AP8030DN

Product Description

Issue   **05**

Date   **2017-04-20**

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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.

Symbol	Description
NOTE	Calls attention to important information, best practices and tips. 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 (2016-10-15)

This version has the following updates:

The following information is added:

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

The following information is modified:

- **1.1 Product Positioning**
- **5.1 Basic Specifications**

Changes in Issue 03 (2015-07-15)

This version has the following updates:

The following information is modified:

- **5.2 Radio Specifications**

Changes in Issue 02 (2014-12-05)

This version has the following updates:

The following information is modified:

- **5.2 Radio Specifications**

Changes in Issue 01 (2014-09-10)

This is the initial commercial release.

Contents

1 Product Positioning and Characteristics

1.1 Product Positioning

Table 1-1 Product positioning

Product Model	Frequency Band	IEEE Standard Compliance	Positioning	Usage Scenario
AP8030DN	Dual band: 2.4 GHz 5 GHz The AP8030DN 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	Huawei AP8030DN is the latest 802.11ac outdoor dual-band wireless access point (AP). Physically hardened, the AP8030DN supports 3x3 MIMO and offers enhanced outdoor coverage performance. It can provide services simultaneously on the 2.4 GHz and 5 GHz frequency bands to support more access users. It also provides comprehensive	Huawei AP8030DNs comply with IP67 dustproof and waterproof protection standards, applicable to coverage scenarios (for example, squares, pedestrian streets, and amusement parks) and bridging scenarios (for example, wireless harbors, data backhaul, video surveillance, and train-to-ground backhaul).

Product Model	Frequency Band	IEEE Standard Compliance	Positioning	Usage Scenario
			service support capabilities and features high reliability, high security, simple network deployment, automatic AC discovery and configuration, and real-time management and maintenance, which meets requirements of outdoor deployment.	

The AP8030DN can work as a Fat AP, Fit AP, or cloud AP. It can switch flexibly among three working modes based on the network plan.

Typical networking modes are as follows:
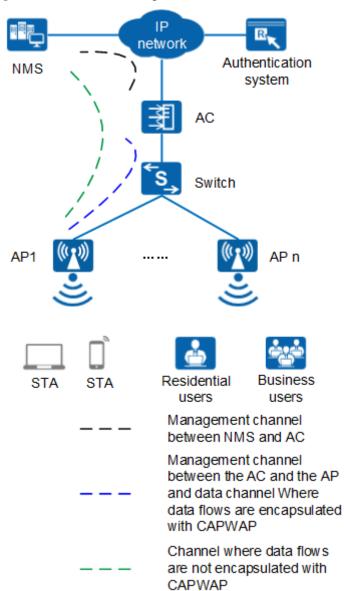
Figure 1-1 Fit AP networking (AP mode)

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).
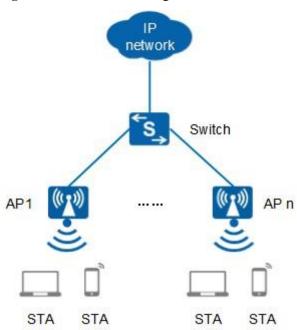
Figure 1-2 Fat AP networking

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 1-3 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	Complies with IEEE 802.11a/b/g/n/ac.
	Supports 3x3 MIMO and provides a maximum rate of 1.75 Gbit/s.
	Supports Wi-Fi Multimedia (WMM) and priority mapping on the air interface and wired interface.
	Supports wired link integrity check.
	Provides two GE auto-sensing uplink electrical ports and supports PoE power supply.
	Supports load balancing.
	Supports roaming without service interruption in Fit AP mode.
	Supports AC dual-link backup in Fit AP mode.
	Uses the latest 802.11ac chip to provide higher performance and wider coverage.
	Uses a metal shell and heat dissipation design to ensure high reliability.
	Supports airtime scheduling which ensures fairness in channel occupation time for all users.
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.

Product Characteristics	Description
High network security	Open system authentication
	WEP authentication/encryption
	WPA/WPA2/WPA-WPA2-PSK authentication and encryption
	WPA/WPA2/WPA-WPA2-802.1x authentication and encryption
	WPA, WPA2, and WPA-WPA2 support TKIP and CCMP encryption algorithms, where CCMP uses 128-bit advanced encryption standard (AES) encryption algorithm and has high security.
	WAPI authentication and encryption
	Supports wireless intrusion detection system (WIDS) and wireless intrusion prevention system (WIPS), including rogue device detection and countermeasure, attack detection and dynamic blacklist, STA/AP blacklist and whitelist.
Flexible networking and environment adaptability	Provides flexible networking capabilities and applies to various application scenarios. Mesh and WDS scenarios are supported only in Fit AP mode.
	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.
	Supports the MIMO antenna system.
	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.
Easy device management and maintenance	Automatically goes online and loads the configuration, and supports plug-and-play (PnP) in Fit AP mode.
	Supports batch upgrade.
	Manages APs locally on the web platform and supports HTTP or HTTPS login, configuration, and maintenance in Fat AP mode.
	Allows real-time monitoring on the network management system (NMS) to facilitate remote configuration and fast fault location.

