



**AP5030DN**

## **Product Description**

**Issue**      **04**

**Date**        **2015-07-15**

# 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   |
|--|---|
|  <b>DANGER</b>  | Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.  |
|  <b>WARNING</b> | Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.   |
|  <b>CAUTION</b> | Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.  |
|  <b>NOTICE</b>  | Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results.<br>NOTICE is used to address practices not related to personal injury. |

| Symbol  | Description   |
|---|---|
|  <b>NOTE</b> | <p>Calls attention to important information, best practices and tips.</p> <p>NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.</p> |

## Change History

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

### Changes in Issue 05 (2016-07-22)

This version has the following updates:

The following information is modified:

- [4.1 Basic Specifications](#)

### Changes in Issue 04 (2015-07-15)

This version has the following updates:

The following information is modified:

- [4.2 Radio Specifications](#)

### Changes in Issue 03 (2014-12-05)

This version has the following updates:

The following information is modified:

- [4.2 Radio Specifications](#)

### Changes in Issue 02 (2014-07-30)

This version has the following updates:

The following information is modified:

- [4.2 Radio Specifications](#)

### Changes in Issue 01 (2013-12-30)

This is the initial commercial release.

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# 1 Product Positioning and Characteristics

## 1.1 Product Positioning

Table 1-1 Product positioning

| Product Model | Frequency Band   | IEEE Standards Compliance | Positioning  | Usage Scenario  |
|---------------|--|---------------------------|--|---|
| AP5030DN      | Dual bands: <ul style="list-style-type: none"> <li>● 2.4 GHz</li> <li>● 5 GHz</li> </ul> The AP5030DN 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     | The cost-effective AP5030DN supports 3 x 3 MIMO and provides comprehensive service support capabilities. It is deployed indoors and features high reliability, high security, simple network deployment, automatic AC discovery and configuration, and real-time management and maintenance. Huawei AP5030DN complies with IEEE 802.11ac and can provide | The AP5030DN provides 802.11n/ac wireless access networks for places with simple building structure, small size, dense users, and high capacity demands, such as small and medium enterprises and branches.<br><br>The AP5030DN can be flexibly deployed and work in hybrid mode (Fit AP+bridge). |

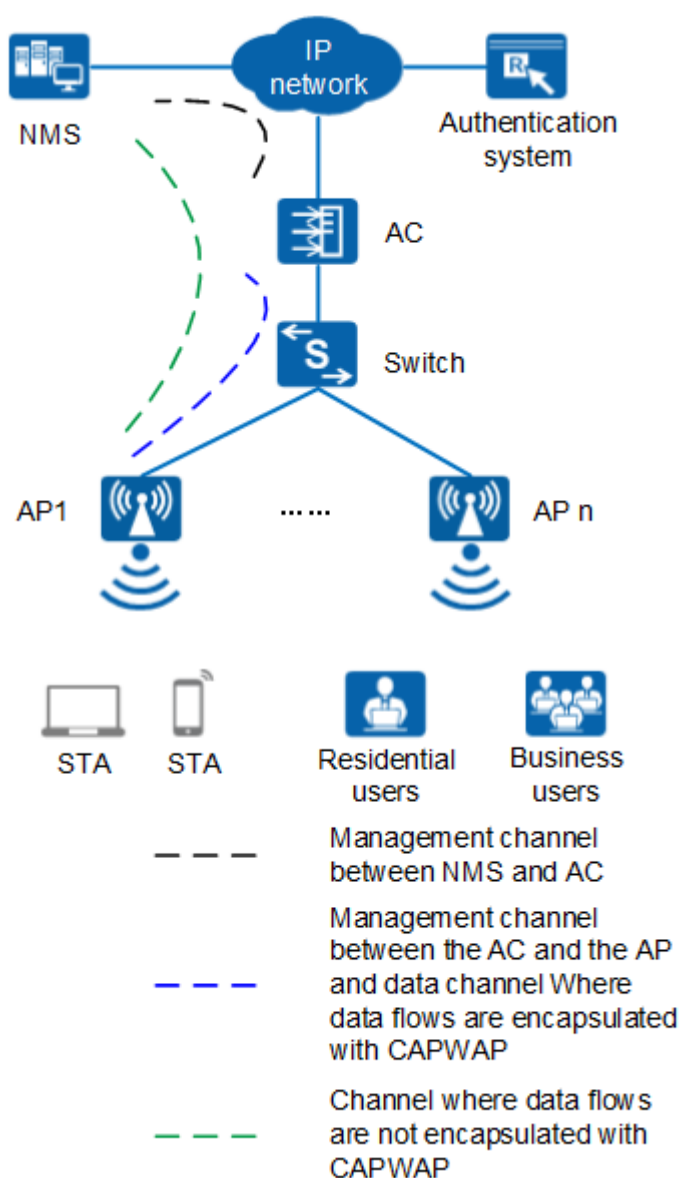
| Product Model | Frequency Band | IEEE Standards Compliance | Positioning  | Usage Scenario |
|---------------|----------------|---------------------------|--|----------------|
|               |                |                           | gigabit access for wireless users. This high capacity greatly improves user experience on wireless networks. |                |

