)<br>Automatic batch upgrade<br>STelnet using SSHv2<br>SFTP using SSHv2<br>Remote wireless O&M through the Bluetooth serial port<br>System status alarm<br>Unified AP management on WebMaster |
| Sensing | Wi-Fi CSI Sensing |

## Fat AP mode

| Item | Description |
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| Item | Description |
| --- | --- |
| WLAN features | Compliance with IEEE 802.11be and compatibility with IEEE 802.11a/b/g/n/ac/ax<br>Maximum ratio combining (MRC)<br>Space time block code (STBC)<br>Cyclic Delay Diversity (CDD)/Cyclic Shift Diversity (CSD)<br>Beamforming<br>Multi-user multiple-input multiple-output (MU-MIMO)<br>Orthogonal frequency division multiple access (OFDMA)<br>Preamble puncturing<br>BSS Color<br>TxBF<br>TWT<br>Compliance with 4096-quadrature amplitude modulation (QAM) and compatibility with 1024-QAM, 256-QAM, 64-QAM, 16-QAM, 8-QAM, quadrature phase shift keying (QPSK), and binary phase shift keying (BPSK)<br>Low-density parity-check (LDPC)<br>Frame aggregation, including A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx)<br>802.11 dynamic frequency selection (DFS)<br>Short guard interval (GI) in 20 MHz, 40 MHz, 80 MHz, 160 MHz modes<br>Wi-Fi multimedia (WMM) for priority-based data processing and forwarding<br>WLAN channel management and channel rate adjustment<br>**NOTE**<br>For detailed management channels, see the Country Codes & Channels Compliance.<br>Automatic channel scanning and interference avoidance<br>Service set identifier (SSID) hiding configuration for each AP, supporting Chinese SSIDs<br>Signal sustain technology (SST)<br>Unscheduled automatic power save delivery (U-APSD)<br>Advanced cellular coexistence (ACC), minimizing the impact of interference from cellular networks<br>802.11k and 802.11v smart roaming<br>802.11r fast roaming (≤ 50 ms) |
| Network features | Compliance with IEEE 802.3ab<br>Auto-negotiation of the rate and duplex mode, and automatic switchover between Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDI-X)<br>Compatibility with IEEE 802.1Q<br>SSID-based VLAN assignment<br>DHCP client, obtaining IP addresses through DHCP<br>Tunnel data forwarding and direct data forwarding<br>STA isolation in the same VLAN<br>IPv4 access control list (ACL)<br>Link Layer Discovery Protocol (LLDP)<br>Leader AP<br>NAT |
| QoS features | WMM power save<br>Priority mapping for upstream packets and flow-based mapping for downstream packets<br>Queue mapping and scheduling<br>User-based bandwidth limiting |

| Item | Description |
| --- | --- |
| | Airtime scheduling<br>Intelligent multimedia scheduling<br>VIP FastPass |
| Security features | Open system authentication<br>WPA2-PSK authentication and encryption (WPA2-Personal)<br>WPA3-SAE authentication and encryption (WPA3-Personal)<br>WPA-WPA2 hybrid authentication<br>WPA2-WPA3 hybrid authentication<br>MAC address authentication, and Portal authentication<br>DHCP snooping<br>802.11w Protected Management Frames (PMF)<br>Secure boot |
| EAP types | EAP-TLS, EAP-TTLS, EAP-PEAP, EAP-CHAP, EAP-SIM, EAP-AKA, EAP-GTC, EAP-FAST, EAP-PEAP, EAP-MD5, EAP-MSCHAPv2, PEAPv0, PEAPv1 |
| Maintenance features | STelnet using SSHv2<br>SFTP using SSHv2<br>Remote wireless O&M through the Bluetooth serial port<br>System status alarm |