Product Characteristics	Description
High reliability and protection level	Provides strong hardware protection capability. ● Adapts to a wide temperature range from -40 ℃ to +65 ℃. Uses industry-standard components and design methods, improving industry-level reliability. Complies with IP67 protection standards. Provides 6 kA or 6 kV surge protection capability on an Ethernet interface. Complies with international standards and China safety standards III.

2 Hardware Structure

2.1 AP8030DN

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

CAUTION

There is a scald warning label attached on the device, warning you not to touch the device after the device has been operating for a long time.

Interfaces

The following figure shows interfaces on the AP.

Figure 2-2 Interfaces on the AP

1. GE0/PoE interface: 10/100/1000M port that connects to the wired Ethernet and supports PoE input.

2. GE1 interface: 10/100/1000M port that connects to the wired Ethernet.

3. SFP: Optical port that supports the 100M/1000M optical module.

4. CONSOLE: Connects to a maintenance terminal for AP configuration and management.

5. Default:Restores factory settings and restarts the device when you hold down the button more than 3 seconds.

📖**NOTE**

The Reset button is protected by a waterproof screw. Before pressing the Reset button, remove the waterproof screw. Keep the screw properly and install it again after pressing the Reset button.

6. Security slot: Connects to a security lock.

7. Device ground screw: Connects the AP to a ground cable.

LED Indicators

The AP provides multiple indicators: SYS indicator, Link/ACT indicator, and Wireless indicator. The following table describes indicators on AP.

📖**NOTE**

Indicator colors may vary slightly at different temperature.
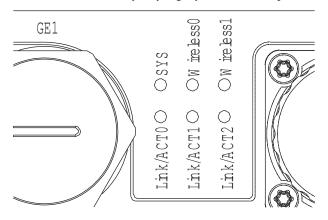
Table 2-1 Descriptions about the SYS indicator

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.

Type	Color	Status	Description
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 mode and fails to go online.

Type	Color	Status	Description
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.

Link/ACT indicators consist of Link/ACT0, Link/ACT1, and Link/ACT2, showing link status of interfaces GE0/PoE, GE1, SFP respectively.

Table 2-2 Descriptions about the Link/ACT indicator

Type	Color	Status	Description
LINK	Green	Steady on	The system is running properly, the Ethernet connection is normal, and no data is being transmitted.
ACT	Green	Blinking	The system is running properly, the Ethernet connection is normal, and the AP is transmitting data. The indicator blinks more quickly when more data is being transmitted.

Wireless indicators consist of Wireless0 and Wireless1, showing wireless link status of the 2.4/5 GHz and 5 GHz radio interfaces respectively.

Table 2-3 Description about the Wireless indicator (Traffic volume indicator)

Color	Status	Description
Green/yellow	Off	Radios are disabled, and no STA is connected to the AP.
Green/yellow	Steady on	The AP has STAs connected to the 2.4 GHz radio or 5 GHz radio, but no data is being transmitted.
Green	Blinking	The AP has STAs connected to the 2.4 GHz radio and is transmitting data. The indicator blinks more quickly when more data is being transmitted.

Color	Status	Description
Yellow	Blinking	The AP has STAs connected to the 5 GHz radio and is transmitting data. The indicator blinks more quickly when more data is being transmitted.
Green/yellow	Blinking alternatively	The AP has STAs connected to both the 2.4 GHz radio and 5 GHz radio. The indicator blinks more quickly when more data is being transmitted.

Table 2-4 Description about the Wireless indicator (Wireless bridge indicator)

Color	Status	Description
Green/yellow	Off	The AP is not transmitting or receiving data or the signal strength is extremely low.
	Blinking once every 2s (0.5 Hz)	The AP is transmitting or receiving data normally, and the signal strength is low.
	Blinking once every 0.25 seconds (4 Hz)	The AP is transmitting or receiving data normally, and the signal strength is medium.
	Steady on	The AP is transmitting or receiving data normally, and the signal strength is high.

