



Huawei

AP2051DN & AP2051DN-E

Access Points

Datasheet



Product Overview

Huawei AP2051DN and AP2051DN-E are the gigabit wall plate access points (APs) in compliance with 802.11ac Wave 2. With mounting brackets, the APs can be easily adapted to junction boxes (86/118/120 mm) and wall-mounting scenarios. The AP2051DN and AP2051DN-E boast built-in smart antennas, a hidden indicator, and a brand-new "morning dew" style. These highlights make the APs suitable for environments with densely distributed small rooms, such as hotel guest rooms, student dormitories, hospital wards, and small offices. The APs provide enhanced service support capabilities and feature high security, simple network deployment, automatic AC discovery and configuration, and real-time management and maintenance. The AP2051DN and AP2051DN-E can connect to wireless terminals through wireless connections or to wired terminals using wired cables. This makes the APs the ideal choice of customers to construct indoor distributed networks.



Junction box-mounting



Desk-mounting

AP2051DN & AP2051DN-E

- 802.11ac Wave 2 compliance, MU-MIMO (2SU-2MU), delivering services simultaneously on 2.4G and 5G radios, at a rate of up to 400 Mbit/s at 2.4 GHz, 867 Mbit/s Mbit/s at 5 GHz, and 1.267 Gbit/s for the device.
- One GE uplink port, four GE downlink ports, and two RJ45 pass-through phone ports (compatible with RJ11)
- Various installation modes for easy deployment, including ceiling-mounting, wall-mounting, plate-mounting and desk-mounting
- USB port used for external power supply and storage
- Built-in smart antennas, improving the coverage area
- AP2051DN-E: PoE OUT supported by GE4, supplying power for STAs such as IP phones
- AP2051DN-E: Built-in Bluetooth, working with eSight to implement Bluetooth device location
- Supports the Fat, Fit, and cloud modes and enables Huawei cloud management platform to manage and operate APs and services on the APs, reducing network O&M costs

Feature Descriptions

Smart antenna array technology

The AP2051DN and AP2051DN-E integrate smart antenna and implicit beamforming technologies to implement more precise user detection, suppress interference, and improve signal quality, enabling users to have a seamless, smooth wireless network experience.

MU-MIMO

The AP2051DN and AP2051DN-E support MU-MIMO technology and can send data to multiple STAs at the same time (currently, most 802.11n/11ac Wave 1 APs can only send data to one STA simultaneously). The technology marks the start of the 802.11ac Wave 2 era.

1-meter Bluetooth location (supported by the AP2051DN-E)

The AP2051DN-E supports built-in Bluetooth. In compliance with BLE4.1, the AP2051DN-E can work with eSight to achieve precise Bluetooth location.

PoE OUT power supply (supported by the AP2051DN-E)

The AP2051DN-E supports PoE OUT and can supply power to STAs such as IP phones (providing that the AP uses 802.3at or DC power supply).

Cloud-based management

Huawei Cloud Managed Network (CMN) Solution consists of the cloud management platform and a full range of cloud managed network devices. The cloud management platform provides various functions including management of APs, tenants, applications, and licenses, network planning and optimization, device monitoring, network service configuration, and value-added services.

GE access

The APs support the 80-MHz bandwidth mode. Frequency bandwidth increase brings extended channels and more sub-carriers for data transmission, and a 2.16-fold rate increase. Support for High Quadrature Amplitude Modulation (HQAM) at 256-QAM increases the 5 GHz radio rate to 867 Mbit/s and the AP rate to 1.267 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 2.4G and 5G 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, WPA/WPA2-PPSK, WPA/WPA2-802.1X, 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 eSight, 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.

- AP access authentication and encryption

- The AP access control ensures validity of APs. The CAPWAP link protection and DTLS 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 AP topology according to the collected data. Based on interference from authorized APs, rogue APs, and non-Wi-Fi interference sources, 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 ACs, the APs can identify over 1600 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 use 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.

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

Item	Description	
Technical specifications	Dimensions (H x W x D)	32.5 mm × 150 mm × 86 mm
	Weight	0.25 kg
	Interface type	Uplink: 1 x GE Downlink: 4 x GE 2 x Pass-through RJ45 port 1 x USB port
	Built-in Bluetooth	AP2051DN-E: BLE4.1
	LED indicator	Indicates the power-on, startup, running, alarm, and fault status of the system.
Power specifications	Power input	Power adapter: 45.6 V to 57 V PoE power supply: in compliance with IEEE 802.3af/at
	PoE OUT	AP2051DN-E: MAX 13.6W (802.3at-compliant, 48 V DC, supported only by GE4)  NOTE <ul style="list-style-type: none"> ● A 40-meter Cat5e Ethernet cable can be used to supply power to an 802.3af-compliant device. ● The PoE out and USB functions cannot be used simultaneously.
	Maximum power consumption	AP2051DN: 11.5 W (excluding the output power of the USB port) AP2051DN-E: 11.5 W (excluding the output power of the USB port and PoE_OUT port)  NOTE The actual maximum power consumption depends on local laws and regulations.
Environmental specifications	Operating temperature	0°C to 40°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

