AP6050DN&AP6150DN

Product Description

Issue   05

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About This Document

Purpose

This document describes the positioning, characteristics, hardware structure, product features, and technical specifications of the AP.

This document helps you understand the characteristics and features of the AP.

Intended Audience

This document is intended for network engineers responsible for network design and deployment. You should understand your network well, including the network topology and service requirements.

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
NOTE	Calls attention to important information, best practices and tips.

Symbol	Description
	NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in previous issues.

Changes in Issue 05 (2017-04-20)

This version has the following updates:

The following information is modified:

- 3.3 QoS Features

Changes in Issue 04 (2016-11-22)

This version has the following updates:

The following information is modified:

- 5.1 Basic Specifications
- 5.2 Radio Specifications

Changes in Issue 03 (2016-10-15)

This version has the following updates:

The following information is added:

- 4 Product Features (in Cloud-based Management Mode)

The following information is modified:

- 2.1 AP6050DN
- 2.2 AP6150DN

Changes in Issue 02 (2016-07-22)

This version has the following updates:

The following information is modified:

- 5.1 Basic Specifications
- 5.2 Radio Specifications

Changes in Issue 01 (2016-05-31)

This is the initial commercial release.

Contents

1 Product Positioning and Characteristics

About This Chapter

1.1 Product Positioning

Table 1-1 Product positioning

Product Model	Frequency Band	IEEE Standards Compliance	Positioning	Usage Scenario
AP6050DN AP6150DN	Dual band: • 2.4 GHz • 5 GHz The AP6050DN and AP6150DN can provide services simultaneously on the 2.4 GHz and 5 GHz frequency bands to support more access users.	IEEE 802.11a/b/g/n/ac/ac wave2	The AP6050DN and AP6150DN are the next-generation technology-leading APs. They support 4×4 MU-MIMO and feature high reliability, high security, simple network deployment, automatic AC discovery and configuration, and real-time management and maintenance. In compliance with IEEE 802.11ac, the	The AP6050DN and AP6150DN provide highest-quality wireless services for mobile office, high-density scenarios, elementary education, and higher education. They provide flexible distribution options in different environments.

Product Model	Frequency Band	IEEE Standards Compliance	Positioning	Usage Scenario
			AP6050DN and AP6150DN support a theoretical rate of up to 2.53 Gbit/s, greatly improving user experience.	

The AP6050DN and AP6150DN can work as a Fat AP, Fit AP, or cloud AP. The AP can switch flexibly among three working modes based on the network plan.

Typical networking modes are as follows:

Figure 1-1 Fit AP networking (AP mode)
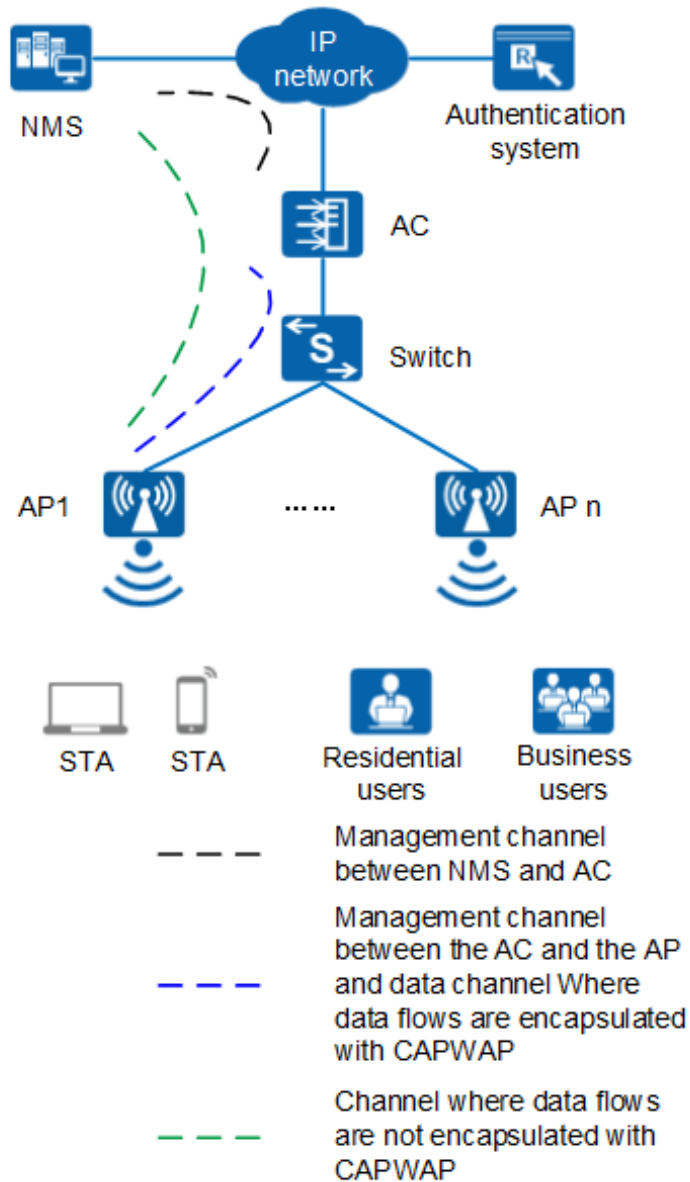
In this networking, the AP functions as a Fit AP. The AC is responsible for user access, AP go-online, AP management, authentication, routing, security, and QoS. Huawei products that provide the AC function include the AC6605, AC6005, ACU2 (with S7700, S9700, or S12700), S5720HI, S6720HI, S7700 (with X series board), S9700 (with X series board), and S12700 (with X series board).

Figure 1-2 Fit AP networking (WDS mode: point-to-point)
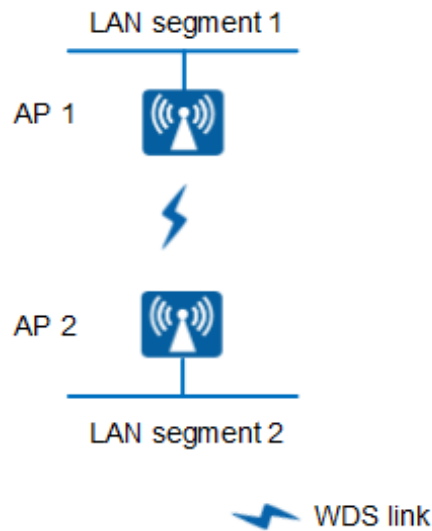
Figure 1-3 Fit AP networking (WDS mode: point-to-multipoint)
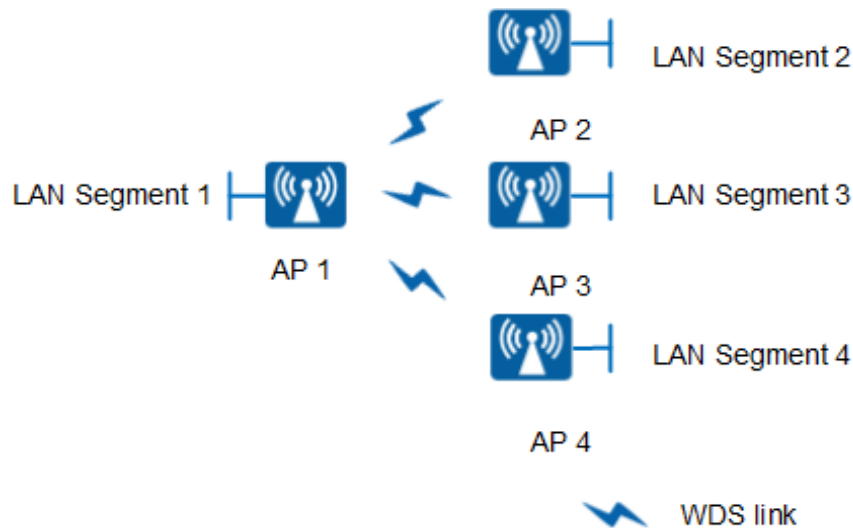
In this networking, the AP connects two or more independently wired or wireless LANs through wireless links to construct a network on which users can exchange data. In Wireless Distribution System (WDS) mode, the AP supports point-to-point (P2P) and point-to-multipoint (P2MP) networking modes. Supporting 5 GHz and 2.4 GHz frequency bands, the AP can implement wireless bridging and access functions.

