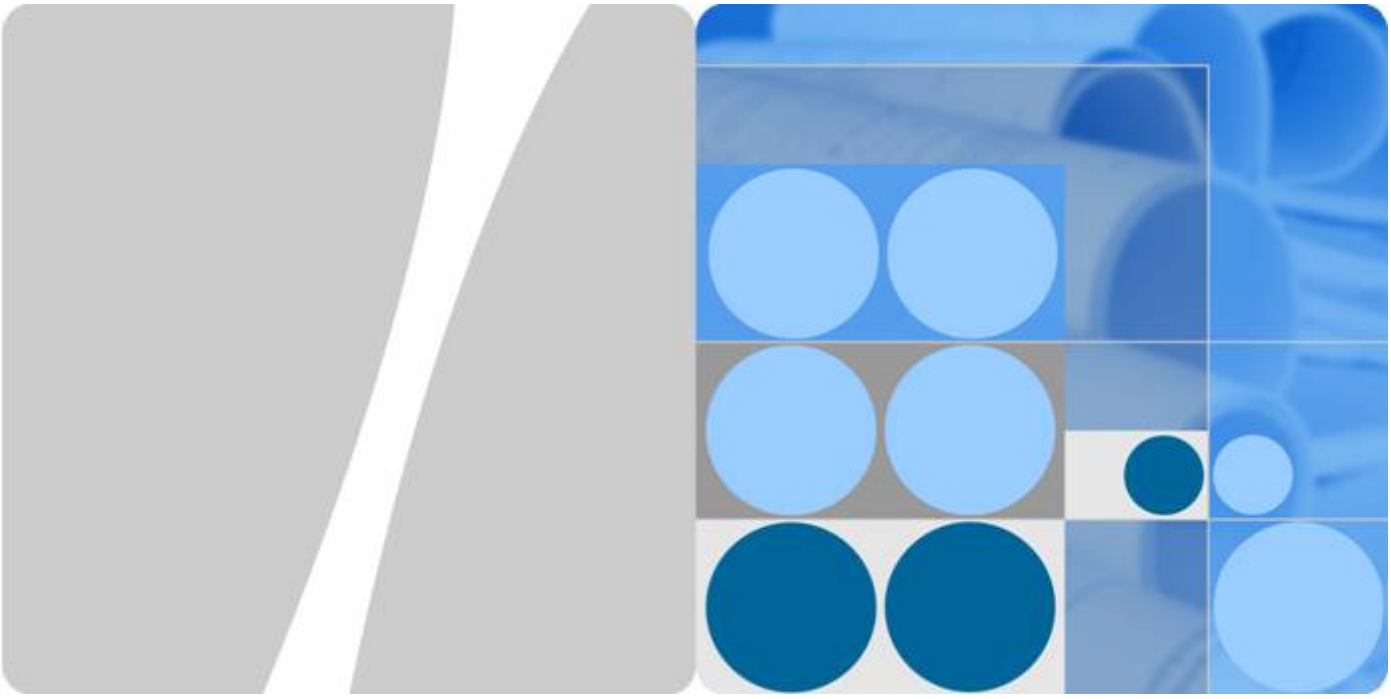

AP7110DN-AGN Wireless LAN Access Point

V200R002C00

Product Description

Issue 03

Date 2013-01-30

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About This Document

Symbol Conventions

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

Symbol	Description
DANGER	Indicates a hazard with a high level or medium level of risk which, if not avoided, could result in death or serious injury.
WARNING	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
CAUTION	Indicates a potentially hazardous situation that, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results.
TIP	Provides a tip that may help you solve a problem or save time.
NOTE	Provides additional information to emphasize or supplement important points in the main text.

Change History

Updates between document issues are cumulative. Therefore, the latest document issue contains all updates made in previous issues.

Changes in Issue 04 (2013-02-28)

The fourth commercial release has the following updates:

- Changes in the product are added to the document.
- Some content in the document is optimized.

Changes in Issue 03 (2013-01-30)

The third commercial release has the following updates:

- Product delivery descriptions are added to the document.

- Some content in the document is optimized.

Changes in Issue 02 (2012-12-31)

The second commercial release has the following updates:

- Changes in the product are added to the document.
- Some content in the document is optimized.

Changes in Issue 01 (2012-10-31)

Initial commercial release.

