Huawei AirEngine 6776I-X6TH&AirEngine 6776I-X7TH Access Point Datasheet

Product Overview

Huawei AirEngine 6776I-X6TH and AirEngine 6776I-X7TH is an outdoor access point (AP) in compliance with Wi-Fi 7 (802.11be). They can simultaneously provide services on 2.4 GHz, 5 GHz, and 6 GHz frequency bands, achieving a device rate of up to 13.66 Gbps. They are empowered by brand-new Wi-Fi 7 technologies, significantly enhancing users' wireless network experience. These outdoor Aps stand out with excellent outdoor coverage performance, IP68 waterproof and dustproof design, and strong urge protection capability. These strengths make Huawei's Wi-Fi 7 outdoor APs ideal for high-density scenarios such as stadiums and amusement parks.



AirEngine 6776I-X6TH



AirEngine 6776I-X7TH

- The AirEngine 6776I-X6TH has built-in directional antennas and works simultaneously on the 2.4 GHz (2x2 MIMO) , 5 GHz (2x2 MIMO) frequency bands, and 6 GHz* (4x4 MIMO) frequency bands achieving rates of up to 0.69 Gbit/s , 1.44 Gbit/s and 11.53 Gbit/s, respectively, and a maximum rate of 13.66 Gbit/s for the device.
- The AirEngine 6776I-X7TH has built-in omnidirectional antennas and works simultaneously on the 2.4 GHz (2x2 MIMO) , 5 GHz (2x2 MIMO) frequency bands, and 6 GHz* (4x4 MIMO) frequency bands achieving rates of up to 0.69 Gbit/s , 1.44 Gbit/s and 11.53 Gbit/s, respectively, and a maximum rate of 13.66 Gbit/s for the device.
- 6 KA surge protection for Ethernet ports, IP68 waterproof and dustproof design, and -40°C to + 70°C wide temperature, fully meeting industrial-grade requirements.
- 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 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.

NOTE

- The 6 GHz radio can be switched into 5 GHz radio.

Feature Descriptions

Wi-Fi 7 (802.11be) standard

Wi-Fi 7 (Wi-Fi 7) is the next-generation Wi-Fi standard to be launched, also known as IEEE 802.11be or extremely high throughput (EHT). Based on Wi-Fi 6, Wi-Fi 7 introduces technologies such as 320 MHz bandwidth, 4096-quadrature amplitude modulation (QAM), multi-resource unit (RU), multi-link operation (MLO), enhanced multi-user multiple-input multiple-output (MU-MIMO), and multi-access point coordination. Drawing on these cutting-edge technologies, Wi-Fi 7 delivers a higher data transmission rate and lower latency than Wi-Fi 6. Wi-Fi 7 is expected to support a throughput of up to 30 Gbps, about three times that of Wi-Fi 6.

Wi-Fi 7 vs. Wi-Fi 6

Based on the Wi-Fi 6 standard, Wi-Fi 7 introduces a plurality of new technologies. The following compares Wi-Fi 6 and Wi-Fi 7.

	Wi-Fi 6	Wi-Fi 7
IEEE standard	802.11ax	802.11be
Maximum transmission rate	9.6 Gbps	23 Gbps
Frequency band	2.4 GHz, 5 GHz, 6 GHz (Wi-Fi 6E)	2.4 GHz, 5 GHz, and 6 GHz
Security protocol	WPA3	WPA3
Channel bandwidth	20 MHz, 40 MHz, 80 MHz, 160 MHz, 80+80 MHz	Up to 320 MHz
Modulation mode	1024-QAM OFDMA	4096-QAM OFDMA

NOTE

- The maximum transmission rate of the picture is the maximum rate of a single radio. It is 5 GHz radio for Wi-Fi 6, while it is 6 GHz radio for Wi-Fi 7.

New Features in Wi-Fi 7

Wi-Fi 7 aims to increase the WLAN throughput to 30 Gbps and provide low-latency access assurance. To achieve this goal, the 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:

Up to 320 MHz Bandwidth

The 2.4 GHz and 5 GHz frequency bands are unlicensed spectrums that limited and congested. When running emerging applications (such as VR/AR), existing Wi-Fi networks inevitably encounter low quality of service (QoS). To achieve a maximum of 30 Gbps throughput, Wi-Fi 7 will support the 6 GHz of frequency band and extend new bandwidth modes, including contiguous 240 MHz, non-contiguous 160+80 MHz, contiguous 320 MHz, and non-contiguous 160+160 MHz.

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.

