Huawei AirEngine 6776-X6H&AirEngine 6776-X6ETH Access Points Datasheet

Product Overview

Huawei AirEngine 6776-X6H&AirEngine 6776-X6ETH are indoor access points (APs) in compliance with Wi-Fi 7 (802.11be). The Aps are empowered by brand-new Wi-Fi 7 technologies, significantly enhancing users' wireless network experience. These strengths make the AirEngine 6776-X6H&AirEngine 6776-X6ETH ideal for indoor coverage scenarios such as mobile office, education, healthcare, and shopping malls and supermarkets.

AirEngine 6776-X6H

AirEngine 6776-X6ETH

- The AirEngine 6776-X6H has built-in dynamic-zoom smart antennas and provides services simultaneously on both the 2.4 GHz (4x4) and 5 GHz (4x4) frequency bands, at a rate of up to 1.38 Gbps at 2.4 GHz, 5.76 Gbps at 5 GHz and 7.14 Gbps for the device.
- The AirEngine 6776-X6ETH uses external antennas and provides services simultaneously on the 2.4 GHz (2x2), 5 GHz (4x4), and 6 GHz (2x2) * frequency bands, at a rate of up to 689 Mbps at 2.4 GHz, 5.76 Gbps at 5 GHz, 1.44 Gbps at 6 GHz, and 7.89 Gbps for the device.
- Support Bluetooth serial port-based O&M through built-in Bluetooth and CloudCampus APP.
- Support Fit AP, Fat AP and cloud-managed AP modes, easily managing the AP and their services on Huawei cloud management platform and reducing network O&M costs.

NOTE

- The feature description and specification are based on the version of V600R25C00.
- The 6G-related features (e.g., 6G, 320MHz) are only applicable to the AirEngine 6776-X6ETH, and iCSSR is only applicable to the AirEngine 6776-X6H.
- The third radio (6 GHz) of the AirEngine 6776-X6ETH can be switched to the 2.4 GHz radio. In this case, the three radios become 2.4GHz(4x4) + 5GHz(4x4). The data rate of the AP is up to 7.14 Gbps.

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

Wi-Fi 7 aims to increase the WLAN throughput and provide low-latency access assurance. To achieve this goal, the Wi-Fi 7 standard defines modifications to both the physical layer (PHY) and MAC layer. Compared with Wi-Fi 6, Wi-Fi 7 brings the following technical innovations:

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 6 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 Maximum ratio combining (MRC) Space time block code (STBC) Cyclic Delay Diversity (CDD)/Cyclic Shift Diversity (CSD) Beamforming Multi-user multiple-input multiple-output (MU-MIMO) Orthogonal frequency division multiple access (OFDMA)

Item	Description
	Preamble puncturing BSS Color TxBF TWT 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) Low-density parity-check (LDPC) Frame aggregation, including A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx) 802.11 dynamic frequency selection (DFS) Short guard interval (GI) in 20 MHz, 40 MHz, 80 MHz, 160 MHz modes Wi-Fi multimedia (WMM) for priority-based data processing and forwarding WLAN channel management and channel rate adjustment **NOTE** For detailed management channels, see the Country Codes & Channels Compliance. Automatic channel scanning and interference avoidance Service set identifier (SSID) hiding configuration for each AP, supporting Chinese SSIDs Signal sustain technology (SST) Unscheduled automatic power save delivery (U-APSD) Multi-user call admission control (CAC) Advanced cellular coexistence (ACC), minimizing the impact of interference from cellular networks 802.11k and 802.11v smart roaming 802.11r fast roaming (≤ 50 ms) Spectrum analysis Terminal location FTM (Fine Timing Measurement) location ASFN (Advanced Same Frequency Network)
Network features	Compliance with IEEE 802.3ab Auto-negotiation of the rate and duplex mode, and automatic switchover between Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDI-X) Compatibility with IEEE 802.1Q SSID-based VLAN assignment Eth-Trunk function Management channel of the AP's uplink port in tagged and untagged modes DHCP client, obtaining IP addresses through DHCP Tunnel data forwarding and direct data forwarding STA isolation in the same VLAN IPv4/IPv6 access control list (ACL) Link Layer Discovery Protocol (LLDP) Service holding when CAPWAP link disconnection in direct data forwarding mode Unified authentication on the AC AC dual-link backup Telemetry, quickly collecting AP status and application experience parameters MESH HotSpot2.0