☷**NOTE**

When the WDS/Mesh function is enabled on an AP, the blinking frequency of its Wireless indicator indicates the receive signal strength on the WDS/Mesh connection by default. After you connect an AP to a WDS/Mesh network, you can run the **wifi-light** { **signal-strength** | **traffic** } command on the AC to specify whether the Wireless indicator blinking frequency indicates the receive signal strength or service traffic rate.

- **wifi-light signal-strength**:
  - If the Mesh function is enabled on the AP, the blinking frequency of the Wireless indicator reflects the weakest signal strength of all neighboring APs.
  - If WDS is enabled on an AP, the blinking frequency of the Wireless indicator reflects the strength of signals received from a WDS AP.
    - If the AP works in leaf mode, the blinking frequency of the Wireless indicator reflects the strength of signals received from a middle AP.
    - If the AP works in middle mode, the blinking frequency of the Wireless indicator reflects the strength of signals received from a root AP.
    - If the AP works in root mode, the blinking frequency of the Wireless indicator reflects the weakest signal strength of middle APs.
- **wifi-light traffic**: allows the Wireless indicator to reflect the service traffic volume on the radio.

When an AP functions as a Fat AP, the Wireless indicator of the AP cannot reflect the signal strength.

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

3.1 WLAN Features

WLAN features supported by the AP are as follows:

- Complies with IEEE 802.11a/b/g/n/ac, supports 3x3 MIMO, and provides a maximum rate of 1.75 Gbit/s.

- Maximum ratio combining (MRC)

- Space time block code (STBC)

- 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
- 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

- 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

- Dying Gasp

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
	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)
	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)
	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)

Features	Description
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)

Features	Description
Maintenance Features	Unified management and maintenance 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

5 Technical Specifications

5.1 Basic Specifications

Table 5-1 Basic Specifications

Item		Description
Technical specifications	Dimensions (H x W x D)	100 mm x 290 mm x 260 mm
	Weight	3.6 kg
	System memory	256 MB DDR3 64 MB Flash
Power specifications	Power input	PoE power supply in compliance with IEEE 802.3at
	Maximum power consumption	20.1 W **NOTE** The actual maximum power consumption depends on local laws and regulations.
Environment specifications	Operating temperature	-60 m to 1800 m: -40 °C to +65 °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
	Operating humidity	0% to 100% (non-condensing)
	IP rating	IP67
	Wind resistance	Up to 149 MPH
	Atmospheric pressure	53 kPa to 106 kPa

5.2 Radio Specifications

Table 5-2 Radio specifications

Item	Description		
Antenna type	Built-in directional antenna Horizontal beamwidth: 60 degrees Vertical beamwidth: 30 degrees		
Antenna gain	2.4 GHz: 10 dBi 5 GHz: 10 dBi		
Maximum number of users	● Fit AP mode: ≤ 256 ● Fat AP mode: ≤ 64 ● Cloud AP mode: ≤ 256		
Maximum number of VAPs for each radio	16		
Maximum transmit power	2.4 GHz: 28 dBm (combined power) 5 GHz: 26 dBm (combined power) **NOTE** The actual transmit power depends on local laws and regulations.		
Maximum number of non-overlapping channels	2.4 GHz (2.412 GHz to 2.472 GHz) 802.11b/g 20 MHz: 3 802.11n 20 MHz: 3 40 MHz: 1	5 GHz (5.18 GHz to 5.24 GHz，5.745GHz to 5.825GHz) 802.11a – 20 MHz: 9 802.11n – 20 MHz: 9 – 40 MHz: 4 802.11ac – 20MHz: 9 – 40MHz: 4 – 80MHz: 2	**NOTE** 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 *Country Codes & Channels Compliance*.

Item	Description
Channel rate	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 450 Mbit/s
	802.11ac: 6.5 to 1300 Mbit/s

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. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

   Caution: The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

   Note: This equipment 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 equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

   —Reorient or relocate the receiving antenna.

   —Increase the separation between the equipment and receiver.

   —Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

   —Consult the dealer or an experienced radio/TV technician for help.

   FCC RF Radiation Exposure Statement:

   This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 40cm between the radiator and any part of your body.