The AP5030DN can work as a Fat AP or Fit AP and switch flexibly between the two working modes based on the network plan.

When the wireless network scale is small, customers need to purchase only AP products and set the APs to work as Fat APs. As the network scale expands, tens of or hundreds of APs exist on the network. To simplify network management, customers are advised to purchase ACs to perform centralized management on the APs and set the APs to work as Fit APs.

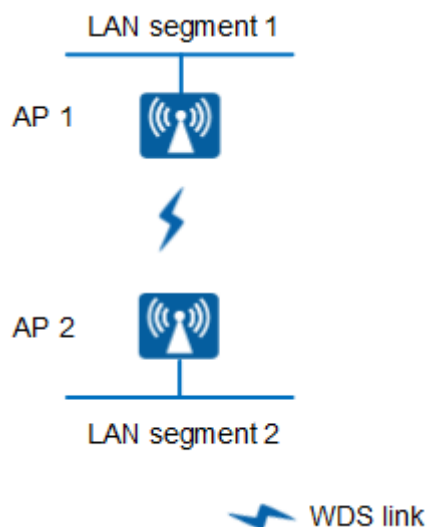
Typical networking modes are as follows:

Figure 1-1 Fit AP networking (AP mode)

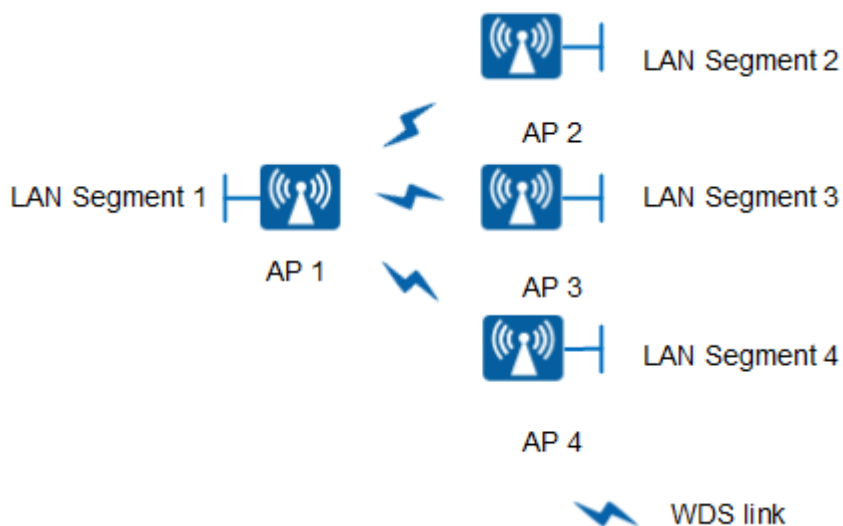


In this networking, the AP functions as a Fit AP. The AC is responsible for user access, AP go-online, AP management, authentication, routing, security, and QoS. Huawei products that provide the AC function include the AC6605, AC6005, ACU2 (with S7700, S9700, or S12700), S5720HI, S7700 (with X series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