NOTE

- The function and features marked with * can be implemented through software upgrade. The following describes are the same.

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.

Wi-Fi 7 Application Scenarios

New functions introduced by Wi-Fi 7 will significantly improve the data transmission rate and deliver lower latency. These highlights will contribute to the development of emerging applications:

- Video stream
- Video/Voice conference
- Online gaming
- Real-time collaboration
- Cloud/Edge computing
- Industrial IoT
- Immersive AR/VR
- Interactive telemedicine

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) 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 Per-packet power control BSS Color TxBF 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, and 160 MHz modes Wi-Fi multimedia (WMM) for priority-based data processing and forwarding WLAN channel management and channel rate adjustment Automatic channel scanning and interference avoidance NOTE For detailed management channels, see the *Country Codes & Channels Compliance*. Service set identifier (SSID) hiding configuration for each AP, supporting Chinese SSIDs Signal sustain technology (SST) Unscheduled automatic power save delivery (U-APSD) Control and Provisioning of Wireless Access Points (CAPWAP) Automatic AP onboarding Extended Service Set (ESS) Multi-user call admission control (CAC)

Item	Description
	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 Eth-Trunk function Management channel of the AP's uplink port in tagged and untagged mode DHCP client, obtaining IP addresses through DHCP Tunnel data forwarding and direct data forwarding Application identification and QoS classification to improve voice quality for popular applications, such as Zoom, QQ, and WeChat STA isolation in the same VLAN IPv4/IPv6 access control list (ACL) Link Layer Discovery Protocol (LLDP) Service holding upon CAPWAP link disconnection in Fit AP mode Unified authentication on the AC in Fit AP mode AC dual-link backup in Fit AP mode Telemetry in Fit AP mode, quickly collecting AP status and application experience parameters
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 Airtime scheduling Air interface HQoS scheduling VIP bandwidth reservation VIP FastPass Per-packet power control
Security features	Supporting Radius over TLS 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 WPA2-PPSK authentication and encryption Wireless intrusion detection system (WIDS) and wireless intrusion prevention system (WIPS)*, including rogue

Item	Description
	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) NOTE 6G WIDS and WIPS feature available in a future software release
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

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) 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 Per-packet power control BSS Color TxBF 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, and 160 MHz modes Wi-Fi multimedia (WMM) for priority-based data processing and forwarding WLAN channel management and channel rate adjustment Automatic channel scanning and interference avoidance NOTE

Item	Description
	For detailed management channels, see the *Country Codes & Channels Compliance*. 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 onboarding 802.11k and 802.11v smart roaming 802.11r fast roaming (≤ 50 ms) Advanced cellular coexistence (ACC), minimizing the impact of interference from cellular networks
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) Unified authentication on the cloud management platform Network address translation (NAT) Telemetry, quickly collecting AP status and application experience parameters
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 VIP bandwidth reservation Airtime scheduling Air interface HQoS scheduling VIP FastPass
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 WPA2-PPSK authentication and encryption 802.1X authentication, MAC address authentication, and Portal authentication DHCP snooping
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

Item	Description
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)

Technical Specifications

Item		Description
Technical specifications	Dimensions (H x W x D)	• AirEngine 6776I-X6TH: 85 mm x 280 mm x 220 mm • AirEngine 6776I-X7TH: 100 mm x 280 mm x 220 mm
	Weight	• AirEngine 6776I-X6TH: 3.28 kg • AirEngine 6776I-X7TH: 3.59 kg
	Interface type	1 x 100M/1GE/2.5GE/5GE/10GE (RJ-45) 1 x 1G/2.5G/10GE SFP+ 1 x 10M/100M/1GE electrical 1 x USB **NOTE** • 10GE and GE electrical port supports PoE input. • 10G optical ports support optical-electrical separation solution by working with the waterproof connection kit for an AP hybrid cable to achieve data transmission on the optical port and power supply on the electrical (RJ45) port. • The third-party device connected to AP via the USB port must be insulated. the USB cable length must be less than 2 m. • The USB module must meet the specifications of Huawei outdoor APs. For details, see Huawei WLAN AP IoT Card (USB) Hardware Specifications.
	BLE	BLE5.2
	LED indicator	Indicates the power-on, startup, running, alarm, and fault states of the system.
Power specifications	Power input	PoE power supply: In compliance with 802.3bt/at **NOTE** • When 802.3at power is supplied, the AP will operate with restrictions, and the details refer to the Info-Finder.