Item	Description			
Receiver sensitivity (Typical values)	2.4 GHz 802.11b (CCK) -100 dBm @ 1 Mb/s -94 dBm @ 2 Mb/s -94 dBm @ 5.5 Mb/s -90 dBm @ 11 Mb/s	2.4 GHz 802.11g (non-HT20) -95 dBm @ 6 Mb/s -95 dBm @ 9 Mb/s -94 dBm @ 12 Mb/s -94 dBm @ 18 Mb/s -91 dBm @ 24 Mb/s -87 dBm @ 36 Mb/s -83 dBm @ 48 Mb/s -82 dBm @ 54 Mb/s	2.4 GHz 802.11n (HT20) -95 dBm @ MCS0 -95 dBm @ MCS1 -94 dBm @ MCS2 -89 dBm @ MCS3 -85 dBm @ MCS4 -82 dBm @ MCS5 -80 dBm @ MCS6 -78 dBm @ MCS7 -93 dBm @ MCS8 -93 dBm @ MCS9 -92 dBm @ MCS10 -87 dBm @ MCS11 -83 dBm @ MCS12 -80 dBm @ MCS13 -78 dBm @ MCS14 -76 dBm @ MCS15 -91 dBm @ MCS16 -91 dBm @ MCS17 -90 dBm @ MCS18 -85 dBm @ MCS19 -81 dBm @	2.4 GHz 802.11n(HT40) -92 dBm @ MCS0 -90 dBm @ MCS1 -90 dBm @ MCS2 -85 dBm @ MCS3 -83 dBm @ MCS4 -79 dBm @ MCS5 -78 dBm @ MCS6 -75 dBm @ MCS7 -90 dBm @ MCS8 -88 dBm @ MCS9 -88 dBm @ MCS10 -83 dBm @ MCS11 -81 dBm @ MCS12 -77 dBm @ MCS13 -76 dBm @ MCS14 -73 dBm @ MCS15 -88 dBm @ MCS16 -86 dBm @ MCS17 -86 dBm @ MCS18 -81 dBm @ MCS19 -79 dBm @

Item	Description			
			-78 dBm @ MCS21	-75 dBm @ MCS21
			-76 dBm @ MCS22	-74 dBm @ MCS22
			-74 dBm @ MCS23	-71 dBm @ MCS23

Item	Description			
	5 GHz 802.11a (non-HT20) -96 dBm @ 6 Mb/s -95 dBm @ 9 Mb/s -94 dBm @ 12 Mb/s -93 dBm @ 18 Mb/s -89 dBm @ 24 Mb/s -86 dBm @ 36 Mb/s -82 dBm @ 48 Mb/s -80 dBm @ 54 Mb/s	5 GHz 802.11n (HT20) -95 dBm @ MCS0 -94 dBm @ MCS1 -93 dBm @ MCS2 -88 dBm @ MCS3 -85 dBm @ MCS4 -80 dBm @ MCS5 -79 dBm @ MCS6 -78 dBm @ MCS7 -93 dBm @ MCS8 -92 dBm @ MCS9 -91 dBm @ MCS10 -86 dBm @ MCS11 -83 dBm @ MCS12 -78 dBm @ MCS13 -77 dBm @ MCS14 -76 dBm @ MCS15 -91 dBm @ MCS16 -90 dBm @ MCS17 -89 dBm @ MCS18 -84 dBm @ MCS19 -81 dBm @	5 GHz 802.11n (HT40) -92 dBm @ MCS0 -91 dBm @ MCS1 -90 dBm @ MCS2 -85 dBm @ MCS3 -82 dBm @ MCS4 -78 dBm @ MCS5 -76 dBm @ MCS6 -75 dBm @ MCS7 -90 dBm @ MCS8 -89 dBm @ MCS9 -88 dBm @ MCS10 -83 dBm @ MCS11 -80 dBm @ MCS12 -76 dBm @ MCS13 -74 dBm @ MCS14 -73 dBm @ MCS15 -88 dBm @ MCS16 -87 dBm @ MCS17 -86 dBm @ MCS18 -81 dBm @ MCS19 -78 dBm @	-

Item	Description			
		-76 dBm @ MCS21	-74 dBm @ MCS21	
		-75 dBm @ MCS22	-72 dBm @ MCS22	
		-74 dBm @ MCS23	-71 dBm @ MCS23	