**Figure 1-2** Fit AP networking (WDS mode: point-to-point)

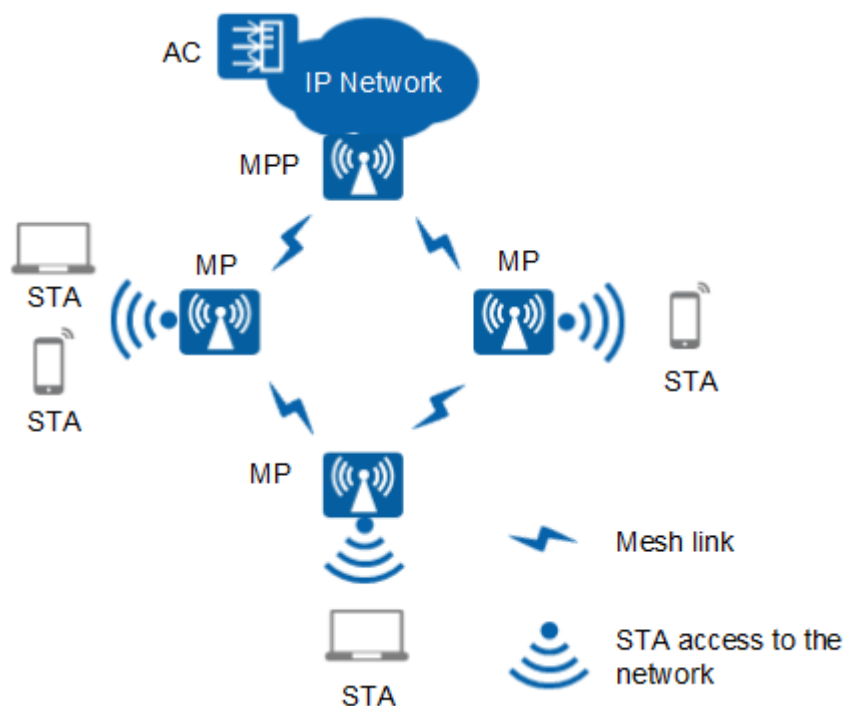


**Figure 1-3** Fit AP networking (WDS mode: point-to-multipoint)



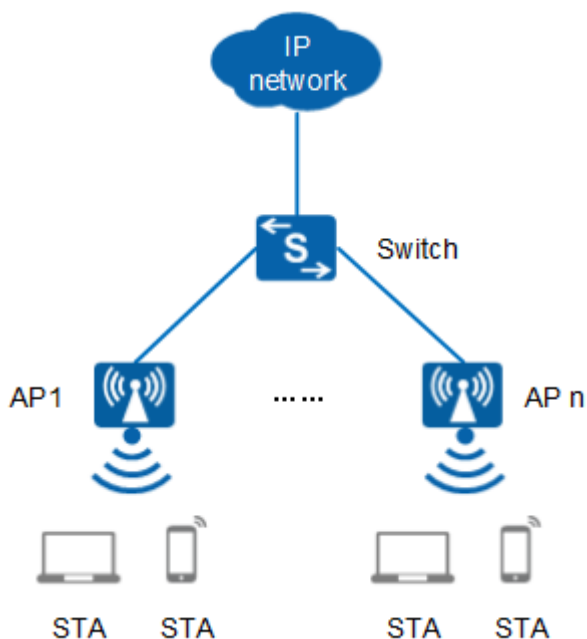
In this networking, the AP connects two or more independently wired or wireless LANs through wireless links to construct a network on which users can exchange data. In Wireless Distribution System (WDS) mode, the AP supports point-to-point (P2P) and point-to-multipoint (P2MP) networking modes. Supporting 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.