Item		Description
	Maximum power consumption	• AirEngine 6776I-X6TH: 33.1 W (excluding USB) • AirEngine 6776I-X7TH: 33.5 W (excluding USB) **NOTE** The actual maximum power consumption depends on local laws and regulations.
Environmental specifications	Operating temperature	-40°C to +70°C **NOTE** • The value may vary depending on the installation environment.
	Storage temperature	-40°C to +85°C
	Operating humidity	0% to 100%
	Dustproof and waterproof grade	IP68
	Altitude	-60 m to +5000 m
	Atmospheric pressure	53 kPa to 106 kPa
Radio specifications	Antenna type	• AirEngine 6776I-X6TH: Built-in directional antennas **NOTE** Horizontal beamwidth: 70° for 2.4 GHz, 60° for 5 GHz and 55° for 6 GHz. Vertical beamwidth: 35° for 2.4 GHz, 20° for 5 GHz and 20° for 6 GHz. • AirEngine 6776I-X7TH: Built-in omnidirectional antenna
	Antenna gain	• AirEngine 6776I-X6TH: ◦ 2.4GHz: 10dBi ◦ 5GHz: 11dBi ◦ 6GHz: 12dBi • AirEngine 6776I-X7TH: ◦ 2.4GHz: 5dBi ◦ 5GHz: 5dBi ◦ 6GHz: 5dBi **NOTE** 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) **NOTE** The actual number of users varies according to the environment.
	Maximum transmit power	• AirEngine 6776I-X6TH: ◦ 2.4GHz: 28dBi (combined power)

Item		Description
		• 5GHz: 23dBi (combined power) • 6GHz: 27dBi (combined power) • AirEngine 6776I-X7TH: • 2.4GHz: 28dBi (combined power) • 5GHz: 24dBi (combined power) • 6GHz: 27dBi (combined power) NOTE The actual transmit power depends on local laws and regulations.
	Frequency bands	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).

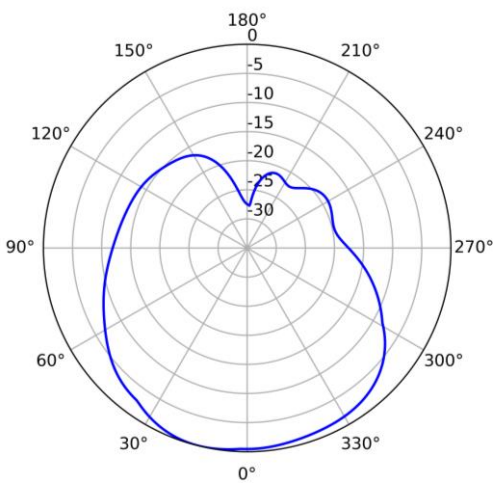
Standards Compliance

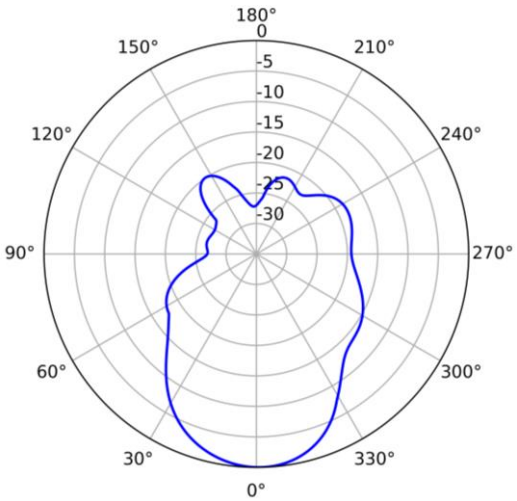
Item	Description		
Safety standards	• UL 62368-1 • EN 62368-1	• IEC 62368-1	• GB 4943.1
Radio standards	• ETSI EN 300 328	ETSI EN 301 893	
EMC standards	• EN 301 489-1 • EN 301 489-17 • EN 60601-1-2 • EN 55024 • EN 55032 • EN 55035	• GB 9254 • GB 17625.1 • GB 17625.2 • CISPR 24 • CISPR 32 • CISPR 35	• 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	• 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 • 802.1X		