Hardware specifications

Item	Description
Antenna type	Built-in dual-band smart antennas
Gain	2.4G: 3 dB 5G: 4 dB  NOTE Gain involves the physical gain and SINR enhancement of smart antennas.
Maximum number of SSIDs for each radio	≤ 16
Maximum number of users	≤ 256  NOTE The actual number of users varies according to the environment.
Maximum transmit power	2.4G: 23 dBm (combined power) 5G: 23 dBm (combined power)  NOTE The actual transmit power depends on local laws and regulations.
Power increment	1 dBm
Radio specifications	Receiver sensitivity
	2.4 GHz 802.11b: -99 dBm @ 1 Mbit/s -91 dBm @ 11 Mbit/s
	2.4 GHz 802.11g: -93 dBm @ 6 Mbit/s -78 dBm @ 54 Mbit/s
	2.4 GHz 802.11n (HT20): -93 dBm @ MCS0 -72 dBm @ MCS15
	5 GHz 802.11a: -93 dBm @ 6 Mbit/s -77 dBm @ 54 Mbit/s
	5 GHz 802.11n (HT20): -92 dBm @ MCS0 -72 dBm @ MCS15
	5 GHz 802.11n (HT40): -89 dBm @ MCS0 -70 dBm @ MCS15
	5 GHz 802.11ac (VHT20): -92 dBm @ MCS0NSS1 -71 dBm @ MCS8NSS2
	5 GHz 802.11ac (VHT40): -90 dBm @ MCS0NSS1 -63 dBm @ MCS9NSS2
5 GHz 802.11ac (VHT80): -86 dBm @ MCS0NSS1 -60 dBm @ MCS9NSS2	


Basic Specifications



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Softwarespecifications**Fat/Fit AP mode**


Item	Description
WLAN features	<p>Compliance with IEEE 802.11a/b/g/n/ac/ac Wave 2</p> <p>Maximum rate: up to 1.267 Gbit/s</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>MU-MIMO</p> <p>Low-density parity-check (LDPC)</p> <p>Maximum-likelihood detection (MLD)</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, and 80 MHz modes</p> <p>Priority mapping and packet scheduling based on a Wi-Fi Multimedia (WMM) profile to implement priority-based data processing and forwarding</p> <p>Automatic and manual rate adjustment</p> <p>WLAN channel management and channel rate adjustment</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>Automatic login in Fit AP mode</p> <p>Extended Service Set (ESS) in Fit AP mode</p> <p>Multi-user CAC</p> <p>Hotspot2.0</p> <p>802.11k and 802.11v smart roaming</p> <p>802.11r fast roaming (≤ 50 ms)</p> <p>WAN authentication escape. In local forwarding mode, this function retains the online state of existing STAs and allows access of new STAs when APs are disconnected from an AC, ensuring service continuity.</p>

Item	Description
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>STA isolation in the same VLAN</p> <p>Access control lists (ACLs)</p> <p>Link Layer Discovery Protocol (LLDP)</p> <p>Uninterrupted service forwarding upon CAPWAP channel disconnection in Fit AP mode</p> <p>Unified authentication on the AC in Fit AP mode</p> <p>AC dual-link backup in Fit AP mode</p> <p>Network Address Translation (NAT) in Fat AP mode</p> <p>IPv6 in Fit AP mode</p> <p>Soft Generic Routing Encapsulation (GRE)</p> <p>IPv6 Source Address Validation Improvements (SAVI)</p>
QoS features	<p>Priority mapping and packet scheduling based on a Wi-Fi Multimedia (WMM) profile 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>Adaptive bandwidth management (automatic bandwidth adjustment based on the user quantity and radio environment) to improve user experience</p> <p>Smart Application Control (SAC) in Fit AP mode</p> <p>Airtime scheduling</p> <p>Support for Microsoft Lync APIs and high voice call quality through Lync API identification and scheduling</p>