## Cloud-Managed AP mode

| Item | Description |
| --- | --- |
| WLAN features | Compliance with IEEE 802.11be and compatibility with IEEE 802.11a/b/g/n/ac/ax<br>Maximum ratio combining (MRC)<br>Space time block code (STBC)<br>Cyclic Delay Diversity (CDD)/Cyclic Shift Diversity (CSD)<br>Beamforming<br>Multi-user multiple-input multiple-output (MU-MIMO)<br>Orthogonal frequency division multiple access (OFDMA)<br>Preamble puncturing<br>BSS Color<br>TxBF<br>TWT<br>Compliance with 4096-quadrature amplitude modulation (QAM) and compatibility with 1024-QAM, 256-QAM, 64-QAM, 16-QAM, 8-QAM, quadrature phase shift keying (QPSK), and binary phase shift keying (BPSK)<br>Low-density parity-check (LDPC)<br>Frame aggregation, including A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx)<br>802.11 dynamic frequency selection (DFS)<br>Short guard interval (GI) in 20 MHz, 40 MHz, 80 MHz, 160 MHz modes<br>Wi-Fi multimedia (WMM) for priority-based data processing and forwarding<br>WLAN channel management and channel rate adjustment<br>**NOTE**<br>For detailed management channels, see the Country Codes & Channels Compliance.<br>Automatic channel scanning and interference avoidance |

| Item | Description |
| --- | --- |
| | Service set identifier (SSID) hiding configuration for each AP, supporting Chinese SSIDs<br>Signal sustain technology (SST)<br>Unscheduled automatic power save delivery (U-APSD)<br>Automatic AP Online by NCE-Campus<br>Multi-user call admission control (CAC)<br>Advanced cellular coexistence (ACC), minimizing the impact of interference from cellular networks<br>802.11k and 802.11v smart roaming<br>802.11r fast roaming (≤ 50 ms)<br>Spectrum analysis<br>Terminal location<br>FTM (Fine Timing Measurement) location |
| Network features | Compliance with IEEE 802.3ab<br>Auto-negotiation of the rate and duplex mode, and automatic switchover between Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDI-X)<br>Compatibility with IEEE 802.1Q<br>SSID-based VLAN assignment<br>DHCP client, obtaining IP addresses through DHCP<br>STA isolation in the same VLAN<br>IPv4/IPv6 access control list (ACL)<br>Link Layer Discovery Protocol (LLDP)<br>Service holdover when the link to NCE-Campus is disconnected<br>Unified authentication on the cloud management platform<br>Network address translation (NAT)<br>Telemetry, quickly collecting AP status and application experience parameters<br>MESH<br>Tunnel-AC<br>IPv6 SAVI<br>HotSpot2.0 |
| QoS features | WMM power save<br>Priority mapping for upstream packets and flow-based mapping for downstream packets<br>Queue mapping and scheduling<br>User-based bandwidth limiting<br>Adaptive bandwidth management (automatic bandwidth adjustment based on the user quantity and radio environment) to improve user experience<br>Application identification and QoS classification to improve voice quality for popular applications, such as Zoom, QQ, and WeChat<br>Airtime scheduling<br>Air interface HQoS scheduling<br>Intelligent multimedia scheduling<br>VIP bandwidth reservation<br>VIP FastPass, per-packet power control<br>Native-IP IFIT<br>iFlow<br>User-defined application |

| Item | Description |
| --- | --- |
| Security features | Open system authentication<br>WPA2-PSK authentication and encryption (WPA2-Personal)<br>WPA2-802.1X authentication and encryption (WPA2-Enterprise)<br>WPA3-SAE authentication and encryption (WPA3-Personal)<br>WPA3-802.1X authentication and encryption (WPA3-Enterprise)<br>WPA-WPA2 hybrid authentication<br>WPA2-WPA3 hybrid authentication<br>WPA/WPA2/WPA2-PPSK authentication and encryption<br>WPA/WPA2/WPA2-DPSK authentication and encryption<br>802.1X authentication, MAC address authentication, and Portal authentication<br>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<br>DHCP snooping<br>802.11w Protected Management Frames (PMF)<br>CAPWAP DTLS data encryption and decryption<br>URL filtering<br>MACsec@ Uplink Ethernet port<br>Wi-Fi Shield<br>Secure boot<br>Build-in TPM module<br>Dot1x client |
| EAP types | EAP-TLS, EAP-TTLS, EAP-PEAP, EAP-CHAP, EAP-SIM, EAP-AKA, EAP-GTC, EAP-FAST, EAP-PEAP, EAP-MD5, EAP-MSCHAPv2, PEAPv0, PEAPv1 |
| Maintenance features | Unified AP management and maintenance on the cloud management platform<br>Automatic AP onboarding, automatic configuration loading, and PnP<br>Batch upgrade<br>STelnet using SSHv2<br>SFTP using SSHv2<br>Remote wireless O&M through the Bluetooth serial port<br>Real-time user configuration monitoring and fast fault locating using the NMS<br>System status alarm<br>Network Time Protocol (NTP) |
| Sensing | Wi-Fi CSI Sensing |