Figure 1-4 Fit AP mesh networking
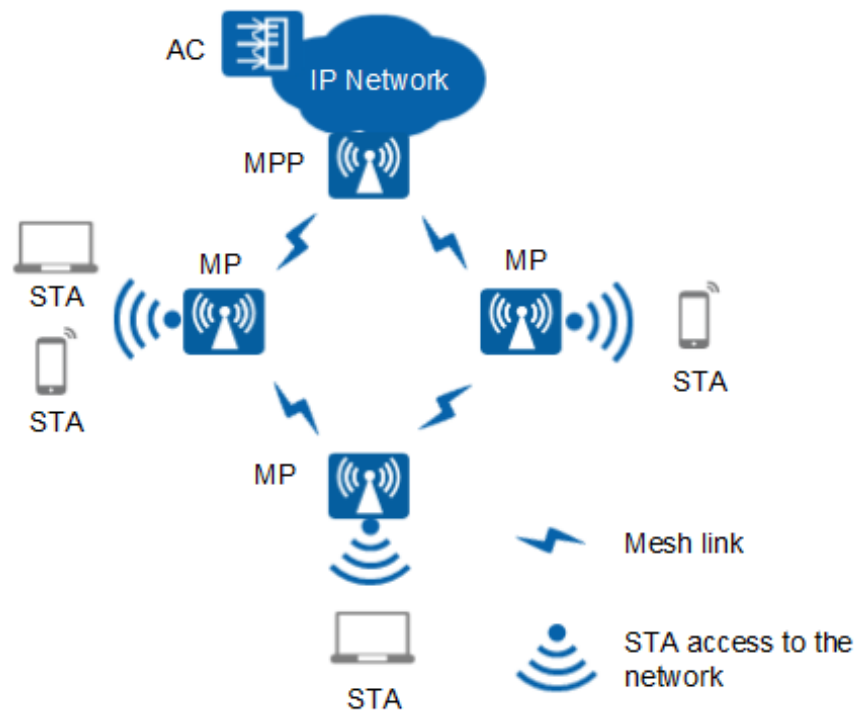
In this networking, APs function as mesh points (MPs) and are fully meshed to establish an auto-configured and self-healing wireless mesh network (WMN). APs with the gateway function can work as the mesh portal points (MPPs) through which the WMN can provide access to the Internet. Terminals connect to APs to access the WMN. The WMN uses dedicated mesh routing protocols to guarantee high transmission quality and is more applicable to scenarios that require high bandwidth and highly stable Internet connections.

Figure 1-5 Fat AP networking
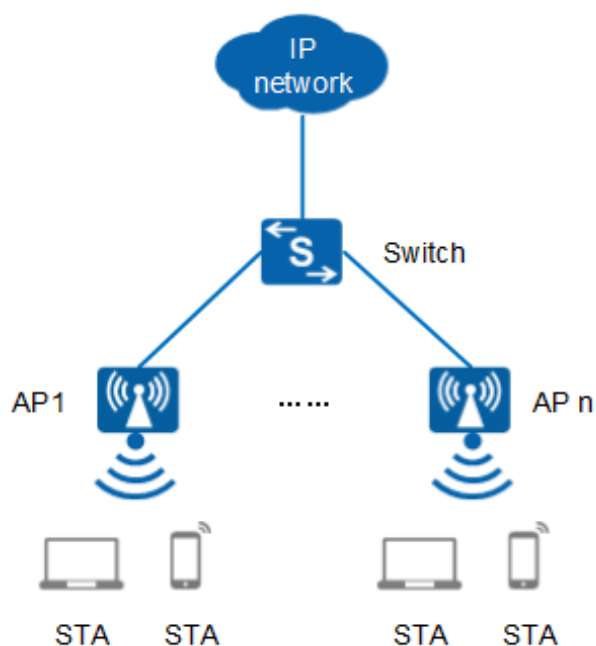
In this networking, the device functions as a Fat AP to implement functions such as user access, authentication, data security, service forwarding, and QoS.

Figure 1-6 Cloud AP networking
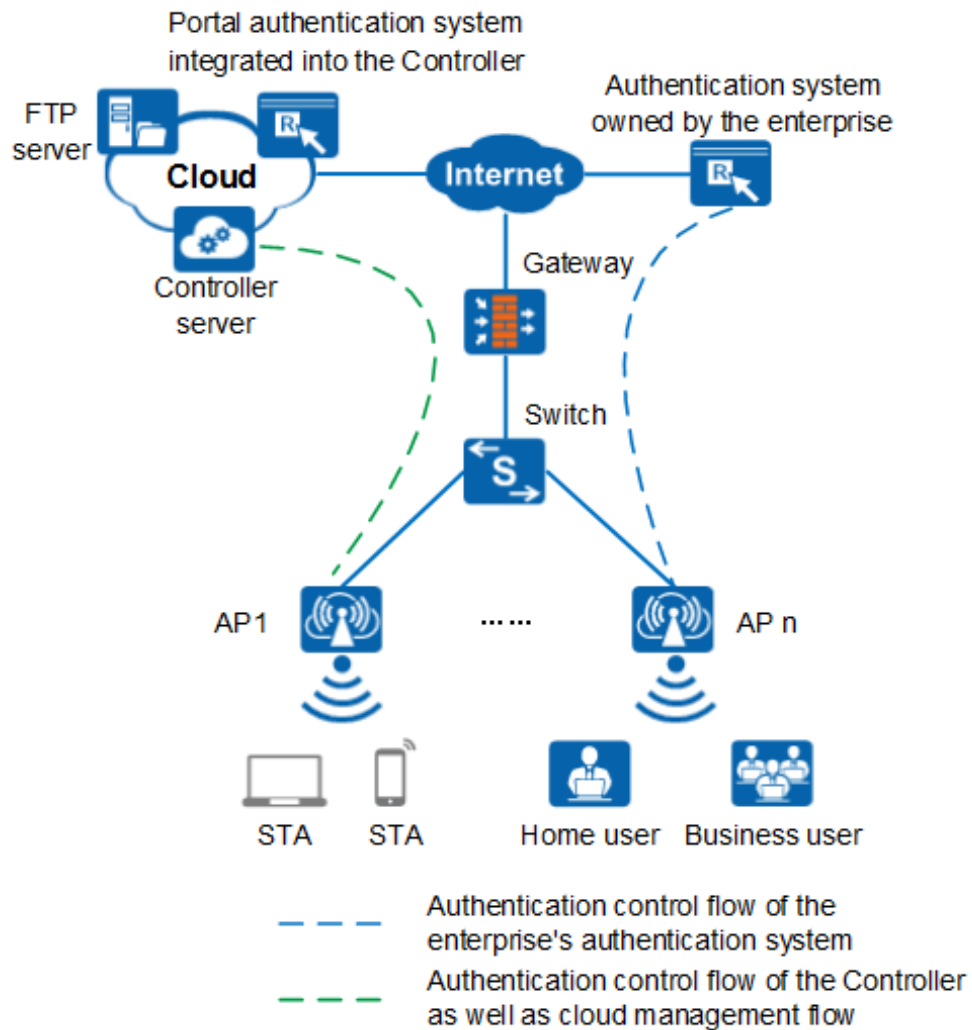
In this networking, the device functions as a cloud AP and works with the Agile Controller-Campus on the same cloud for user access, AP online, authentication, routing, AP management, security, and QoS. An enterprise can choose to use the Portal authentication server integrated in the Agile Controller-Campus or the authentication server deployed by itself.