Item	Description		
	• 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		

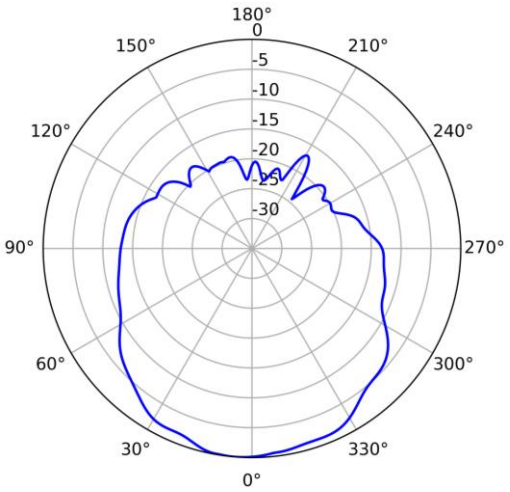
Antennas Pattern

AirEngine 6776I-X6TH

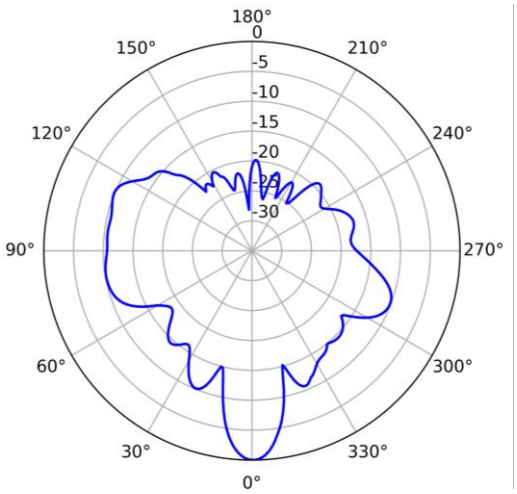




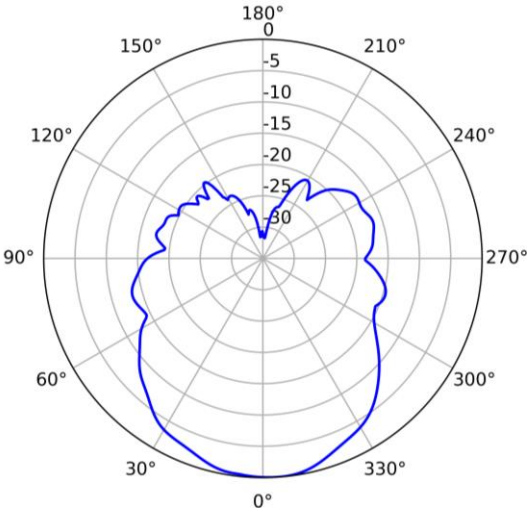
2.4GHz (Horizontal)



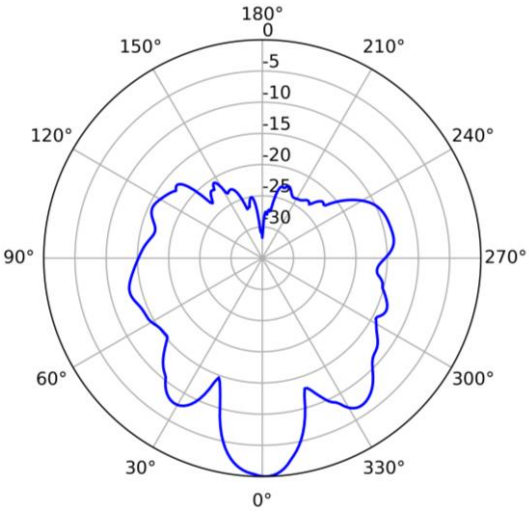
2.4GHz (Vertical)



5GHz (Horizontal)



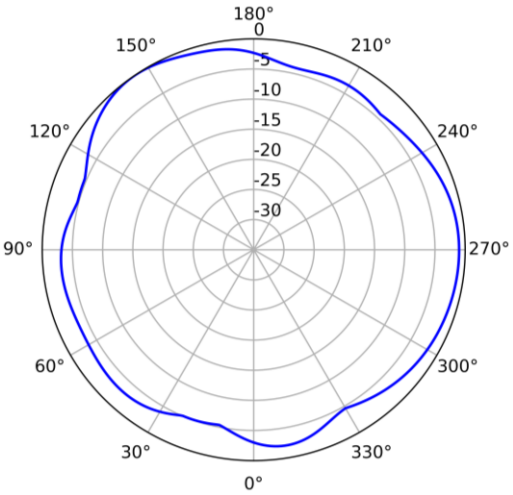
5GHz (Vertical)