Item	Description
Security features	<p>Open system authentication</p> <p>WEP authentication/encryption using a 64-bit, 128-bit, or 152-bit encryption key</p> <p>WPA/WPA2-PSK authentication and encryption (WPA/WPA2 personal edition)</p> <p>WPA/WPA2-802.1X authentication and encryption (WPA/WPA2 enterprise edition)</p> <p>WPA-WPA2 hybrid authentication</p> <p>WPA/WPA2-PPSK authentication and encryption in Fit AP mode</p> <p>WAPI authentication and encryption</p> <p>Wireless intrusion detection system (WIDS) and wireless intrusion prevention system (WIPS), including rogue device detection and countermeasure, attack detection and dynamic blacklist, and STA/AP blacklist and whitelist</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> <p>802.11w Protected Management Frames (PMFs)</p> <p>Application identification</p>
Maintenance features	<p>Unified management and maintenance on the AC in Fit AP mode</p> <p>Automatic login and configuration loading, and plug-and-play (PnP) in Fit AP mode</p> <p>Batch upgrade in Fit AP mode</p> <p>Telnet</p> <p>STelnet using SSH v2</p> <p>SFTP using SSH v2</p> <p>Web local AP management through HTTP or HTTPS in Fat AP mode</p> <p>Real-time configuration monitoring and fast fault location 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>The AP supports bring your own device (BYOD) only in Fit AP mode.</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>

Item	Description
Location service	<p> NOTE</p> <p>The AP supports the locating service only in Fit AP mode.</p> <p>Locates tags manufactured by AeroScout or Ekahau.</p> <p>Locates Wi-Fi terminals.</p> <p>Works with eSight to locate rogue devices.</p> <p>AP2051DN-E: Built-in Bluetooth, working with eSight to implement Bluetooth device location</p>
Spectrum analysis	<p> NOTE</p> <p>The AP supports spectrum analysis only in Fit AP mode.</p> <p>Identifies interference sources such as 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.</p> <p>Works with eSight to perform spectrum analysis on interference sources.</p>

Cloud-based management mode

Item	Description
WLAN features	<p>Compliance with IEEE 802.11a/b/g/n/ac/ac Wave 2</p> <p>Maximum rate: up to 1.267 Gbit/s</p> <p>Maximum ratio combining (MRC)</p> <p>Space time block code (STBC)</p> <p>Beamforming</p> <p>Low-density parity-check (LDPC)</p> <p>Maximum-likelihood detection (MLD)</p> <p>Frame aggregation, including A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx)</p> <p>802.11 dynamic frequency selection (DFS)</p> <p>Priority mapping and packet scheduling based on a Wi-Fi Multimedia (WMM) profile to implement priority-based data processing and forwarding</p> <p>WLAN channel management and channel rate adjustment</p> <p> NOTE</p> <p>For detailed management channels, see the Country Code & Channel Compliance Table.</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>Automatic login</p>

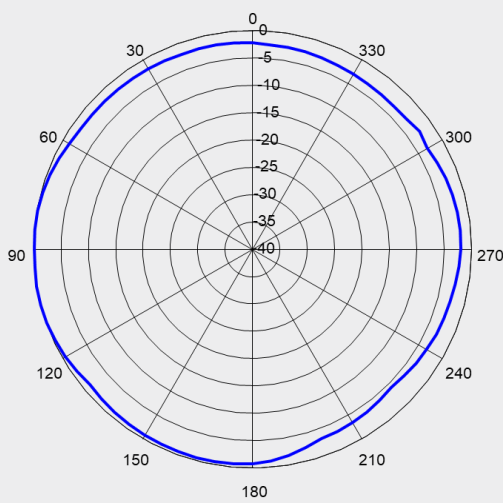
Item	Description
Network features	<ul style="list-style-type: none"> Compliance with IEEE 802.3ab Auto-negotiation of the rate and duplex mode and automatic switchover between the Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDI-X) Compliance with IEEE 802.1q SSID-based VLAN assignment DHCP client, obtaining IP addresses through DHCP STA isolation in the same VLAN Access control lists (ACLs) Unified authentication on Huawei cloud management platform Network Address Translation (NAT)
QoS features	<ul style="list-style-type: none"> Priority mapping and packet scheduling based on a Wi-Fi Multimedia (WMM) profile to implement priority-based data processing and forwarding WMM parameter management for each radio WMM power saving Priority mapping for upstream packets and flow-based mapping for downstream packets Queue mapping and scheduling User-based bandwidth limiting Airtime scheduling
Security features	<ul style="list-style-type: none"> Open system authentication WEP authentication/encryption using a 64-bit, 128-bit, or 152-bit encryption key WPA/WPA2-PSK authentication and encryption (WPA/WPA2 personal edition) WPA/WPA2-802.1X authentication and encryption (WPA/WPA2 enterprise edition) WPA-WPA2 hybrid authentication WPA/WPA2-PPSK authentication and encryption 802.1X authentication, MAC address authentication, and Portal authentication DHCP snooping Dynamic ARP Inspection (DAI) IP Source Guard (IPSG)