Contents

1 Product Orientation and Characteristics

Product Orientation

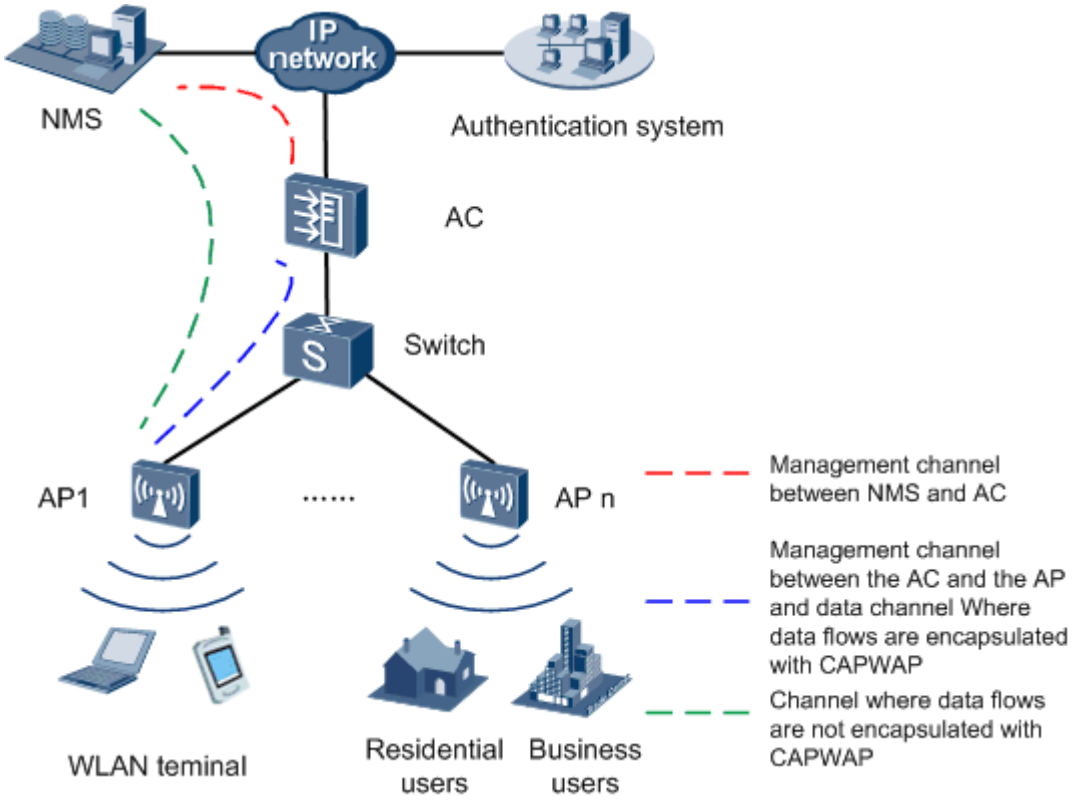
The AP7110DN-AGN is a premium series dual-band access point (AP) that supports 3×3 MIMO, supports 2.4 GHz and 5 GHz frequency bands. It complies with IEEE 802.11a/b/g/n, connects a large number of users, and works as a Fit AP. The AP7110DN-AGN has the following advantages:

- High reliability
- High security
- Simple network deployment
- Automatic AC discovery and configuration
- Real-time management and maintenance

The AP7110DN-AGN integrates the latest and widely-used WLAN technology to provide high-performance wireless services for medium to large enterprises and high-density scenarios. The AP7110DN-AGN can be flexibly deployed in these places and work in both Fit AP and bridge mode.

The AP7110DN-AGN is for use in Fit AP and bridge networking scenarios.

Figure 1-1 Fit AP networking



In this networking, the AP7110DN-AGN functions as a Fit AP that provides only data forwarding functions. The AC is responsible for user access, authentication, AP management, and configurations of security protocols, routing, and QoS.

Figure 1-2 WDS networking (point-to-point)