1.2 Product Characteristics

Product Characteristics	Description
High-speed and reliable wireless access	• Compatibility with IEEE 802.11a/b/g/n/ac/ac wave 2. • Supports 4×4 MU-MIMO and a rate up to 2.53 Gbit/s. • Supports a rate of up to 800 Mbit/s at 2.4 GHz frequency band. • Supports a rate of up to 1.73 Gbit/s at 5 GHz frequency band.

Product Characteristics	Description
	• Supports link aggregation of dual Ethernet ports. • Supports Wi-Fi Multimedia (WMM) and priority mapping on the air interface and wired interface. • Supports wired link integrity check. • Supports load balancing. • Supports roaming without service interruption in Fit AP mode. • Supports AC dual-link backup in Fit AP mode. • Supports beamforming. • Provides a latest 802.11ac Wave 2 chip with higher performance and wider coverage. • Uses a metal shell and heat dissipation design to ensure high reliability.
Comprehensive user access control capability	• Supports access control lists (ACLs) and implements user access control based on the user group policy. • Provides fine-grained bandwidth management for each user. • Supports user isolation policies. • Supports unified authentication on the AC in Fit AP mode. • Identifies the device type according to the organizationally unique identifier (OUI) in the MAC address, user agent (UA) information in an HTTP packet, and DHCP options in Fit AP mode. • The RADIUS server delivers packet forwarding, security, and QoS policies according to the device type carried in the RADIUS authentication and accounting packets in Fit AP mode.
High network security	• Open system authentication • WEP authentication/encryption • WPA/WPA2-PSK authentication and encryption • WPA/WPA2-802.1x authentication and encryption • 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
Flexible networking and environment adaptability	• Provides flexible networking capabilities and applies to various application scenarios. • Has strong environment adaptability. The AP can automatically select the transmission rates, channels, and transmit power to adapt to various radio environments and avoid interference in real time. • Adjusts bandwidth allocation based on the user quantity and environment to improve user experience. • The AP6050DN supports the MIMO antenna system equipped with built-in dual-band omnidirectional antennas. • The AP6150DN supports the MIMO antenna system equipped with external dual-band omnidirectional antennas.

Product Characteristics	Description
	• Works in Fit AP mode to identify 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 microwaves, and works together with eSight to display spectrums of interference sources.
Easy device management and maintenance	• Works in Fit AP mode to support automatic going-online, configuration loading, and plug-and-play (PnP). • Supports batch upgrade. • Works in Fat AP mode to support HTTP or HTTPS login to the web platform to achieve local management and maintenance. • Allows real-time monitoring on the network management system (NMS) to facilitate remote configuration and fast fault location. • Supports the Link Layer Discovery Protocol (LLDP) to implement automatic link discovery and obtain the network topology.

2 Hardware Structure

About This Chapter

2.1 AP6050DN

Appearance

Figure 2-1 shows the appearance of the AP.

📖 NOTE

The actual device appearance may be different from the following device appearance, but these differences will not affect device functions.

Figure 2-1 AP6050DN appearance

Port

The following figure shows ports on the AP6050DN.

Figure 2-2 AP6050DN ports
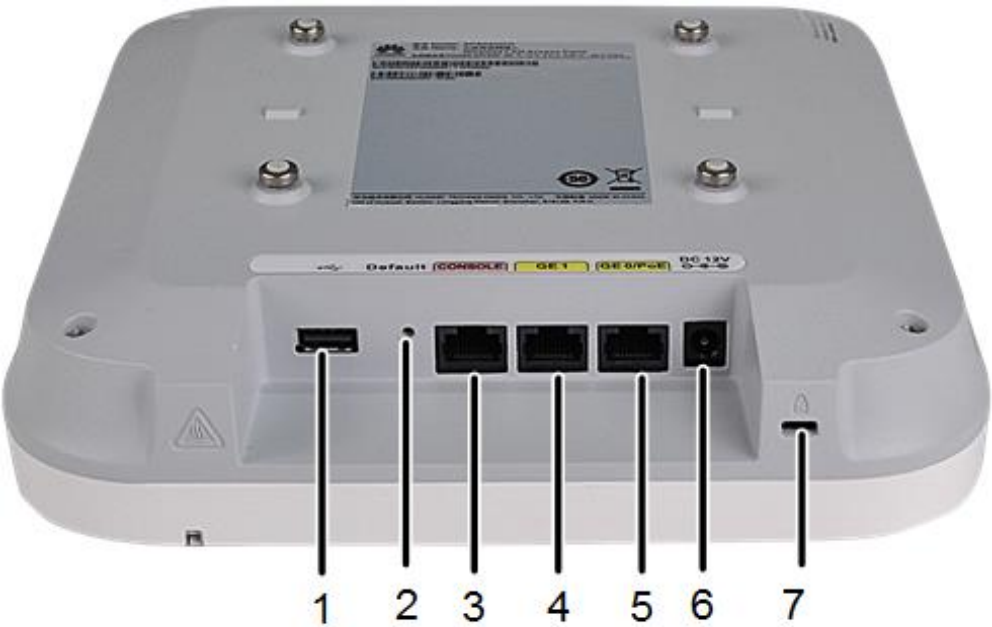
As shown in Figure 2-2, each port can be described as follows:

1. USB port: connects to a USB flash drive to extend the storage space of the AP, and provides a maximum of 2.5 W power.
2. Default button: restores factory settings if you hold down the button more than 3 seconds.
3. Console port: connects to the maintenance terminal for AP configuration and management.
4. GE1: 10/100/1000M port used to connect to the wired Ethernet.
5. GE0/PoE: 10/100/1000M port used to connect to the wired Ethernet. The port can connect to a PoE power supply to provide power for APs.
6. Input port for 12 V DC power supply.
7. Lock port: protects the AP against theft.