Item	Description			
	5 GHz 802.11ac (VHT20)	5 GHz 802.11ac (VHT40)	5 GHz 802.11ac (VHT80)	-
	-95 dBm @ MCS0NSS1	-92 dBm @ MCS0NSS1	-90 dBm @ MCS0NSS1	
	-94 dBm @ MCS1NSS1	-92 dBm @ MCS1NSS1	-88 dBm @ MCS1NSS1	
	-93 dBm @ MCS2NSS1	-89 dBm @ MCS2NSS1	-86 dBm @ MCS2NSS1	
	-88 dBm @ MCS3NSS1	-85 dBm @ MCS3NSS1	-82 dBm @ MCS3NSS1	
	-85 dBm @ MCS4NSS1	-82 dBm @ MCS4NSS1	-79 dBm @ MCS4NSS1	
	-80 dBm @ MCS5NSS1	-78 dBm @ MCS5NSS1	-75 dBm @ MCS5NSS1	
	-78 dBm @ MCS6NSS1	-76 dBm @ MCS6NSS1	-73 dBm @ MCS6NSS1	
	-77 dBm @ MCS7NSS1	-75 dBm @ MCS7NSS1	-72 dBm @ MCS7NSS1	
	-73 dBm @ MCS8NSS1	-70 dBm @ MCS8NSS1	-67 dBm @ MCS8NSS1	
	-93 dBm @ MCS0NSS2	-69 dBm @ MCS9NSS1	-65 dBm @ MCS9NSS1	
	-92 dBm @ MCS1NSS2	-90 dBm @ MCS0NSS2	-88 dBm @ MCS0NSS2	
	-91 dBm @ MCS2NSS2	-90 dBm @ MCS1NSS2	-86 dBm @ MCS1NSS2	
	-86 dBm @ MCS3NSS2	-87 dBm @ MCS2NSS2	-84 dBm @ MCS2NSS2	
	-83 dBm @ MCS4NSS2	-83 dBm @ MCS3NSS2	-80 dBm @ MCS3NSS2	
	-78 dBm @ MCS5NSS2	-80 dBm @ MCS4NSS2	-77 dBm @ MCS4NSS2	
	-76 dBm @ MCS6NSS2	-76 dBm @ MCS5NSS2	-73 dBm @ MCS5NSS2	
	-75 dBm @ MCS7NSS2	-74 dBm @ MCS6NSS2	-71 dBm @ MCS6NSS2	
	-71 dBm @ MCS8NSS2	-73 dBm @ MCS7NSS2	-70 dBm @ MCS7NSS2	
	-91 dBm @ MCS0NSS3	-67 dBm @ MCS8NSS2	-64 dBm @ MCS8NSS2	
	-90 dBm @ MCS1NSS3	-66 dBm @ MCS9NSS2	-62 dBm @ MCS9NSS2	

Item	Description			
	-89 dBm @ MCS2NSS3	-88 dBm @ MCS0NSS3	-86 dBm @ MCS0NSS3	
	-84 dBm @ MCS3NSS3	-88 dBm @ MCS1NSS3	-84 dBm @ MCS1NSS3	
	-81 dBm @ MCS4NSS3	-85 dBm @ MCS2NSS3	-82 dBm @ MCS2NSS3	
	-76 dBm @ MCS5NSS3	-81 dBm @ MCS3NSS3	-78 dBm @ MCS3NSS3	
	-74 dBm @ MCS6NSS3	-78 dBm @ MCS4NSS3	-75 dBm @ MCS4NSS3	
	-73 dBm @ MCS7NSS3	-74 dBm @ MCS5NSS3	-71 dBm @ MCS5NSS3	
	-69 dBm @ MCS8NSS3	-72 dBm @ MCS6NSS3	-68 dBm @ MCS7NSS3	
	-67 dBm @ MCS9NSS3	-71 dBm @ MCS7NSS3	-61 dBm @ MCS8NSS3	
		-64 dBm @ MCS8NSS3	-59 dBm @ MCS9NSS3	
		-63 dBm @ MCS9NSS3		

5.3 Standards Compliance

Safety standards

- UL 60950‑1
- UL 60950‑22
- CAN/CSA 22.2 No.60950-1
- CAN/CSA 22.2 No.60950-22
- IEC 60950‑1
- IEC 60950‑22
- EN 60950‑1
- EN 60950‑22
- 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

- ETSI EN 301 489–1
- ETSI EN 301 489–17
- ETSI EN 60601-1-2
- FCC Part 15
- ICES-003
- YD/T 1312.2-2004
- ITU k.21
- 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), WPA
- 802.1X
- Advanced Encryption Standards(AES), Temporal Key Integrity Protocol(TKIP)
- EAP Type(s)

Environment standards

- ETSI 300 019-2-1
- ETSI 300 019-2-2
- ETSI 300 019-2-4
- IEC 60068-2-52
- ETSI 300 019-1-1
- ETSI 300 019-1-2

- ETSI 300 019-1-4

EMF

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

RoSH

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

Reach

- Regulation 1907/2006/EC

WEEE

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