## 1.2 Product Characteristics

| Product Characteristics                      | Description   |
|--|---|
| High-speed and reliable wireless access      | <ul style="list-style-type: none"> <li>● Compatibility with IEEE 802.11a/b/g/n/ac</li> <li>● 3 x 3 MIMO and a maximum rate of 1.75 Gbit/s</li> <li>● Link aggregation of dual Ethernet ports</li> <li>● Supports Wi-Fi Multimedia (WMM) and priority mapping on the air interface and wired interface.</li> <li>● Supports wired link integrity check.</li> <li>● Supports load balancing.</li> <li>● Supports roaming without service interruption in Fit AP mode.</li> <li>● Supports AC dual-link backup in Fit AP mode.</li> <li>● Latest 802.11ac chip with higher performance and wider coverage</li> <li>● Supports airtime scheduling which ensures fairness in channel occupation time for all users.</li> </ul>                           |
| Comprehensive user access control capability | <ul style="list-style-type: none"> <li>● Supports access control lists (ACLs) and implements user access control based on the user group policy.</li> <li>● Provides fine-grained bandwidth management for each user.</li> <li>● Supports user isolation policies.</li> <li>● Supports unified authentication on the AC in Fit AP mode.</li> <li>● 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.</li> <li>● 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.</li> </ul> |
| High network security                        | <ul style="list-style-type: none"> <li>● Open system authentication</li> <li>● WEP authentication/encryption</li> <li>● WPA/WPA2-PSK authentication and encryption</li> <li>● WPA/WPA2-802.1x authentication and encryption</li> <li>● WAPI authentication and encryption</li> <li>● 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</li> </ul>   |

| <b>Product Characteristics</b>                   | <b>Description</b>  |
|--|---|
| Flexible networking and environment adaptability | <ul style="list-style-type: none"><li>● Provides flexible networking capabilities and applies to various application scenarios. Mesh and WDS scenarios are supported only in Fit AP mode.</li><li>● 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.</li><li>● Adjusts bandwidth allocation based on the user quantity and environment to improve user experience.</li><li>● 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 in Fit AP mode and works with eSight to display spectrums of interference sources.</li></ul> |
| Easy device management and maintenance           | <ul style="list-style-type: none"><li>● Works in Fit AP mode to support automatic going-online, configuration loading, and plug-and-play (PnP).</li><li>● Supports batch upgrade.</li><li>● Works in Fat AP mode to support HTTP or HTTPS login to the web platform to achieve local management and maintenance.</li><li>● Allows real-time monitoring on the network management system (NMS) to facilitate remote configuration and fast fault location.</li><li>● Supports the Link Layer Discovery Protocol (LLDP) to implement automatic link discovery and obtain the network topology.</li></ul>  |

# 2 Hardware Structure

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## 2.1 AP5030DN

### 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** AP appearance



### Port

The following figure shows ports on the AP.

**Figure 2-2** AP ports



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

- 1. Input port for 12 V DC power supply
- 2. Default button: restores factory settings if you hold down the button more than 3 seconds.
- 3. GE1: 10/100/1000M port used to connect to the wired Ethernet.
- 4. 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.
- 5. Console port: connects to the maintenance terminal for AP configuration and management.
- 6. 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.  |
| 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) | <ul style="list-style-type: none"> <li>● The system is running properly, the Ethernet connection is normal, and STAs are associated with the AP.</li> <li>● The system enters the Uboot CLI.</li> </ul> |

| Type  | Color | Status                           | Description   |
|-------|-------|----------------------------------|---|
|       |       | 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) | <ul style="list-style-type: none"> <li>● The software is being upgraded.</li> <li>● After the software is uploaded and started, the AP working in Fit AP mode requests to go online on the AC and maintains this state until it goes online successfully on the AC (before the CAPWAP link is established).</li> <li>● The AP working in Fit AP mode fails to go online on the AC (the CAPWAP link disconnects).</li> </ul> |
| 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

## 3.1 WLAN Features

WLAN features supported by the AP are as follows:

- Compliance with IEEE 802.11a/b/g/n/ac
- Maximum rate of 1.75 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)
- Short guard interval (GI) in 20 MHz, 40 MHz, and 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
- Airtime scheduling