LED Indicators

📖 NOTE

Indicator colors may vary slightly at different temperature.

Type	Color	Status	Description
Default status after power-on	Green	Steady on	The AP is just powered on and the software is not started yet.

Type	Color	Status	Description
Software startup status	Green	Steady on after blinking once	After the system is reset and starts uploading the software, the indicator blinks green once. Until the software is uploaded and started, the indicator remains steady green.
Running status	Green	Blinking once every 2s (0.5 Hz)	• The system is running properly, the Ethernet connection is normal, and STAs are associated with the AP. • The system enters the Uboot CLI.
		Blinking once every 5s (0.2 Hz)	The system is running properly, the Ethernet connection is normal, and no STA is associated with the AP. The system is in low power consumption state.
Alarm	Green	Blinking once every 0.25s (4 Hz)	• The software is being upgraded. • After the software is loaded and started, the AP requests to go online if it works in Fit AP or cloud-based management mode. The indicator remains in this state before the AP successfully goes online. • The AP works in Fit AP or cloud-based

Type	Color	Status	Description
			management mode and fails to go online.
Fault	Red	Steady on	A fault that affects services has occurred, such as a DRAM detection failure or system software loading failure. The fault cannot be automatically rectified and must be rectified manually.

2.2 AP6150DN

Appearance

Figure 2-3 shows the appearance of the AP.

☐ NOTE

The actual device appearance may be different from the following device appearance, but these differences will not affect device functions.

Figure 2-3 AP6150DN appearance

Port

The following figure shows ports on the AP6150DN.

Figure 2-4 AP6150DN ports

As shown in Figure 2-4, each port can be described as follows:

1. USB port: connects to a USB flash drive to extend the storage space of the AP, and provides a maximum of 2.5 W power.

2. Default button: restores factory settings if you hold down the button more than 3 seconds.

3. Console port: connects to the maintenance terminal for AP configuration and management.

4. GE1: 10/100/1000M port used to connect to the wired Ethernet.

5. GE0/PoE: 10/100/1000M port used to connect to the wired Ethernet. The port can connect to a PoE power supply to provide power for APs.

6. Input port for 12 V DC power supply.

7. Lock port: protects the AP against theft.

8. Antenna port: Connects an antenna to the AP to send and receive wireless signals. The port type is RP-SMA-K.

LED Indicators

📖 **NOTE**

Indicator colors may vary slightly at different temperature.

Type	Color	Status	Description
Default status after power-on	Green	Steady on	The AP is just powered on and the software is not started yet.
Software startup	Green	Steady on after	After the system is

Type	Color	Status	Description
status		blinking once	reset and starts uploading the software, the indicator blinks green once. Until the software is uploaded and started, the indicator remains steady green.
Running status	Green	Blinking once every 2s (0.5 Hz)	• The system is running properly, the Ethernet connection is normal, and STAs are associated with the AP. • The system enters the Uboot CLI.
		Blinking once every 5s (0.2 Hz)	The system is running properly, the Ethernet connection is normal, and no STA is associated with the AP. The system is in low power consumption state.
Alarm	Green	Blinking once every 0.25s (4 Hz)	• The software is being upgraded. • After the software is loaded and started, the AP requests to go online if it works in Fit AP or cloud-based management mode. The indicator remains in this state before the AP successfully goes online. • The AP works in Fit AP or cloud-based management

Type	Color	Status	Description
			mode and fails to go online.
Fault	Red	Steady on	A fault that affects services has occurred, such as a DRAM detection failure or system software loading failure. The fault cannot be automatically rectified and must be rectified manually.

3 Product Features (in Fat AP and Fit AP Modes)

About This Chapter

3.1 WLAN Features

WLAN features supported by the AP are as follows:

- Compliance with IEEE 802.11a/b/g/n/ac/ac Wave 2
- Maximum rate of 2.53 Gbit/s
- Maximum ratio combining (MRC)
- Space time block code (STBC)
- Beamforming
- MU-MIMO
- Low-density parity-check (LDPC)
- Maximum-likelihood detection (MLD)
- 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, and 80+80 MHz modes

- Priority mapping and packet scheduling based on a Wi-Fi Multimedia (WMM) profile to implement priority-based data processing and forwarding
- Automatic and manual rate adjustment
- WLAN channel management and channel rate adjustment

📖 **NOTE**

For details about WLAN channel management, see the *Country Code & Channel Compliance Table*.

- Automatic channel scanning and interference avoidance
- Service set identifier (SSID) hiding
- Signal sustain technology (SST)
- Unscheduled automatic power save delivery (U-APSD)
- Control and Provisioning of Wireless Access Points (CAPWAP) in Fit AP mode
- Automatic login in Fit AP mode
- Extended Service Set (ESS) in Fit AP mode
- Wireless distribution system (WDS) in Fit AP mode
- Mesh networking in Fit AP mode
- Multi-user CAC

3.2 Network Features

Network features supported by the AP are as follows:

- 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
- VLAN trunk on uplink Ethernet ports
- Management channel of the AP uplink port in tagged and untagged mode
- DHCP client, obtaining IP addresses through DHCP
- Tunnel data forwarding and direct data forwarding
- STA isolation in the same VLAN
- 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

3.3 QoS Features

QoS features supported by the AP are as follows:

- 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
- Adaptive bandwidth management (automatic bandwidth adjustment based on the user quantity and radio environment) to improve user experience
- Smart Application Control (SAC) in Fit AP mode

3.4 Security Features

Security features supported by the AP are as follows:

- 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
- WAPI authentication and encryption
- 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
- 802.1x authentication, MAC address authentication, and Portal authentication
- DHCP snooping
- Dynamic ARP Inspection (DAI)
- IP Source Guard (IPSG)

3.5 Maintenance Features

Maintenance features supported by the AP are as follows:

- 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
- WDS zero-configuration deployment in Fit AP mode
- Mesh network zero-configuration deployment in Fit AP mode
- Batch upgrade in Fit AP mode
- Telnet
- STelnet using SSH v2
- SFTP using SSH v2
- Local AP management through the serial interface
- Web local AP management through HTTP or HTTPS in Fat AP mode

- Real-time configuration monitoring and fast fault location using the NMS
- SNMP v1/v2/v3 in Fat AP mode
- System status alarm
- Network Time Protocol (NTP) in Fat AP mode

3.6 BYOD

☍ NOTE

The AP supports bring your own device (BYOD) only in Fit AP mode.