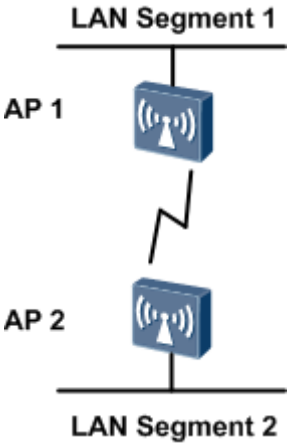
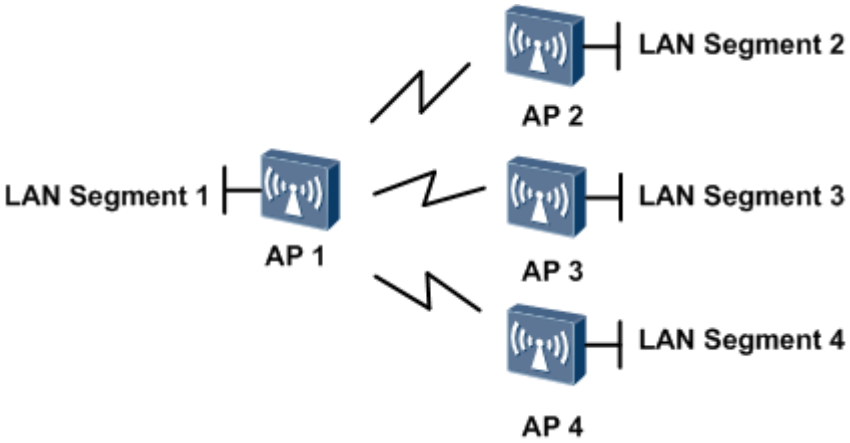


Figure 1-3 WDS networking (point-to-multipoint)



In this networking, the AP7110DN-AGN connects two or more independent wired or wireless LANs through wireless links to realize communication between the LANs. In a Wireless Distribution System (WDS), the AP7110DN-AGN supports point-to-point, point-to-multipoint networking modes. The AP implements wireless bridging and access functions using 5 GHz and 2.4 GHz frequency bands.

Product Characteristics

The AP7110DN-AGN has the following characteristics on the WLAN.

Product Characteristics	Description
Highly reliable wireless access	● Complies with IEEE 802.11 a/b/g/n. ● Supports 3×3 MIMO and provides a maximum rate of 450 Mbit/s for each radio. ● Uses Wi-Fi Multimedia (WMM) to implement priority scheduling based on the service type (voice, video, or data), and supports priority mapping on the air interface and wired interface. ● Supports wired link integrity check. ● Supports load balancing. ● Supports roaming without service interruptions. ● Supports AC Dual-Link Backup. ● Supports the beamforming technique. ● Uses the latest 802.11n chip to provide higher performance and wider coverage.
Comprehensive user access control capability	● Supports access control lists (ACLs) and user access controls based on user group policies. ● Provides per-user bandwidth management. ● Supports user isolation policies. ● Supports AC authentication.

Product Characteristics	Description
High security	The AP7110DN-AGN supports multiple authentication and encryption modes and provides various measures to enhance system security: ● Wired Equivalent Privacy (WEP) ● Wi-Fi Protected Access (WPA)/WPA2 ● WLAN Authentication and Privacy Infrastructure (WAPI) ● Detection of rogue APs
Flexible networking and environment adaptability	● For use in Fit AP and WDS networking scenarios. ● Automatically selects the transmission rate, channel, and transmit power to adapt to multiple radio environments and limit interference in real time. ● Adjusts bandwidth allocation based on the number of users and radio environment. ● Supports the MIMO antenna system and connects to external dual-band antennas (2.4 GHz and 5 GHz). You can adjust the antennas based on the radio environment.
Simple device management and maintenance	● Automatically discovers ACs and loads the AC (plug-and-play) configuration. ● Supports batch upgrade. ● Monitored by the NMS in real time. You can remotely configure APs and locate faults on APs using the NMS. ● Supports the Link Layer Discovery Protocol (LLDP) to implement automatic link discovery and obtain the network topology.

2 Product Structure

Appearance

Figure 2-1 shows the appearance of the AP7110DN-AGN.

NOTE

The actual device appearance may differ from the figure, but the appearance does not affect device.

Figure 2-1 Appearance of the AP7110DN-AGN

Ports

Figure 2-2 shows ports on the AP7110DN-AGN.

Figure 2-2 Ports of the AP7110DN-AGN

1. Ground port: connects to a ground cable to ground an AP.
2. Console port.
3. ETH/PoE: 10/100/1000M port, which connects to the Ethernet. The port can connect to a PoE switch or a PoE power source to provide power for APs.
4. Default: restores factory settings.
5. Power input port: 12 V DC.
6. Lock port: protects the AP7110DN-AGN against theft.

NOTE

Different power adapters are delivered with AP7110DN-AGN according to standards in the countries or regions where the AP7110DN-AGNs are delivered. These countries and regions are identified by the barcode on an AP's nameplate, including: EU (Europe), UK (United Kingdom), CN (China), AU (Australia), US (United States), and USA (the AP is sold only in the U.S).