## 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 Technical Specifications

## 4.1 Basic Specifications

**Table 4-1** Basic specifications

| Item                       |                                    | Description  |
|----------------------------|------------------------------------|--|
| Technical specifications   | Dimensions (H x W x D)             | 53 mm x 220 mm x 220 mm  |
|                            | Weight                             | 0.8 kg   |
|                            | System memory                      | <ul style="list-style-type: none"> <li>● 256 MB DDR2</li> <li>● 32 MB flash memory</li> </ul>  |
| Power specifications       | Power input                        | <ul style="list-style-type: none"> <li>● DC 12 V <math>\pm</math> 10%</li> <li>● PoE power: -48 V DC (in compliance with IEEE 802.3af/at)</li> </ul> |
|                            | Maximum power consumption          | 12.95 W<br>NOTE<br>The actual maximum power consumption depends on local laws and regulations.   |
| Environment specifications | Operating temperature and altitude | -60 m to +1800 m: -10°C to +50°C<br>1800 m to 5000 m: Temperature decreases by 1°C every time the altitude increases 300 m.                          |
|                            | Storage temperature                | -40°C to +70°C   |
|                            | Operating humidity                 | 5% to 95% (non-condensing)   |
|                            | IP rating                          | IP41   |
|                            | Atmospheric pressure               | 70 kPa to 106 kPa  |

## 4.2 Radio Specifications

**Table 4-2** Radio specifications

| Item                                       | Description  |   |  |
|--|--|---|--|
| Antenna type                               | Built-in omnidirectional antenna   |   |  |
| Antenna gain                               | <ul style="list-style-type: none"> <li>● 2.4G: 4dBi</li> <li>● 5G: 5dBi</li> </ul>   |   |  |
| Maximum number of users                    | <ul style="list-style-type: none"> <li>● FIT AP: <math>\leq 256</math></li> <li>● FAT AP: <math>\leq 64</math></li> </ul>  |   |  |
| Maximum number of VAPs for each radio      | 16   |   |  |
| Maximum transmit power                     | <ul style="list-style-type: none"> <li>● 2.4 GHz: 25 dBm (combined power)</li> <li>● 5 GHz: 25 dBm (combined power)</li> </ul> <p><b>NOTE</b><br/>The 2.4 GHz radio does not support the 40M bandwidth in FCC regions (including America).</p> <p>The actual transmit power depends on local laws and regulations.</p> |   |  |
| Maximum number of non-overlapping channels | 2.4 GHz (2.412 GHz to 2.472 GHz)<br>802.11b/g<br><ul style="list-style-type: none"> <li>● 20 MHz: 3</li> </ul> 802.11n<br><ul style="list-style-type: none"> <li>● 20 MHz: 3</li> <li>● 40 MHz: 1</li> </ul>   | 5 GHz (5.18 GHz to 5.825 GHz)<br><ul style="list-style-type: none"> <li>● 802.11a               <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> </ul> </li> <li>● 802.11n               <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> <li>- 40 MHz: 6</li> </ul> </li> <li>● 802.11ac               <ul style="list-style-type: none"> <li>- 20MHz: 13</li> <li>- 40MHz: 6</li> <li>- 80MHz: 3</li> </ul> </li> </ul> | <p><b>NOTE</b><br/>The table uses the number of non-overlapping channels supported by China as an example. The number of non-overlapping channels varies in different countries. For details, see the <i>Country Codes &amp; Channels Compliance</i>.</p> <p><b>NOTICE</b><br/>If the AP is delivered to the USA, pay attention to the following on channel and frequency band usage.</p> <ol style="list-style-type: none"> <li>1. The country code of the AP is fixed.</li> <li>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.</li> </ol> |

| Item                   | Description  |
|------------------------|--|
| Channel rate supported | <ul style="list-style-type: none"><li>● 802.11b: 1, 2, 5.5, and 11 Mbit/s</li><li>● 802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbit/s</li><li>● 802.11n: 6.5 to 450 Mbit/s</li><li>● 802.11ac: 6.5 to 1300 Mbit/s</li></ul> |