# Technical Specifications

| Item | | Description |
| --- | --- | --- |
| Technical specifications | Dimensions (H x W x D) | 54 mm x 265 mm x 265 mm |
| | Weight | 2.27 kg |
| | Interface type | 1 x 1G/10G SFP+<br>1 x 100M/1GE/2.5GE/5GE/10GE(RJ-45) |

| Item | | Description |
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| | | 1 x 10M/100M/1GE(RJ-45)<br>1 x USB<br>**NOTE**<br>• The 10GE (RJ-45) supports PoE input.<br>• The GE (RJ-45) supports PoE output.<br>• The 10G SFP+ supports the 10GE optical module, 2.5G optical module,1G optical module, or hybrid module (supporting PoE input). |
| | Bluetooth | Bluetooth 6.0 |
| | IoT | • Built-in multi-protocol IoT interfaces, flexibly supporting BLE, ZigBee, HomeKit, and Thread*<br>• USB port extension external IoT (Supports protocols such as ZigBee, RFID)<br>**NOTE**<br>Features marked with asterisks (*) can be implemented through software upgrade. |
| | LED indicator | Indicates the power-on, startup, running, alarm, and fault states of the system. |
| Power specifications | Power input | • 48V~57.6V<br>• PoE power supply: In compliance with 802.3bt/at<br>**NOTE**<br>When 802.3at power is supplied, the AP will operate with restrictions, and the details refer to the Info-Finder. |
| | Maximum power consumption | • 33 W (excluding USB and PoE out)<br>**NOTE**<br>The actual maximum power consumption depends on local laws and regulations. |
| Environmental specifications | Operating temperature | -10°C to +50°C<br>**NOTE**<br>The value may vary depending on the installation environment. |
| | Storage temperature | -40°C to +70°C |
| | Operating humidity | 5% to 95% |
| | Altitude | -60 m to +5000 m |
| | Atmospheric pressure | 53 kPa to 106 kPa |
| Radio specifications | Antenna type | Built-in smart antennas |
| | Antenna gain | 2.4 GHz: 4 dBi<br>5 GHz: 5 dBi<br>**NOTE**<br>The gains above are the single-antenna peak gains. |
| | Maximum number of SSIDs for each radio | 16 |
| | Maximum number of users | 1800 (600 per radio)<br>**NOTE** |

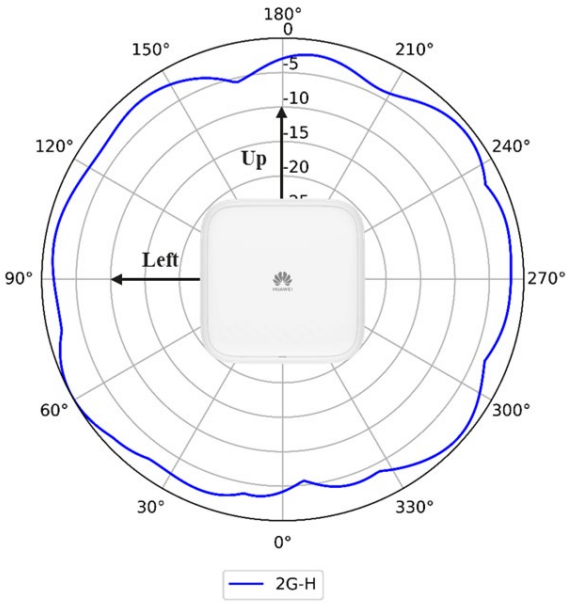
| Item | | Description |
| --- | --- | --- |
| | | The actual number of users varies according to the application environment. |
| | Maximum transmit power | 2.4 GHz: 26 dBm<br>5 GHz-L: 26 dBm<br>5 GHz-H: 26 dBm<br>**NOTE**<br>Above are the combined power powers. The actual transmit power depends on local laws and regulations. |
| | Frequency bands | 2.400 to 2.4835 GHz ISM<br>5.150 to 5.250 GHz U-NII-1<br>5.250 to 5.350 GHz U-NII-2A<br>5.470 to 5.725 GHz U-NII-2C<br>5.725 to 5.850 GHz U-NII-3/ISM<br>**NOTE**<br>The available bands and channels are dependent on the configured regulatory domain (country). |