LED Indicators

Information Type	SYS LED	Link LED	WiFi LED	Description
Startup status	Steady green	-	-	The device is being started.
	Blinking green	-	-	The system is working properly.
	Steady red	-	-	The system fails to load the DRAM or system software.
	Blinking (0.5 Hz)	Off	Off	The system is working properly. However, the Ethernet is not connected. Radios are disabled and no user is connected to the AP.

Information Type	SYS LED	Link LED	WiFi LED	Description
			Blinking green	The system is working properly, but the Ethernet is not connected. The AP has wireless users connected to the 2.4 GHz band and is transmitting data. The indicator blinks more quickly when more packets are being transmitted.
			Blinking yellow	The system is working properly, but the Ethernet is not connected. The AP has wireless users connected to the 5 GHz band and is transmitting data. The indicator blinks more quickly when more packets are being transmitted.
			Blinking green and yellow alternately	The system is working properly, but the Ethernet is not connected. The AP has wireless users connected to the 2.4 GHz and 5 GHz bands and is transmitting data.
	Blinking (0.5 Hz)	Steady or blinking green	Off	The system is working properly, the Ethernet is connected, and radios are disabled. The indicator blinks more quickly when more data is being transmitted.
			Blinking green	The system is working properly, and the Ethernet is connected. The AP has wireless users connected to the 2.4 GHz band and is transmitting data. The indicator blinks more quickly when more packets are being transmitted.
			Blinking yellow	The system is working properly, and the Ethernet is connected. The AP has wireless users connected to the 5 GHz band and is transmitting data. The indicator blinks more quickly when more packets are being transmitted.
			Blinking green and yellow alternately	The AP has wireless users connected to the 2.4 GHz and 5 GHz bands and is transmitting data. The indicator blinks more quickly when more packets are being transmitted.

3 Functions and Features

Functions and Features Supported by the AP7110DN-AGN

Table 3-1 Features

Features	Description
WLAN features	● Compliance with IEEE 802.11a/b/g/n, providing a maximum rate of 450 Mbit/s for each radio ● Maximum ratio combining (MRC) ● Maximum-likelihood detection (MLD) ● Aggregate data units, including A-MPDU (Tx/Rx) and A-MSDU (Rx only) ● 802.11 dynamic frequency selection (DFS) ● Short GI in 20 MHz and 40 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 (the rate is adjusted automatically by default) ● WLAN channel management and channel rate adjustment **NOTE** For details about WLAN channel management, see the *Country codes & Channels compliance status*. ● 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) ● Automatic AC discovery ● WDS

Features	Description
Network features	● Compliance with IEEE 802.3u ● Ports: Auto-negotiation of the rate and duplex mode and automatic switching between the Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDI-X) mode ● VLAN assignment based on SSIDs ● VLAN aggregation on uplink Ethernet ports ● 4094 VLAN IDs (1-4094) and 16 virtual APs (VAPs) ● Uplink ports in tagged and untagged mode ● DHCP client ● PPPoE dialup ● Centralized data forwarding and local data forwarding ● STA isolation in the same VLAN ● ACL ● LLDP ● Uninterrupted service forwarding upon CAPWAP channel disconnection in direct forwarding mode ● Uniform authentication on an AC ● Dual-AC backup
QoS features	● Priority mapping and packet scheduling based on WMM profiles 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 allocation (the system dynamically adjusts bandwidth based on the number of users and radio environment)
Security features	● Open system authentication ● WEP authentication/encryption ● WPA/WPA2-PSK authentication and encryption ● WPA/WPA2-802.1X authentication and encryption ● WAPI authentication and encryption

Features	Description
Maintenance features	● AP management and maintenance by the AC ● Plug-and-play: automatic AC discovery and automatic configuration loading ● Batch upgrade ● Debugging using Telnet and the serial interface ● Real-time configuration monitoring and fast fault location by using the NMS ● System status alarm

4 Technical Specifications

Specifications

Table 4-1 Specifications of the AP7110DN-AGN

Item		Description
Technical specifications	Dimensions (H x W x D)	45 mm x 200 mm x 200 mm
	Weight	1.0 kg
	System memory	● 256 MB DDR3 ● 32 MB flash memory
Power specifications	Power input	● DC 12V±10% ● POE Power: -48V DC ● PoE function in compliance with IEEE 802.3at
	Maximum power consumption	15.7W **NOTE** The maximum power consumption depends on local laws.
Environment parameters	Operating temperature	-10℃ to +55℃
	Storage temperature	-40℃ to +70℃
	Humidity	5% to 95% (non-condensing)
	Waterproof grade	IP41
	Altitude	–60 m to 4000 m