| Item                                  | Description  |  |   |  |
|---------------------------------------|--|--|---|--|
| Receiver sensitivity (Typical values) | 2.4 GHz <ul style="list-style-type: none"> <li>● -101 dBm @ 1 Mb/s</li> <li>● -96 dBm @ 2 Mb/s</li> <li>● -93 dBm @ 5.5 Mb/s</li> <li>● -91 dBm @ 11 Mb/s</li> </ul> | 2.4 GHz <ul style="list-style-type: none"> <li>802.11g (non-HT20)</li> <li>● -92 dBm @ 6 Mb/s</li> <li>● -91 dBm @ 9 Mb/s</li> <li>● -91 dBm @ 12 Mb/s</li> <li>● -90 dBm @ 18 Mb/s</li> <li>● -89 dBm @ 24 Mb/s</li> <li>● -85 dBm @ 36 Mb/s</li> <li>● -82 dBm @ 48 Mb/s</li> <li>● -81 dBm @ 54 Mb/s</li> </ul> | 2.4 GHz <ul style="list-style-type: none"> <li>802.11n (HT20)</li> <li>● -92 dBm @ MCS0</li> <li>● -92 dBm @ MCS1</li> <li>● -92 dBm @ MCS2</li> <li>● -87 dBm @ MCS3</li> <li>● -85 dBm @ MCS4</li> <li>● -81 dBm @ MCS5</li> <li>● -79 dBm @ MCS6</li> <li>● -77 dBm @ MCS7</li> <li>● -90 dBm @ MCS8</li> <li>● -90 dBm @ MCS9</li> <li>● -90 dBm @ MCS10</li> <li>● -85 dBm @ MCS11</li> <li>● -83 dBm @ MCS12</li> <li>● -79 dBm @ MCS13</li> <li>● -77 dBm @ MCS14</li> <li>● -75 dBm @ MCS15</li> <li>● -88 dBm @ MCS16</li> <li>● -88 dBm @ MCS17</li> <li>● -88 dBm @ MCS18</li> <li>● -83 dBm @ MCS19</li> <li>● -81 dBm @ MCS20</li> </ul> | 2.4 GHz <ul style="list-style-type: none"> <li>802.11n(HT40)</li> <li>● -90 dBm @ MCS0</li> <li>● -90 dBm @ MCS1</li> <li>● -89 dBm @ MCS2</li> <li>● -85 dBm @ MCS3</li> <li>● -82 dBm @ MCS4</li> <li>● -78 dBm @ MCS5</li> <li>● -76 dBm @ MCS6</li> <li>● -75 dBm @ MCS7</li> <li>● -88 dBm @ MCS8</li> <li>● -88 dBm @ MCS9</li> <li>● -87 dBm @ MCS10</li> <li>● -83 dBm @ MCS11</li> <li>● -80 dBm @ MCS12</li> <li>● -76 dBm @ MCS13</li> <li>● -74 dBm @ MCS14</li> <li>● -73 dBm @ MCS15</li> <li>● -86 dBm @ MCS16</li> <li>● -86 dBm @ MCS17</li> <li>● -85 dBm @ MCS18</li> <li>● -81 dBm @ MCS19</li> <li>● -78 dBm @ MCS20</li> </ul> |

| Item | Description |  |   |   |
|------|-------------|--|---|---|
|      |             |  | <ul style="list-style-type: none"><li>● -77 dBm @ MCS21</li><li>● -75 dBm @ MCS22</li><li>● -73 dBm @ MCS23</li></ul> | <ul style="list-style-type: none"><li>● -74 dBm @ MCS21</li><li>● -72 dBm @ MCS22</li><li>● -71 dBm @ MCS23</li></ul> |