Item	Description
	IPv6 SAVI
QoS features	WMM power save 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 Application identification and QoS classification to improve voice quality for popular applications, such as Zoom, QQ, and WeChat Airtime scheduling Air interface HQoS scheduling Intelligent multimedia scheduling VIP bandwidth reservation VIP FastPass, per-packet power control
Security features	Open system authentication 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 WPA/WPA2/WPA2-PPSK authentication and encryption WPA/WPA2/WPA2-DPSK authentication and encryption 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 802.11w Protected Management Frames (PMF) CAPWAP DTLS data encryption and decryption URL filtering MACsec@ Uplink Ethernet port Wi-Fi Shield 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	Unified AP management and maintenance on the AC Automatic AP onboarding, automatic configuration loading, and plug-and-play (PnP) Automatic batch upgrade STelnet using SSHv2 SFTP using SSHv2 Remote wireless O&M through the Bluetooth serial port System status alarm Unified AP management on WebMaster

Item	Description
Sensing	Wi-Fi CSI Sensing

Fat AP mode

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

Item	Description
	NAT
QoS features	WMM power save Priority mapping for upstream packets and flow-based mapping for downstream packets Queue mapping and scheduling User-based bandwidth limiting Airtime scheduling Intelligent multimedia scheduling
Security features	Open system authentication WPA2-PSK authentication and encryption (WPA2-Personal) WPA3-SAE authentication and encryption (WPA3-Personal) WPA-WPA2 hybrid authentication WPA2-WPA3 hybrid authentication MAC address authentication, and Portal authentication DHCP snooping 802.11w Protected Management Frames (PMF) 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 SFTP using SSHv2 Remote wireless O&M through the Bluetooth serial port 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 Maximum ratio combining (MRC) Space time block code (STBC) Cyclic Delay Diversity (CDD)/Cyclic Shift Diversity (CSD) Beamforming Multi-user multiple-input multiple-output (MU-MIMO) Orthogonal frequency division multiple access (OFDMA) Preamble puncturing BSS Color TxBF TWT 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) Low-density parity-check (LDPC) Frame aggregation, including A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx) 802.11 dynamic frequency selection (DFS) Short guard interval (GI) in 20 MHz, 40 MHz, 80 MHz, 160 MHz modes

Item	Description
	Wi-Fi multimedia (WMM) for priority-based data processing and forwarding WLAN channel management and channel rate adjustment **NOTE** For detailed management channels, see the Country Codes & Channels Compliance. Automatic channel scanning and interference avoidance Service set identifier (SSID) hiding configuration for each AP, supporting Chinese SSIDs Signal sustain technology (SST) Unscheduled automatic power save delivery (U-APSD) Automatic AP Online by NCE-Campus Multi-user call admission control (CAC) Advanced cellular coexistence (ACC), minimizing the impact of interference from cellular networks 802.11k and 802.11v smart roaming 802.11r fast roaming (≤ 50 ms) Spectrum analysis Terminal location FTM (Fine Timing Measurement) location
Network features	Compliance with IEEE 802.3ab Auto-negotiation of the rate and duplex mode, and automatic switchover between Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDI-X) Compatibility with IEEE 802.1Q SSID-based VLAN assignment DHCP client, obtaining IP addresses through DHCP STA isolation in the same VLAN IPv4/IPv6 access control list (ACL) Link Layer Discovery Protocol (LLDP) Service holdover when the link to NCE-Campus is disconnected Unified authentication on the cloud management platform Network address translation (NAT) Telemetry, quickly collecting AP status and application experience parameters MESH Tunnel-AC IPv6 SAVI HotSpot2.0
QoS features	WMM power save 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 Application identification and QoS classification to improve voice quality for popular applications, such as Zoom, QQ, and WeChat Airtime scheduling Air interface HQoS scheduling Intelligent multimedia scheduling VIP bandwidth reservation

Item	Description
	VIP FastPass, per-packet power control
Security features	Open system authentication 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 WPA/WPA2/WPA2-PPSK authentication and encryption WPA/WPA2/WPA2-DPSK authentication and encryption 802.1X authentication, MAC address authentication, and Portal authentication 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 DHCP snooping 802.11w Protected Management Frames (PMF) CAPWAP DTLS data encryption and decryption URL filtering MACsec@ Uplink Ethernet port Wi-Fi Shield 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	Unified AP management and maintenance on the cloud management platform Automatic AP onboarding, automatic configuration loading, and PnP Batch upgrade STelnet using SSHv2 SFTP using SSHv2 Remote wireless O&M through the Bluetooth serial port Real-time user configuration monitoring and fast fault locating using the NMS System status alarm Network Time Protocol (NTP)
Sensing	Wi-Fi CSI Sensing