Item	Description
Maintenance features	<ul style="list-style-type: none"> Unified management and maintenance on Huawei cloud management platform Automatic login and configuration loading, and plug-and-play (PnP) Batch upgrade Telnet STelnet using SSH v2 SFTP using SSH v2 Web local AP management through HTTP or HTTPS Real-time configuration monitoring and fast fault location using the NMS System status alarm Network Time Protocol (NTP)

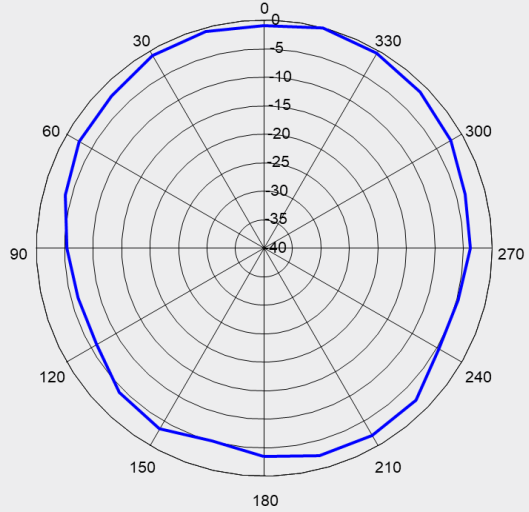
Standards compliance

Item	Description
Safety standards	<ul style="list-style-type: none"> UL 60950-1 IEC 60950-1 EN 60950-1 GB 4943 IEC 62368-1 EN 62368-1
Radio standards	<ul style="list-style-type: none"> ETSI EN 300 328 ETSI EN 301 893 RSS-210 AS/NZS 4268
EMC standards	<ul style="list-style-type: none"> EN 301 489-1 EN 301 489-17 ETSI EN 60601-1-2 ICES-003 YD/T 1312.2-2004 GB 9254 GB 17625.1 EN 55022 EN 55024 IEC6100 k.21 CISPR 22 CISPR 24 IEC61000-4-6 IEC61000-4-2
IEEE standards	<ul style="list-style-type: none"> IEEE 802.11a/b/g IEEE 802.11n IEEE 802.11ac IEEE 802.11h IEEE 802.11d IEEE 802.11e IEEE 802.11k IEEE 802.11u IEEE 802.11v IEEE 802.11w IEEE 802.11r
Security standards	<ul style="list-style-type: none"> 802.11i, Wi-Fi Protected Access 2(WPA2), WPA 802.1X Advanced Encryption Standards(AES), Temporal Key Integrity Protocol(TKIP) EAP Type(s)
EMF	<ul style="list-style-type: none"> CENELEC EN 62311 CENELEC EN 50385 RSS-102
RoHS	<ul style="list-style-type: none"> Directive 2002/95/EC & 2011/65/EU
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

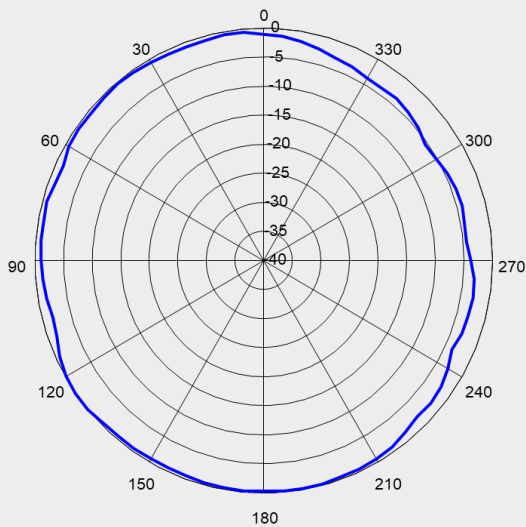
AP2051DN&AP2051DN-E Antennas Pattern



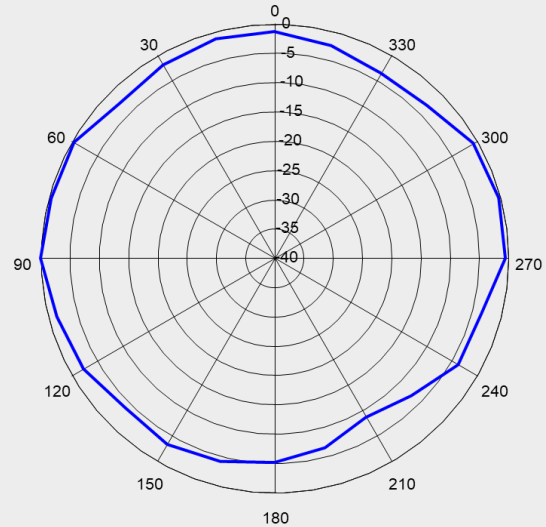
2.4G (PHI=0)



2.4G (PHI=90)



5G (PHI=0)



5G (PHI=90)

Professional Service and Support

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

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



More Information

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

www.huawei.com