| Item | Description  |   |   |   |
|------|--|---|---|---|
|      | 5 GHz<br>802.11a (non-HT20) <ul style="list-style-type: none"> <li>● -94 dBm @ 6 Mb/s</li> <li>● -93 dBm @ 9 Mb/s</li> <li>● -93 dBm @ 12 Mb/s</li> <li>● -92 dBm @ 18 Mb/s</li> <li>● -88 dBm @ 24 Mb/s</li> <li>● -85 dBm @ 36 Mb/s</li> <li>● -81 dBm @ 48 Mb/s</li> <li>● -79 dBm @ 54 Mb/s</li> </ul> | 5 GHz<br>802.11n (HT20) <ul style="list-style-type: none"> <li>● -93 dBm @ MCS0</li> <li>● -93 dBm @ MCS1</li> <li>● -91 dBm @ MCS2</li> <li>● -86 dBm @ MCS3</li> <li>● -83 dBm @ MCS4</li> <li>● -78 dBm @ MCS5</li> <li>● -77 dBm @ MCS6</li> <li>● -76 dBm @ MCS7</li> <li>● -91 dBm @ MCS8</li> <li>● -91 dBm @ MCS9</li> <li>● -89 dBm @ MCS10</li> <li>● -84 dBm @ MCS11</li> <li>● -81 dBm @ MCS12</li> <li>● -76 dBm @ MCS13</li> <li>● -75 dBm @ MCS14</li> <li>● -74 dBm @ MCS15</li> <li>● -89 dBm @ MCS16</li> <li>● -89 dBm @ MCS17</li> <li>● -87 dBm @ MCS18</li> <li>● -82 dBm @ MCS19</li> <li>● -79 dBm @ MCS20</li> </ul> | 5 GHz<br>802.11n (HT40) <ul style="list-style-type: none"> <li>● -91 dBm @ MCS0</li> <li>● -91 dBm @ MCS1</li> <li>● -88 dBm @ MCS2</li> <li>● -83 dBm @ MCS3</li> <li>● -81 dBm @ MCS4</li> <li>● -76 dBm @ MCS5</li> <li>● -75 dBm @ MCS6</li> <li>● -74 dBm @ MCS7</li> <li>● -89 dBm @ MCS8</li> <li>● -89 dBm @ MCS9</li> <li>● -86 dBm @ MCS10</li> <li>● -81 dBm @ MCS11</li> <li>● -79 dBm @ MCS12</li> <li>● -74 dBm @ MCS13</li> <li>● -73 dBm @ MCS14</li> <li>● -72 dBm @ MCS15</li> <li>● -87 dBm @ MCS16</li> <li>● -87 dBm @ MCS17</li> <li>● -84 dBm @ MCS18</li> <li>● -79 dBm @ MCS19</li> <li>● -77 dBm @ MCS20</li> </ul> | - |

| Item | Description |   |   |  |
|------|-------------|---|---|--|
|      |             | <ul style="list-style-type: none"><li>● -74 dBm @ MCS21</li><li>● -73 dBm @ MCS22</li><li>● -72 dBm @ MCS23</li></ul> | <ul style="list-style-type: none"><li>● -72 dBm @ MCS21</li><li>● -71 dBm @ MCS22</li><li>● -70 dBm @ MCS23</li></ul> |  |

| Item | Description   |   |   |   |
|------|---|---|---|---|
|      | 5 GHz<br>802.11ac<br>(VHT20) <ul style="list-style-type: none"> <li>● -93 dBm @ MCS0NSS1</li> <li>● -93 dBm @ MCS1NSS1</li> <li>● -91 dBm @ MCS2NSS1</li> <li>● -86 dBm @ MCS3NSS1</li> <li>● -83 dBm @ MCS4NSS1</li> <li>● -78 dBm @ MCS5NSS1</li> <li>● -77 dBm @ MCS6NSS1</li> <li>● -76 dBm @ MCS7NSS1</li> <li>● -71 dBm @ MCS8NSS1</li> <li>● -91 dBm @ MCS0NSS2</li> <li>● -91 dBm @ MCS1NSS2</li> <li>● -89 dBm @ MCS2NSS2</li> <li>● -84 dBm @ MCS3NSS2</li> <li>● -81 dBm @ MCS4NSS2</li> <li>● -76 dBm @ MCS5NSS2</li> <li>● -75 dBm @ MCS6NSS2</li> <li>● -74 dBm @ MCS7NSS2</li> <li>● -69 dBm @ MCS8NSS2</li> <li>● -89 dBm @ MCS0NSS3</li> <li>● -89 dBm @ MCS1NSS3</li> </ul> | 5 GHz<br>802.11ac<br>(VHT40) <ul style="list-style-type: none"> <li>● -91 dBm @ MCS0NSS1</li> <li>● -90 dBm @ MCS1NSS1</li> <li>● -88 dBm @ MCS2NSS1</li> <li>● -84 dBm @ MCS3NSS1</li> <li>● -81 dBm @ MCS4NSS1</li> <li>● -77 dBm @ MCS5NSS1</li> <li>● -75 dBm @ MCS6NSS1</li> <li>● -74 dBm @ MCS7NSS1</li> <li>● -69 dBm @ MCS8NSS1</li> <li>● -67 dBm @ MCS9NSS1</li> <li>● -89 dBm @ MCS0NSS2</li> <li>● -88 dBm @ MCS1NSS2</li> <li>● -86 dBm @ MCS2NSS2</li> <li>● -82 dBm @ MCS3NSS2</li> <li>● -79 dBm @ MCS4NSS2</li> <li>● -75 dBm @ MCS5NSS2</li> <li>● -73 dBm @ MCS6NSS2</li> <li>● -72 dBm @ MCS7NSS2</li> <li>● -66 dBm @ MCS8NSS2</li> <li>● -64 dBm @ MCS9NSS2</li> </ul> | 5 GHz<br>802.11ac<br>(VHT80) <ul style="list-style-type: none"> <li>● -89 dBm @ MCS0NSS1</li> <li>● -86 dBm @ MCS1NSS1</li> <li>● -85 dBm @ MCS2NSS1</li> <li>● -81 dBm @ MCS3NSS1</li> <li>● -78 dBm @ MCS4NSS1</li> <li>● -74 dBm @ MCS5NSS1</li> <li>● -72 dBm @ MCS6NSS1</li> <li>● -71 dBm @ MCS7NSS1</li> <li>● -67 dBm @ MCS8NSS1</li> <li>● -65 dBm @ MCS9NSS1</li> <li>● -87 dBm @ MCS0NSS2</li> <li>● -84 dBm @ MCS1NSS2</li> <li>● -83 dBm @ MCS2NSS2</li> <li>● -79 dBm @ MCS3NSS2</li> <li>● -76 dBm @ MCS4NSS2</li> <li>● -72 dBm @ MCS5NSS2</li> <li>● -70 dBm @ MCS6NSS2</li> <li>● -69 dBm @ MCS7NSS2</li> <li>● -64 dBm @ MCS8NSS2</li> <li>● -62 dBm @ MCS9NSS2</li> </ul> | - |