Technical Specifications

Item		AirEngine 6776-X6H	AirEngine 6776-X6ETH
Technical specifications	Dimensions (H x W x D)	57 mm x 220 mm x 220 mm	
	Weight	1.37 kg	1.43 kg
	Interface type	1 x 1G/2.5G/10GE SFP+ 1 x 100M/1000M/2.5GE/5GE (RJ-45)	

Item		AirEngine 6776-X6H	AirEngine 6776-X6ETH
		1 x 10M/100M/1GE (RJ-45) 1 x USB port **NOTE** • The 5GE(RJ-45) supports PoE input. • The 10G optical port supports the 1G/2.5G/10G optical module or hybrid module (supporting PoE input). • The 10G optical ports support optical/electrical hybrid cable separation deployment (optical ports for data transmission and Phoenix terminals for power supply).	
	Bluetooth	Bluetooth 5.4	
	IoT	• Built-in multi-protocol IoT interfaces, flexibly supporting BLE, ZigBee, HomeKit, and Thread* • USB port extension external IoT (Supports protocols such as ZigBee, RFID, and UWB) **NOTE** 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	• DC: 43.2 V to 57.6 V • Dual-PoE power supply (5GE(RJ-45)+10G SFP+): in compliance with 802.3bt/at/af **NOTE** • 802.3at/af power supply restrictions are detailed in the Info-Finder. • The 10G optical port supports hybrid optical-electrical cable (optical-electrical separation solution) or (optical-electrical integration solution) for power supply.	
	Maximum power consumption	24.2 W (excluding USB)	25.5 W (excluding USB)
		NOTE The actual maximum power consumption depends on local laws and regulations.	
Environmental specifications	Operating temperature	-10°C to +50°C	
	Storage temperature	-40°C to +70°C	
	Operating humidity	5% to 95% (non-condensing)	
	Altitude	-60 m to +5000 m	
	Atmospheric pressure	53 kPa to 106 kPa	
Radio specifications	Antenna type	Built-in dynamic-zoom smart antennas	External antenna
	Antenna gain	• 2.4GHz: 4 dBi • 5GHz: 5 dBi **NOTE** • The gains above are the single-antenna peak gains. • When all WLAN 2.4 GHz or 5 GHz antennas are	**NOTE** The gain varies with external antennas. For details, see the specifications of each antenna.

Item		AirEngine 6776-X6H	AirEngine 6776-X6ETH
		combined, the equivalent antenna gain is 1 dBi for 2.4 GHz radios, 2 dBi for 5GHz-H radios.	
	Maximum number of SSIDs for each radio	16	
	Maximum number of users	1200 (600/Radios)	1800 (600/Radios)
		NOTE The actual number of users varies according to the application environment.	
	Maximum transmit power	• 2.4 GHz: 26 dBm • 5 GHz: 28 dBm	Three-radio mode: • 2.4GHz: 23 dBm • 5GHz: 26 dBm • 6GHz: 23 dBm Dual radio mode: • 2.4GHz: 26 dBm • 5GHz: 26 dBm
		NOTE Above are the combined power powers. The actual transmit power depends on local laws and regulations.	
	Maximum transmit power	• 2.400 to 2.4835 GHz ISM • 5.150 to 5.250 GHz U-NII-1 • 5.250 to 5.350 GHz U-NII-2A • 5.470 to 5.725 GHz U-NII-2C • 5.725 to 5.850 GHz U-NII-3/ISM • 5.925 to 6.425 GHz U-NII-5 • 6.425 to 6.525 GHz U-NII-6 • 6.525 to 6.875 GHz U-NII-7 • 6.875 to 7.125 GHz U-NII-8 **NOTE** • The available bands and channels are dependent on the configured regulatory domain (country). • AirEngine 6776-X6H doesn't support U-NII-5 to U-NII-8.	