BYOD features supported by the AP are as follows:

- Identifies the device type according to the organizationally unique identifier (OUI) in the MAC address.
- Identifies the device type according to the user agent (UA) information in an HTTP packet.
- Identifies the device type according to DHCP options.
- The RADIUS server delivers packet forwarding, security, and QoS policies according to the device type carried in the RADIUS authentication and accounting packets.

3.7 Locating Service

☍ NOTE

The AP supports the locating service only in Fit AP mode.

Locating service features supported by the AP are as follows:

- Locates tags manufactured by AeroScout or Ekahau.
- Locates Wi-Fi terminals.
- Works with eSight to locate rogue devices.

3.8 Spectrum Analysis

☍ NOTE

The AP supports spectrum analysis only in Fit AP mode.

Spectrum analysis features supported by the AP are as follows:

- 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 microwaves.
- Works with eSight to perform spectrum analysis on interference sources.

4 Product Features (in Cloud-based Management Mode)

The following table lists features supported by APs in cloud-based management mode.

Features	Description
WLAN Features	- Compliance with IEEE 802.11a/b/g/n/ac/ac Wave 2 - Maximum rate of 2.53 Gbit/s - Maximum ratio combining (MRC) - Space time block code (STBC) - Beamforming - Low-density parity-check (LDPC) - Maximum-likelihood detection (MLD) - Frame aggregation, including A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx) 802.11 dynamic frequency selection (DFS) - Priority mapping and packet scheduling based on a Wi-Fi Multimedia (WMM) profile to implement priority-based data processing and forwarding - WLAN channel management and channel rate adjustment **NOTE** For details about WLAN channel management, see the *Country Code & Channel Compliance Table*. - Automatic channel scanning and interference avoidance - Service set identifier (SSID) hiding - Signal sustain technology (SST) - Unscheduled automatic power save delivery (U-APSD)

Features	Description
	• Automatic login
Network Features	• 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 the Agile Controller-Campus • Network Address Translation (NAT)
QoS Features	• 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	• Open system authentication • WEP authentication/encryption using a 64-bit, 128-bit, or 152-bit encryption key • WPA2-PSK authentication and encryption (WPA2 personal edition) • WPA2-802.1x authentication and encryption (WPA2 enterprise edition) • WPA-WPA2 hybrid authentication • 802.1x authentication, MAC address authentication, and Portal authentication • DHCP snooping • Dynamic ARP Inspection (DAI) • IP Source Guard (IPSG)
Maintenance Features	• Unified management and maintenance

Features	Description
	on the Agile Controller-Campus
	• Automatic login and configuration loading, and plug-and-play (PnP)
	• Batch upgrade
	• Telnet
	• STelnet using SSH v2
	• SFTP using SSH v2
	• Local AP management through the serial interface
	• 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)

5 Technical Specifications

About This Chapter

5.1 Basic Specifications

Table 5-1 Basic specifications

Item		Description
Technical specifications	Dimensions (H x W x D)	56 mm x 220 mm x 220 mm
	Weight	1.3 kg
	System memory	512 MB DDR3L
	FLASH	16 MB NOR FLASH + 128 MB NAND FLASH
Power specifications	Power input	• DC: 12 V ± 10% • PoE power supply: in compliance with IEEE 802.3at
	Maximum power consumption	22.9 W(excluding the output power of the USB port) **NOTE** The actual maximum power consumption depends on local laws and regulations.
Environment specifications	Operating temperature	• -60 m to +1800 m: -10°C to +50°C • 1800 m to 5000 m: Temperature decreases by 1°C every time the altitude increases 300 m.
	Storage temperature	-40°C to +70°C

Item		Description
	Operating humidity	5% to 95% (non-condensing)
	IP rating	IP41
	Atmospheric pressure	53 kPa to 106 kPa

5.2 Radio Specifications

Table 5-2 Radio specifications

Item	Description		
Antenna type	AP6050DN: built-in omnidirectional dual-band antenna AP6150DN: external omnidirectional dual-band antenna		
Antenna gain	AP6050DN: • 2.4 GHz: 4 dBi • 5 GHz: 4 dBi AP6150DN: • 2.4 GHz: 3.5 dBi • 5 GHz: 4 dBi		
Maximum number of users	FIT AP: ≤ 512 FAT AP: ≤ 512 Cloud AP: ≤ 512		
Maximum number of VAPs for each radio	16		
Maximum transmit power	AP6050DN • 2.4 GHz: 25.77 dBm (combined power) • 5 GHz: 26.38 dBm (combined power) AP6150DN • 2.4 GHz: 25.77 dBm (combined power) • 5 GHz: 26.38 dBm (combined power) **NOTE** The actual transmit power depends on local laws and regulations.		
Maximum number of non-overlapping	2.4 GHz (2.412 GHz to 2.472 GHz)	5 GHz (5.18 GHz to 5.825 GHz)	**NOTE** The table uses the number of non-overlapping channels supported by China as an example. The number of

Item	Description			
channels	• 802.11b/g – 20 MHz: 3 • 802.11n – 20 MHz: 3 – 40 MHz: 1	• 802.11a – 20 MHz: 13 • 802.11n – 20 MHz: 13 – 40 MHz: 6 • 802.11ac – 20 MHz: 13 – 40 MHz: 6 – 80 MHz: 3 – 160 MHz: 1	non-overlapping channels varies in different countries. For details, see the *Country Codes & Channels Compliance*. **NOTICE** If the AP is delivered to the USA, pay attention to the following on channel and frequency band usage. 1. The country code of the AP is fixed. 2. High power radars working at frequencies in the range of 5.25 GHz to 5.35 GHz, 5.47 GHz to 5.6 GHz, and 5.65 GHz to 5.725 GHz can interfere with or even damage APs working at the same frequency.	
Channel rate supported	• 802.11b: 1, 2, 5.5, and 11 Mbit/s • 802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbit/s • 802.11n: 6.5 to 800 Mbit/s • 802.11ac wave2: 6.5 to 1733.3 Mbit/s			
Receiver sensitivity (Typical values)	2.4 GHz 802.11b • −102 dBm @ 1 Mbit/s • −100 dBm @ 2 Mbit/s • −98 dBm @ 5.5 Mbit/s • −95 dBm @ 11 Mbit/s	2.4 GHz 802.11g • −96 dBm @ 6 Mbit/s • −95 dBm @ 9 Mbit/s • −95 dBm @ 12 Mbit/s • −95 dBm @ 18 Mbit/s • −90 dBm @ 24 Mbit/s • −86 dBm @ 36 Mbit/s • −82 dBm @ 48 Mbit/s • −76 dBm @ 54 Mbit/s	2.4 GHz 802.11n (HT20) • -96 dBm @ MCS0 • -93 dBm @ MCS1 • -92 dBm @ MCS2 • -87 dBm @ MCS3 • -85 dBm @ MCS4 • -81 dBm @ MCS5 • -79 dBm @ MCS6 • -77 dBm @ MCS7 • -94 dBm @ MCS8 • -91 dBm @ MCS9 • -90 dBm @	2.4 GHz 802.11n(HT40) • -93 dBm @ MCS0 • -91 dBm @ MCS1 • -88 dBm @ MCS2 • -85 dBm @ MCS3 • -82 dBm @ MCS4 • -78 dBm @ MCS5 • -76 dBm @ MCS6 • -75 dBm @ MCS7 • -91 dBm @ MCS8 • -89 dBm @ MCS9 • -86 dBm @