# Standards Compliance

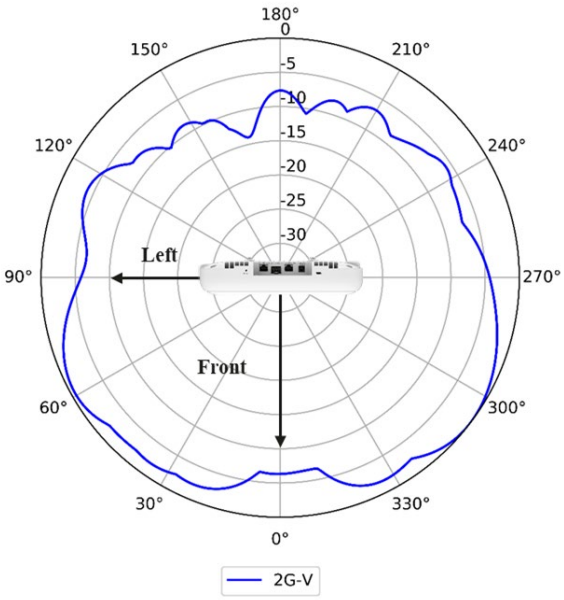
| Item | Description | | |
| --- | --- | --- | --- |
| Safety standards | • EN 62368-1 | • IEC 62368-1 | |
| Radio standards | • ETSI EN 300 328 | • ETSI EN 301 893 | • AN/NZS 4268 |
| EMC standards | • EN 301 489-1<br>• EN 301 489-17<br>• EN 60601-1-2<br>• EN 55032<br>• EN 55035 | • GB 9254<br>• GB 17625.2<br>• AS/NZS CISPR32<br>• CISPR 32<br>• CISPR 35 | • IEC/EN61000-4-2<br>• IEC/EN 61000-4-3<br>• IEC/EN 61000-4-4<br>• IEC/EN 61000-4-5<br>• IEC/EN 61000-4-6<br>• ICES-003 |
| IEEE standards | • IEEE 802.11a/b/g<br>• IEEE 802.11n<br>• IEEE 802.11ac<br>• IEEE 802.11ax<br>• IEEE 802.11be | • IEEE 802.11h<br>• IEEE 802.11d<br>• IEEE 802.11e<br>• IEEE 802.11k | • IEEE 802.11v<br>• IEEE 802.11w<br>• IEEE 802.11r |
| Security standards | • 802.11i，Wi-Fi Protected Access (WPA)，WPA2，WPA2-Enterprise，WPA2-PSK，WPA3，WAPI<br>• 802.1X<br>• Advanced Encryption Standards(AES)，Temporal Key Integrity Protocol(TKIP)，WEP，Open<br>• EAP Type(s) | | |
| EMF | • EN 62311 | • EN 50385 | |
| RoHS | • Directive 2002/95/EC & 2011/65/EU<br>• (EU)2015/863 | | |
| Reach | • Regulation 1907/2006/EC | | |

| Item | Description |
| --- | --- |
| WEEE | • Directive 2002/96/EC & 2012/19/EU |