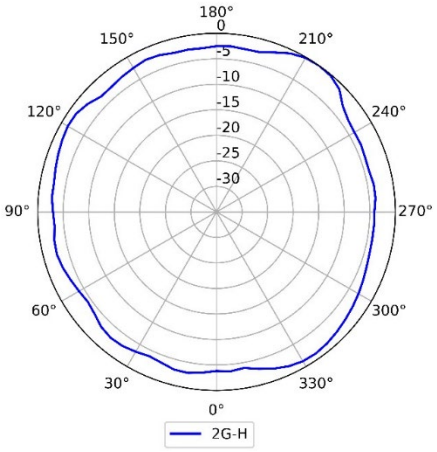
Standards Compliance

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 • EN 301 489-17 • EN 60601-1-2 • EN 55032 • EN 55035	• GB 9254 • GB 17625.2 • AS/NZS CISPR32 • CISPR 32 • CISPR 35	• IEC/EN61000-4-2 • IEC/EN 61000-4-3 • IEC/EN 61000-4-4 • IEC/EN 61000-4-5 • IEC/EN 61000-4-6

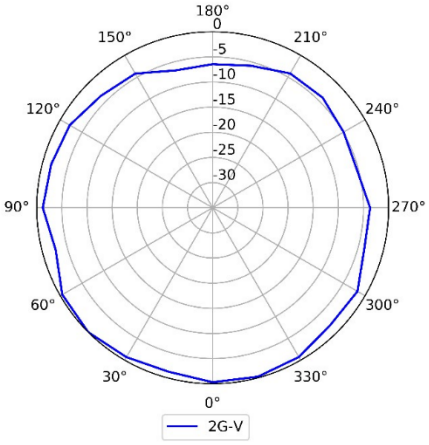
Item	Description		
			• ICES-003
IEEE standards	• IEEE 802.11a/b/g • IEEE 802.11n • IEEE 802.11ac • IEEE 802.11ax • IEEE 802.11be	• IEEE 802.11h • IEEE 802.11d • IEEE 802.11e • IEEE 802.11k	• IEEE 802.11v • IEEE 802.11w • IEEE 802.11r
Security standards	• 802.11i，Wi-Fi Protected Access (WPA)，WPA2，WPA2-Enterprise，WPA2-PSK，WPA3，WAPI • 802.1X • Advanced Encryption Standards(AES)，Temporal Key Integrity Protocol(TKIP)，WEP，Open • EAP Type(s)		
EMF	• EN 62311	• EN 50385	
RoHS	• Directive 2002/95/EC & 2011/65/EU • (EU)2015/863		
Reach	• Regulation 1907/2006/EC		
WEEE	• Directive 2002/96/EC & 2012/19/EU		

Antennas Pattern

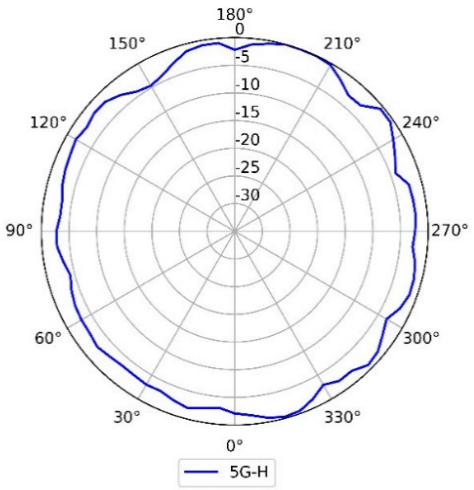
AirEngine 6776-X6H



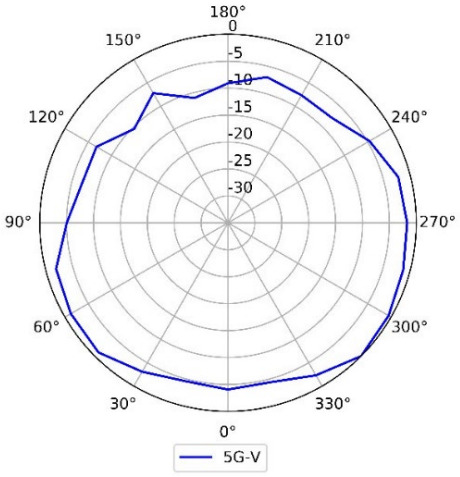
2.4GHz (Horizontal)



2.4GHz (Vertical)



5GHz (Horizontal)



5GHz (Vertical)

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