Item	Description			
			MCS10	MCS10
			• -85 dBm @ MCS11	• -83 dBm @ MCS11
			• -83 dBm @ MCS12	• -80 dBm @ MCS12
			• -79 dBm @ MCS13	• -76 dBm @ MCS13
			• -77 dBm @ MCS14	• -74 dBm @ MCS14
			• -75 dBm @ MCS15	• -73 dBm @ MCS15
			• -92 dBm @ MCS16	• -89 dBm @ MCS16
			• -89 dBm @ MCS17	• -87 dBm @ MCS17
			• -88 dBm @ MCS18	• -84 dBm @ MCS18
			• -83 dBm @ MCS19	• -81 dBm @ MCS19
			• -81 dBm @ MCS20	• -78 dBm @ MCS20
			• -77 dBm @ MCS21	• -74 dBm @ MCS21
			• -75 dBm @ MCS22	• -72 dBm @ MCS22
			• -73 dBm @ MCS23	• -71 dBm @ MCS23
			• -90 dBm @ MCS24	• -87 dBm @ MCS24
			• -87 dBm @ MCS25	• -85 dBm @ MCS25
			• -86 dBm @ MCS26	• -82 dBm @ MCS26
			• -81 dBm @ MCS27	• -79 dBm @ MCS27
			• -79 dBm @ MCS28	• -76 dBm @ MCS28
			• -75 dBm @ MCS29	• -72 dBm @ MCS29
			• -73 dBm @ MCS30	• -70 dBm @ MCS30
			• -71 dBm @ MCS31	• -69 dBm @ MCS31
	5 GHz 802.11a	5 GHz 802.11n (HT20)	5 GHz 802.11n (HT40)	-

Item	Description			
	• –94 dBm @ 6 Mbit/s	• -94 dBm @ MCS0	• -91 dBm @ MCS0	
	• –94 dBm @ 9 Mbit/s	• -92 dBm @ MCS1	• -89 dBm @ MCS1	
	• –93 dBm @ 12 Mbit/s	• -90 dBm @ MCS2	• -87 dBm @ MCS2	
	• –91 dBm @ 18 Mbit/s	• -86 dBm @ MCS3	• -84 dBm @ MCS3	
	• –88 dBm @ 24 Mbit/s	• -83 dBm @ MCS4	• -81 dBm @ MCS4	
	• –84 dBm @ 36 Mbit/s	• -79 dBm @ MCS5	• -77 dBm @ MCS5	
	• –81 dBm @ 48 Mbit/s	• -78 dBm @ MCS6	• -75 dBm @ MCS6	
	• –74 dBm @ 54 Mbit/s	• -75 dBm @ MCS7	• -74 dBm @ MCS7	
		• -92 dBm @ MCS8	• -89 dBm @ MCS8	
		• -90 dBm @ MCS9	• -87 dBm @ MCS9	
		• -88 dBm @ MCS10	• -85 dBm @ MCS10	
		• -84 dBm @ MCS11	• -82 dBm @ MCS11	
		• -81 dBm @ MCS12	• -79 dBm @ MCS12	
		• -77 dBm @ MCS13	• -75 dBm @ MCS13	
		• -76 dBm @ MCS14	• -73 dBm @ MCS14	
		• -73 dBm @ MCS15	• -72 dBm @ MCS15	
		• -90 dBm @ MCS16	• -87 dBm @ MCS16	
		• -88 dBm @ MCS17	• -85 dBm @ MCS17	
		• -86 dBm @ MCS18	• -83 dBm @ MCS18	
		• -82 dBm @ MCS19	• -80 dBm @ MCS19	
		• -79 dBm @ MCS20	• -77 dBm @ MCS20	
		• -75 dBm @ MCS21	• -73 dBm @ MCS21	
		• -74 dBm @ MCS22	• -71 dBm @ MCS22	

Item	Description			
		• -71 dBm @ MCS23	• -70 dBm @ MCS23	
		• -88 dBm @ MCS24	• -85 dBm @ MCS24	
		• -86 dBm @ MCS25	• -83 dBm @ MCS25	
		• -84 dBm @ MCS26	• -81 dBm @ MCS26	
		• -80 dBm @ MCS27	• -78 dBm @ MCS27	
		• -77 dBm @ MCS28	• -75 dBm @ MCS28	
		• -73 dBm @ MCS29	• -71 dBm @ MCS29	
		• -72 dBm @ MCS30	• -69 dBm @ MCS30	
		• -69 dBm @ MCS31	• -68 dBm @ MCS31	
	5 GHz 802.11ac (VHT20) • -94 dBm @ MCS0NSS1 • -92 dBm @ MCS1NSS1 • -89 dBm @ MCS2NSS1 • -86 dBm @ MCS3NSS1 • -83 dBm @ MCS4NSS1 • -79 dBm @ MCS5NSS1 • -78 dBm @ MCS6NSS1 • -73 dBm @ MCS7NSS1 • -72 dBm @ MCS8NSS1 • -92 dBm @ MCS0NSS2 • -90 dBm @ MCS1NSS2 • -87 dBm @ MCS2NSS2	5 GHz 802.11ac (VHT40) • -91 dBm @ MCS0NSS1 • -89 dBm @ MCS1NSS1 • -87 dBm @ MCS2NSS1 • -84 dBm @ MCS3NSS1 • -81 dBm @ MCS4NSS1 • -77 dBm @ MCS5NSS1 • -75 dBm @ MCS6NSS1 • -74 dBm @ MCS7NSS1 • -70 dBm @ MCS8NSS1 • -68 dBm @ MCS9NSS1 • -89 dBm @ MCS0NSS2 • -87 dBm @ MCS1NSS2	5 GHz 802.11ac (VHT80) • -87 dBm @ MCS0NSS1 • -86 dBm @ MCS1NSS1 • -84 dBm @ MCS2NSS1 • -80 dBm @ MCS3NSS1 • -77 dBm @ MCS4NSS1 • -73 dBm @ MCS5NSS1 • -71 dBm @ MCS6NSS1 • -70 dBm @ MCS7NSS1 • -66 dBm @ MCS8NSS1 • -64 dBm @ MCS9NSS1 • -85 dBm @ MCS0NSS2 • -84 dBm @ MCS1NSS2	5 GHz 802.11ac (VHT160) • -85 dBm @ MCS0NSS1 • -82 dBm @ MCS1NSS1 • -79 dBm @ MCS2NSS1 • -76 dBm @ MCS3NSS1 • -73 dBm @ MCS4NSS1 • -69 dBm @ MCS5NSS1 • -67 dBm @ MCS6NSS1 • -66 dBm @ MCS7NSS1 • -61 dBm @ MCS8NSS1 • -60 dBm @ MCS9NSS1 • -83 dBm @ MCS0NSS2 • -80 dBm @ MCS1NSS2