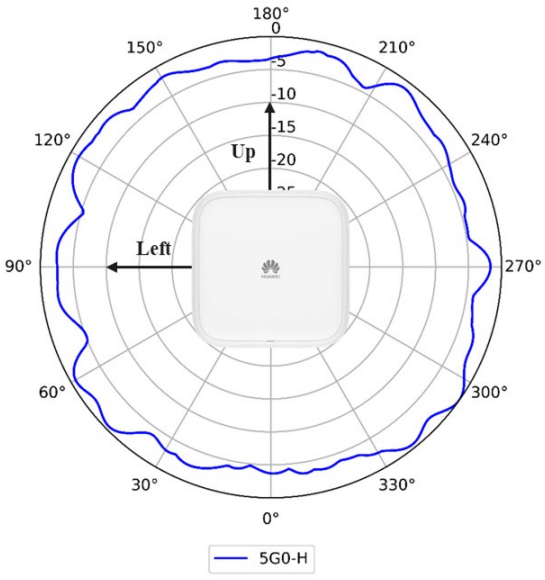
# Antennas Pattern



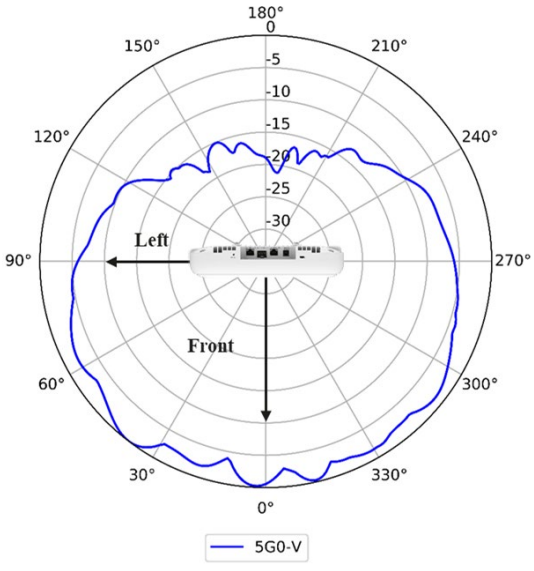

2.4GHz (Horizontal)



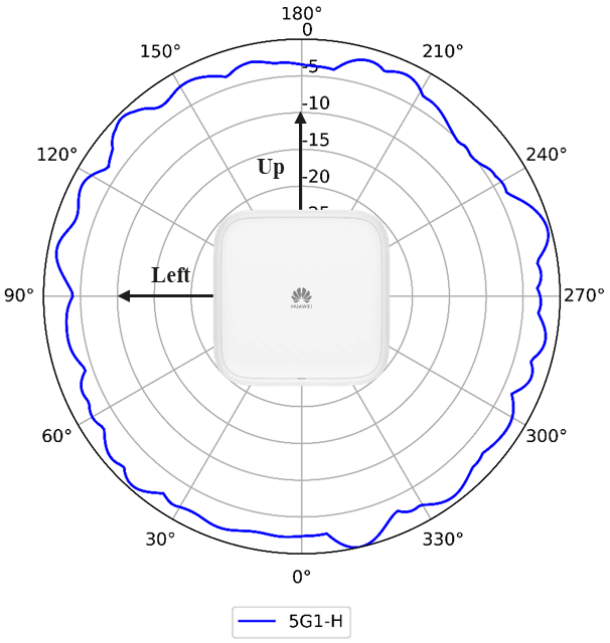

2.4GHz (Vertical)



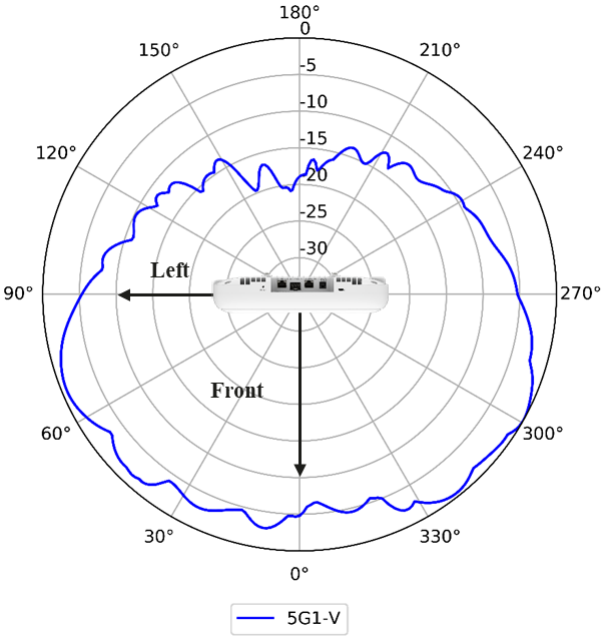

5GHz_0 (Horizontal)




5GHz_0 (Vertical)




5GHz_1 (Horizontal)




5GHz_1 (Vertical)

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