Radio Parameters

Table 4-2 Radio parameters of the AP7110DN-AGN

<table>
<tr><th>Item</th><th colspan="4">Description</th></tr>
<tr><td>Antenna type</td><td colspan="4">Removable RP-SMA antenna</td></tr>
<tr><td>Maximum antenna gain</td><td colspan="4">2.4GHz: 3dBi
5GHz: 5.74dBi</td></tr>
<tr><td>Maximum number of concurrent users</td><td colspan="4">128</td></tr>
<tr><td>Maximum transmit power</td><td colspan="4">20dBm
● You can adjust the transmit power from the maximum to 15 dBm, with a step of 1 dBm.
NOTE
Actual transmit power depends on local laws and regulations.</td></tr>
<tr><td rowspan="2">Maximum number of non-overlapping channels</td><td colspan="2">2.4 GHz
802.11b/g
● 20MHz: 3
802.11n
● 20MHz: 3
● 40MHz: 1</td><td colspan="2">5 GHz
802.11a
● 20MHz: 24
802.11n
● 20MHz: 24
● 40MHz: 11</td></tr>
<tr><td colspan="4">CAUTION
If the AP7110DN-AGN 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. The frequency band ranging from 5.15 GHz to 5.25 GHz can only be used indoors.
3. 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.
4. APs cannot work at channels in frequencies ranging from 5.6 GHz to 5.65 GHz or their overlapping channels.</td></tr>
<tr><td rowspan="6">Channel Rate</td><td colspan="4">802.11b: 1, 2, 5.5, and 11 Mbit/s</td></tr>
<tr><td colspan="4">802.11g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbit/s</td></tr>
<tr><td colspan="4">802.11n data rate (2.4 GHz and 5 GHz)</td></tr>
<tr><td colspan="2">GI[2]=800ns</td><td colspan="2">GI=400ns</td></tr>
<tr><td>20 MHz (Mbit/s)</td><td>40 MHz (Mbit/s)</td><td>20 MHz (Mbit/s)</td><td>40 MHz (Mbit/s)</td></tr>
<tr><td>6.5 @ MCS[1]0</td><td>13.5 @ MCS0</td><td>7.2 @ MCS0</td><td>15 @ MCS0</td></tr>
<tr><td>13 @ MCS1</td><td>27 @ MCS1</td><td>14.4 @ MCS1</td><td>30 @ MCS1</td></tr>
</table>

Item	Description			
	19.5 @ MCS2	40.5 @ MCS2	21.7 @ MCS2	45 @ MCS2
	26 @ MCS3	54 @ MCS3	28.9 @ MCS3	60 @ MCS3
	39 @ MCS4	81 @ MCS4	43.3 @ MCS4	90 @ MCS4
	52 @ MCS5	108 @ MCS5	57.8 @ MCS5	120 @ MCS5
	58.5 @ MCS6	121.5 @ MCS6	65 @ MCS6	135 @ MCS6
	65 @ MCS7	135 @ MCS7	72.2 @ MCS7	150 @ MCS7
	13 @ MCS8	27 @ MCS8	14.4 @ MCS8	30 @ MCS8
	26 @ MCS9	54 @ MCS9	28.9 @ MCS9	60 @ MCS9
	39 @ MCS10	81 @ MCS10	43.3 @ MCS10	90 @ MCS10
	52 @ MCS11	108 @ MCS11	57.8 @ MCS11	120 @ MCS11
	78 @ MCS12	162 @ MCS12	86.7 @ MCS12	180 @ MCS12
	104 @ MCS13	216 @ MCS13	115.6 @ MCS13	240 @ MCS13
	117 @ MCS14	243 @ MCS14	130 @ MCS14	270 @ MCS14
	130 @ MCS15	270 @ MCS15	144.4 @ MCS15	300 @ MCS15
	19.5 @ MCS16	40.5 @ MCS16	21.7 @ MCS16	45 @ MCS16
	39 @ MCS17	81 @ MCS17	43.3 @ MCS17	90 @ MCS17
	58.5 @ MCS18	121.5 @ MCS18	65 @ MCS18	135 @ MCS18
	78 @ MCS19	162 @ MCS19	86.7 @ MCS19	180 @ MCS19
	117 @ MCS20	243 @ MCS20	130 @ MCS20	270 @ MCS20
	156 @ MCS21	324 @ MCS21	173.3 @ MCS21	360 @ MCS21
	175.5 @ MCS22	364.5 @ MCS22	195 @ MCS22	405 @ MCS22
	195 @ MCS23	405 @ MCS23	216.7 @ MCS23	450 @ MCS23
	NOTE Modulation coding scheme (MCS) index: determines the spatial flow quantity, modulation, coding rate, and data rate. Guard interval (GI): indicates the period in nanoseconds the radio listens between packets.			