Item	Description			
	• -84 dBm @ MCS3NSS2	• -85 dBm @ MCS2NSS2	• -82 dBm @ MCS2NSS2	• -77 dBm @ MCS2NSS2
	• -81 dBm @ MCS4NSS2	• -82 dBm @ MCS3NSS2	• -78 dBm @ MCS3NSS2	• -74 dBm @ MCS3NSS2
	• -77 dBm @ MCS5NSS2	• -79 dBm @ MCS4NSS2	• -75 dBm @ MCS4NSS2	• -71 dBm @ MCS4NSS2
	• -76 dBm @ MCS6NSS2	• -75 dBm @ MCS5NSS2	• -71 dBm @ MCS5NSS2	• -67 dBm @ MCS5NSS2
	• -71 dBm @ MCS7NSS2	• -73 dBm @ MCS6NSS2	• -69 dBm @ MCS6NSS2	• -65 dBm @ MCS6NSS2
	• -70 dBm @ MCS8NSS2	• -72 dBm @ MCS7NSS2	• -68 dBm @ MCS7NSS2	• -64 dBm @ MCS7NSS2
	• -90 dBm @ MCS0NSS3	• -68 dBm @ MCS8NSS2	• -64 dBm @ MCS8NSS2	• -59 dBm @ MCS8NSS2
	• -88 dBm @ MCS1NSS3	• -66 dBm @ MCS9NSS2	• -62 dBm @ MCS9NSS2	• -58 dBm @ MCS9NSS2
	• -85 dBm @ MCS2NSS3	• -87 dBm @ MCS0NSS3	• -83 dBm @ MCS0NSS3	
	• -82 dBm @ MCS3NSS3	• -85 dBm @ MCS1NSS3	• -82 dBm @ MCS1NSS3	
	• -79 dBm @ MCS4NSS3	• -83 dBm @ MCS2NSS3	• -80 dBm @ MCS2NSS3	
	• -75 dBm @ MCS5NSS3	• -80 dBm @ MCS3NSS3	• -76 dBm @ MCS3NSS3	
	• -74 dBm @ MCS6NSS3	• -77 dBm @ MCS4NSS3	• -73 dBm @ MCS4NSS3	
	• -69 dBm @ MCS7NSS3	• -73 dBm @ MCS5NSS3	• -69 dBm @ MCS5NSS3	
	• -68 dBm @ MCS8NSS3	• -71 dBm @ MCS6NSS3	• -66 dBm @ MCS7NSS3	
	• -66 dBm @ MCS9NSS3	• -70 dBm @ MCS7NSS3	• -62 dBm @ MCS8NSS3	
	• -88 dBm @ MCS0NSS4	• -66 dBm @ MCS8NSS3	• -60 dBm @ MCS9NSS3	
	• -86 dBm @ MCS1NSS4	• -64 dBm @ MCS9NSS3	• -81 dBm @ MCS0NSS4	
	• -83 dBm @ MCS2NSS4	• -85 dBm @ MCS0NSS4	• -80 dBm @ MCS1NSS4	
	• -80 dBm @ MCS3NSS4	• -83 dBm @ MCS1NSS4	• -78 dBm @ MCS2NSS4	
	• -77 dBm @ MCS4NSS4	• -81 dBm @ MCS2NSS4	• -74 dBm @ MCS3NSS4	
	• -73 dBm @ MCS5NSS4	• -78 dBm @ MCS3NSS4	• -71 dBm @ MCS4NSS4	
	• -72 dBm @ MCS6NSS4	• -75 dBm @ MCS4NSS4	• -67 dBm @ MCS5NSS4	

Item	Description			
	• -67 dBm @ MCS7NSS4 • -66 dBm @ MCS8NSS4	• -71 dBm @ MCS5NSS4 • -69 dBm @ MCS6NSS4 • -68 dBm @ MCS7NSS4 • -64 dBm @ MCS8NSS4 • -62 dBm @ MCS9NSS4	• -65 dBm @ MCS6NSS4 • -64 dBm @ MCS7NSS4 • -60 dBm @ MCS8NSS4 • -58 dBm @ MCS9NSS4	

5.3 Standards Compliance

Safety Standards

- UL 60950–1
- CAN/CSA 22.2 No.60950-1
- IEC 60950–1
- EN 60950–1
- GB 4943
- IEC/EN/UL 62368-1

Radio Standards

- ETSI EN 300 328
- ETSI EN 301 893
- RSS-210
- AS/NZS 4268

EMC Standards

- EN 301 489–1
- EN 301 489–17
- ETSI EN 60601-1-2
- FCC Part 15
- ICES-003
- YD/T 1312.2-2004
- ITU k.20
- GB 9254
- GB 17625.1
- AS/NZS CISPR22
- EN 55022

- EN 55024
- CISPR 22
- CISPR 24
- IEC61000-4-6
- IEC61000-4-2

IEEE Standards

- IEEE 802.11a/b/g
- IEEE 802.11n
- IEEE 802.11ac
- IEEE 802.11h
- IEEE 802.11d
- IEEE 802.11e

Security Standards

- 802.11i, Wi-Fi Protected Access 2 (WPA2), and WPA
- 802.1X
- Advanced Encryption Standards (AES) and Temporal Key Integrity Protocol (TKIP)
- EAP Type (s)

EMF

- CENELEC EN 62311
- CENELEC EN 50385
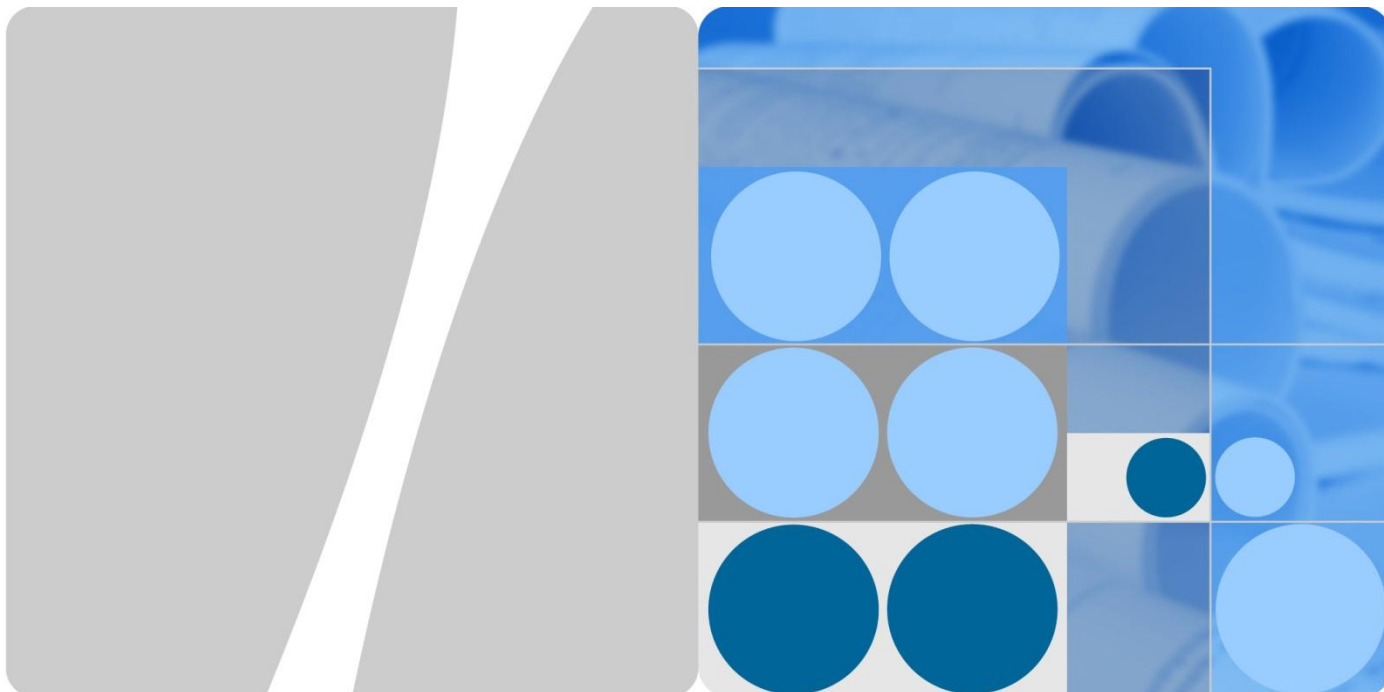- OET65
- RSS-102
- FCC Part1&2
- FCC KDB series