| Item | Description  |  |  |  |
|------|--|--|--|--|
|      | <ul style="list-style-type: none"> <li>● -87 dBm @ MCS2NSS3</li> <li>● -82 dBm @ MCS3NSS3</li> <li>● -79 dBm @ MCS4NSS3</li> <li>● -74 dBm @ MCS5NSS3</li> <li>● -73 dBm @ MCS6NSS3</li> <li>● -72 dBm @ MCS7NSS3</li> <li>● -67 dBm @ MCS8NSS3</li> <li>● -65 dBm @ MCS9NSS3</li> </ul> | <ul style="list-style-type: none"> <li>● -87 dBm @ MCS0NSS3</li> <li>● -86 dBm @ MCS1NSS3</li> <li>● -84 dBm @ MCS2NSS3</li> <li>● -80 dBm @ MCS3NSS3</li> <li>● -77 dBm @ MCS4NSS3</li> <li>● -73 dBm @ MCS5NSS3</li> <li>● -71 dBm @ MCS6NSS3</li> <li>● -70 dBm @ MCS7NSS3</li> <li>● -63 dBm @ MCS8NSS3</li> <li>● -61 dBm @ MCS9NSS3</li> </ul> | <ul style="list-style-type: none"> <li>● -85 dBm @ MCS0NSS3</li> <li>● -82 dBm @ MCS1NSS3</li> <li>● -81 dBm @ MCS2NSS3</li> <li>● -77 dBm @ MCS3NSS3</li> <li>● -74 dBm @ MCS4NSS3</li> <li>● -70 dBm @ MCS5NSS3</li> <li>● -67 dBm @ MCS7NSS3</li> <li>● -61 dBm @ MCS8NSS3</li> <li>● -59 dBm @ MCS9NSS3</li> </ul> |  |

## 4.3 Standards Compliance

### Safety Standards

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

### Radio standards

- ETSI EN 300 328
- ETSI EN 301 893
- FCC Part 15C: 15.247
- FCC Part 15C: 15.407
- 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)

## Environment Standards

- ETSI 300 019-2-1
- ETSI 300 019-2-2
- ETSI 300 019-2-3
- ETSI 300 019-1-1
- ETSI 300 019-1-2
- ETSI 300 019-1-3

## **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