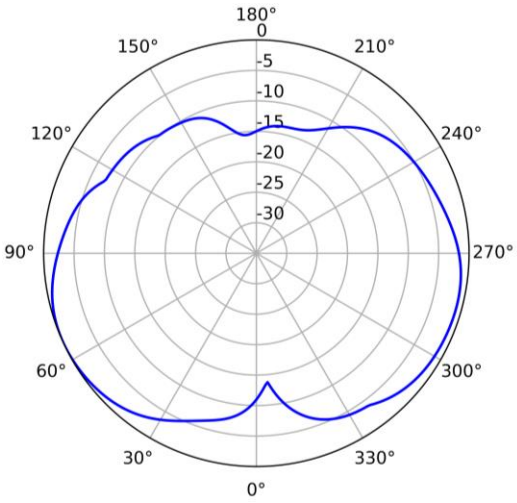
6GHz (Horizontal)

6GHz (Vertical)

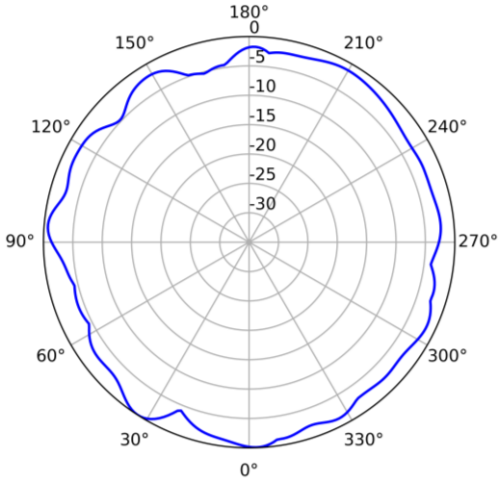
AirEngine 6776I-X7TH



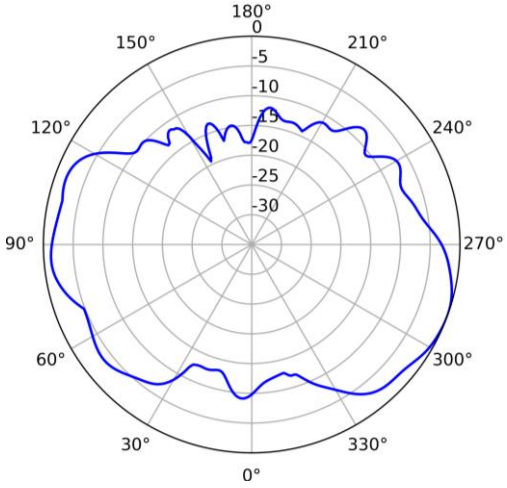
2.4GHz (Horizontal)



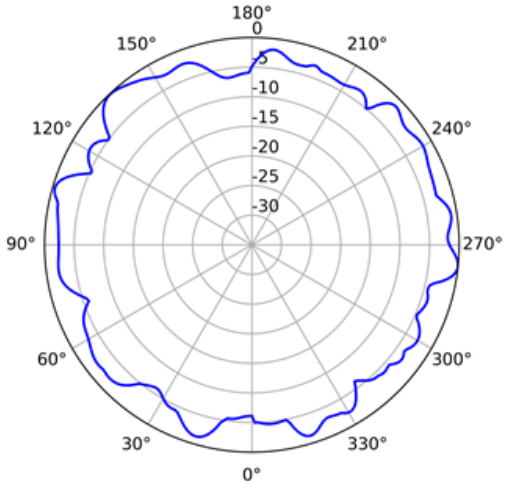
2.4GHz (Vertical)



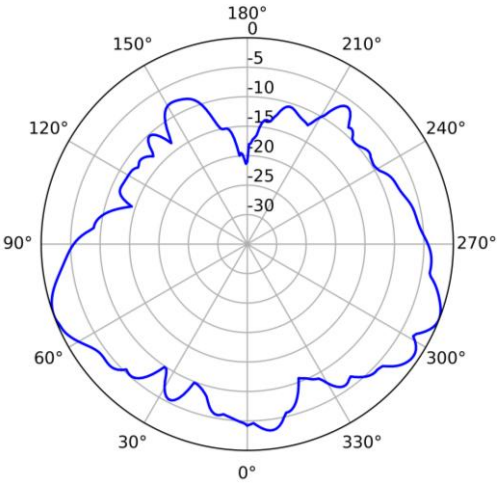
5GHz (Horizontal)



5GHz (Vertical)



6GHz (Horizontal)



6GHz (Vertical)

More Information

For more information about Huawei WLAN products, visit http://e.huawei.com or contact us in the following ways:

- Global service hotline: http://e.huawei.com/en/service-hotline
- Logging in to the Huawei Enterprise Technical Support Website: http://support.huawei.com/enterprise/
- Sending an email to the customer service mailbox: support_e@huawei.com

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