RoHS

- Directive 2002/95/EC & 2011/65/EU

Reach

- Regulation 1907/2006/EC

WEEE

- Directive 2002/96/EC & 2012/19/EU

AP6050DN&AP6150DN
Regulatory Compliance Statement

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1 Regulatory Compliance Information

About This Chapter

1.1 Regulatory Compliance Standards

AP6050DN&AP6150DN complies with the standards listed in Table 1-1.

Table 1-1 Regulatory compliance standards

Discipline	Standards
EMC	• CISPR32 Class B • EN 55032 Class B • FCC Part 15 Subpart B Class B • AS/NZS CISPR 32:2013 • CISPR24 • EN 55024 • ETSI EN 301 489-1 • ETSI EN 301 489-17
Safety	• IEC 60950-1 • EN 60950-1 • IEC 62368-1 • EN 62368-1

Discipline	Standards
RF	• ETSI EN 300 328 • ETSI EN 301 893 • FCC Part15 Subpart C • FCC Part15 Subpart E • Radiocommunications (Short Range Devices) Standard 2014 (For AP6050DN)
Hazardous substances	• EN 50581
Health	• EN 50385 • FCC Part 1 1.1310 • Radiocommunications (Electromagnetic Radiation—Human Exposure) Standard 2014 (For AP6050DN)

NOTE

EMC: electromagnetic compatibility

RF: radio frequency

CISPR: International Special Committee on Radio Interference

EN: European Standard

ETSI: European Telecommunications Standards Institute

CFR: Code of Federal Regulations

FCC: Federal Communication Commission

IEC: International Electrotechnical Commission

AS/NZS: Australian/New Zealand Standard

VCCI: Voluntary Control Council for Interference

CNS: Chinese National Standard

UL: Underwriters Laboratories

CSA: Canadian Standards Association

BS: British Standard

IS: Indian Standard

GR: General Requirement

WLAN: wireless local area network

ICNIRP: International Commission on Non-Ionizing Radiation Protection

OET: Office of Engineering Technology

IEEE: Institute of Electrical and Electronics Engineers

RoHS: restriction of the use of certain hazardous substances

## 1.2 European Regulatory Compliance

AP6050DN&AP6150DN complies with the following European directives and regulations.

- 2014/53/EU(RED)
- 2011/65/EU (RoHS)

- REGULATION (EC) NO. 1907/2006 (REACH)
- 2012/19/EU (WEEE)
- 2004/12/EC&94/62/EC (Packaging)
- 2006/66/EC (Batteries and accumulators)

AP6050DN&AP6150DN complies with Directive 2012/19/EU on waste electrical and electronic equipment (WEEE). Huawei is responsible for recycling its end-of-life devices, and please contact Huawei local service center when recycling is required. Huawei strictly complies with the EU Waste Electrical and Electronic Equipment Directive (WEEE Directive) and electronic waste management regulations enacted by different countries worldwide. In addition, Huawei has established a system for recycling and reuse of electronic wastes, and it can provide service of dismantling and recycling for WEEE. By Huawei recycling system, the waste can be handled environmentally and the resource can be recycled and reused fully, which is also Huawei WEEE stratagem in the word. Most of the materials in product are recyclable, and our packaging is designed to be recycled and should be handled in accordance with your local recycling policies.

In accordance with Article 11(2) in Directive 2012/19/EU (WEEE), products were marked with the following symbol: a cross-out wheeled waste bin with a bar beneath as below:
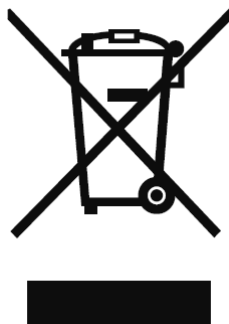
CE Marking:

The following CE mark identifier and affixed to the equipment and packaging:

Article 10.2

This device shall be so constructed that it can be operated in at least one Member State without infringing applicable requirements on the use of radio spectrum.

Article 10.10

The functions of Wireless Access Systems including Radio Local Area Networks (WAS/RLANs) within the band 5150-5350 MHz for this device are restricted to indoor use only within all European Union countries (BE/BG/CZ/DK/DE/EE/IE/EL/ES/FR/HR/IT/CY/LV/LT/LU/HU/MT/NL/AT/PL/PT/RO/SI/SK/FI/SE/UK).

1.3 U.S.A Regulatory Compliance

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

1.3.1 FCC Part 15B

AP6050DN&AP6150DN complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device does not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

If this device is modified without authorization from Huawei, the device may no longer comply with FCC requirements for Class B digital devices. In that a case, your right to use the device may be limited by FCC regulations. Moreover, you may be required to correct any interference to radio or television communications at your own expense.

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This device generates, uses and radiates radio frequency energy. If it is not installed and used in accordance with the instructions, it may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this device does cause harmful interference to radio or television reception, which can be determined by turning the device off and on, the user may take one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Reinforce the separation between the device and receiver.
- Connect the device into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or TV technician for assistance.

⚠ **CAUTION**

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user authority to operate the equipment.

1.4 CISPR 32 Compliance

AP6050DN&AP6150DN complies with CISPR 32 for Class B by the ITE.

1.5 RF Exposure (Health) Information

This equipment complies with relevant RF radiation exposure limits set forth for a public/uncontrolled environment. This equipment should be installed and/or operated with a minimum distance as below between the radiator and your body.

- AP6050DN&AP6150DN: 20 centimeters.

1.6 Other Markets

For relevant compliance information/documentation for markets not mentioned above, please contact Huawei representative