<table>
<tr><th>Item</th><th colspan="4">Description</th></tr>
<tr><td rowspan="2">Receiver Sensitivity</td><td>2.4 GHz
802.11b (CCK)
● -97 dBm @ 1 Mb/s
● -92 dBm @ 2 Mb/s
● -92 dBm @ 5.5 Mb/s
● -89 dBm @ 11 Mb/s</td><td>2.4 GHz
802.11g (non-HT20)
● -91 dBm @ 6 Mb/s
● -90 dBm @ 9 Mb/s
● -90 dBm @ 12 Mb/s
● -88 dBm @ 18 Mb/s
● -84 dBm @ 24 Mb/s
● -81 dBm @ 36 Mb/s
● -77 dBm @ 48 Mb/s
● -74 dBm @ 54 Mb/s</td><td>2.4 GHz
802.11n (HT20)
● -90 dBm @ MCS0/8/16
● -90 dBm @ MCS1/9/17
● -88 dBm @ MCS2/10/18
● -82 dBm @ MCS3/11/19
● -79 dBm @ MCS4/12/20
● -75 dBm @ MCS5/13/21
● -73 dBm @ MCS6/14/22
● -72 dBm @ MCS7/15/23</td><td>5 GHz
802.11a (non-HT20)
● -91 dBm @ 6 Mb/s
● -90 dBm @ 9 Mb/s
● -89 dBm @ 12 Mb/s
● -86 dBm @ 18 Mb/s
● -83 dBm @ 24 Mb/s
● -80 dBm @ 36 Mb/s
● -75 dBm @ 48 Mb/s
● -74 dBm @ 54 Mb/s</td></tr>
<tr><td>2.4 GHz
802.11n(HT40)
● -86 dBm @ MCS0/8/16
● -86 dBm @ MCS1/9/17
● -84 dBm @ MCS2/10/18
● -80 dBm @ MCS3/11/19
● -77 dBm @ MCS4/12/20
● -72 dBm @ MCS5/13/21
● -70 dBm @ MCS6/14/22
● -68 dBm @ MCS7/15/23</td><td>5 GHz
802.11n (HT20)
● -90 dBm @ MCS0/8/16
● -88 dBm @ MCS1/9/17
● -86 dBm @ MCS2/10/18
● -81 dBm @ MCS3/11/19
● -78 dBm @ MCS4/12/20
● -74 dBm @ MCS5/13/21
● -72 dBm @ MCS6/14/22
● -71 dBm @ MCS7/15/23</td><td colspan="2">5 GHz
802.11n (HT40)
● -87 dBm @ MCS0/8/16
● -85 dBm @ MCS1/9/17
● -83 dBm @ MCS2/10/18
● -79 dBm @ MCS3/11/19
● -75 dBm @ MCS4/12/20
● -71 dBm @ MCS5/13/21
● -68 dBm @ MCS6/14/22
● -67 dBm @ MCS7/15/23</td></tr>
</table>

Standards Compliance

- Safety standards
  - UL 60950-1

  - CAN/CSA 22.2 No.60950-1
  - IEC 60950-1
  - EN 60950-1
  - GB 4943
- Radio standards
  - ESTI EN 300 328
  - ESTI EN 301 893
  - FCC Part 15C: 15.247
  - FCC Part 15C: 15.407
  - RSS-210
- EMC standards
  - EN 301.489–1
  - EN 301.489–17
  - FCC Part 15
  - ICES-003
  - YD/T 1312.2-2004
  - ITU k.21
  - GB 9254
  - GB 17625.1
- IEEE standards
  - IEEE 802.11a/b/g
  - IEEE 802.11n
  - 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 300 019-2-2
  - ETSI 300 019-2-3
- EMF
  - CENELEC EN 62311
  - CENELEC EN 50385
  - OET65
  - RSS-102
- RoSH
  - Directive 2002/95/EC

- Reach
  - Directive 1907/2006/EC
- WEEE
  - Directive 2002/96/EC