HPE aruba networking

Data sheet



HPE Aruba Networking 650 Series Campus Access Points

Flagship offering with the performance to meet growing enterprise needs with Wi-Fi 6E

HPE

Key features

— Comprehensive tri-band coverage across 2.4 GHz, 5 GHz, and 6 GHz to deliver up to 7.8 Gbps combined peak data rate

— 4x4 MIMO radios to deliver peak performance and increased capacity using MU-MIMO and OFDMA (uplink and downlink for both)

— Up to seven 160 MHz channels in 6 GHz support low-latency, bandwidth-hungry applications such as high-definition video and augmented reality/virtual reality applications

— Unique ultra tri-band filtering enables 5 GHz and 6 GHz to operate without restrictions or interference

— High availability with configurable 5 Gbps dual Ethernet ports for hitless failover of Ethernet and power

— Built-in GPS receivers and intelligent software enable access points to self-locate and act as reference points for accurate indoor location measurements

By leveraging the 6 GHz band, HPE Aruba Networking 650 Series Campus Access Points delivers peak performance and far greater capacity than previous generations of Wi-Fi. With up to 1200 MHz of new channels, capacity is nearly tripled — so you can meet growing demand due to bandwidth-hungry video, increasing numbers of customer and Internet of Things (IoT) devices, and growth in cloud. Unique to HPE Aruba Networking, the 650 series includes ultra tri-band filtering to help minimize channel interference and dual configurable 5 Gbps Ethernet ports to reduce coverage gaps, provide greater resiliency, and deliver fast, secure connectivity.

More capacity and wider channels

The 650 series access points are designed to take advantage of the 6 GHz band, which translates into far greater speeds, wider channels for multi-gigabit traffic, and less interference. The three 4x4 MIMO radios of the platform deliver a combined peak data rate of up to 7.8 Gbps.

Advantages of 6 GHz

Wi-Fi 6E provides up to 1200 MHz in the 6 GHz band for higher throughput and improved application performance.

With up to seven 160 MHz channels, Wi-Fi 6E can better support low-latency, bandwidth-hungry applications such as high-definition video and artificial reality / virtual reality applications. Only Wi-Fi 6E capable devices can use the 6 GHz band so there is no interference or slowdowns due to legacy devices.

Device class support

For operation in the 6 GHz band, the 650 series access points are part of the low power indoor (LPI) device class. This fixed indoor-only class uses lower power levels and does not require an Automated Frequency Coordination service (AFC) to manage incumbent outdoor services which is required for standard class access points.

The connectorized models will typically operate as standard power access points but may also be allowed to operate as low power indoor devices in some countries.

Less interference

650 series access points include HPE Aruba Networking ultra tri-band filtering, which enables enterprises to take advantage of the entire 5 GHz and 6 GHz bands without experiencing interference while operating on any channel in either band concurrently. Since there is only 50 MHz between 5 GHz and the 6 GHz, without advanced filtering, enterprises would likely experience problems between the bands and would therefore be limited in the number of channels available. By applying advanced filtering capabilities, enterprises can make full use of available spectrum without creating coverage gaps or islands.

Table 1. Channel bandwidth and peak data rates

Band	Channel bandwidth	Peak data rate
6 GHz	160 MHz	4.8 Gbps
5 GHz	80 MHz	2.4 Gbps
2.4 GHz	20 MHz	574 Mbps
Total	n/a	7.8 Gbps

Business continuity

The 650 series access points provide high availability with two HPE Smart Rate Ethernet ports for hitless failover for both data and power. Configurable to 1, 2.5, or 5 Gbps, these dual ports provide business continuity for mission-critical applications.

Global readiness

While the need for more Wi-Fi capacity is recognized across the globe, countries are approaching 6 GHz differently. The 650 series access points are set up to automatically update regulatory rules once 6E regulations have been approved and certified.

Extend the benefits of Wi-Fi 6

The 650 series access points are based on the 802.11ax standard, which means that all its efficiency and security enhancements are also available on the 6 GHz band. Wi-Fi 6 features such as orthogonal frequency division multiple access (OFDMA), BSS coloring, Enhanced Open, and Wi-Fi Protected Access 3 (WPA3) are fully supported on the HPE Aruba Networking Wi-Fi 6E access points as well.

Advantages of OFDMA

This capability allows HPE Aruba Networking access points to handle multiple 802.11ax capable customers on each channel simultaneously, regardless of device or traffic type. Channel utilization is optimized by handling each transaction through smaller subcarriers or resource units (RUs), which means that customers are sharing a channel and not competing for airtime and bandwidth.

The 650 series access points supports up to 37 resource units, the maximum as defined in the standard for an 80 MHz channel.

Advantages of MU-MIMO

MU-MIMO can be used to increase the capacity and aggregate performance by relying on spatial multiplexing to communicate with up to four customer devices simultaneously. The 650 series access points supports 4x4 MU-MIMO in both uplink and downlink directions.

Wi-Fi optimization

Customer optimization

HPE Aruba Networking patented AI-powered ClientMatch technology helps eliminate sticky customer issues by steering a customer to the access point where it receives the best radio signal.

HPE Aruba Networking ClientMatch steers traffic from the noisy 2.4 GHz band to the preferred 5 GHz or 6 GHz band depending on customer capabilities. HPE Aruba Networking ClientMatch also dynamically steers traffic to load balance access points to improve the user experience.

Automated Wi-Fi radio frequency management

To optimize the user experience and provide greater stability, HPE Aruba Networking AirMatch allows organization to automate network optimization using machine learning. HPE Aruba Networking AirMatch provides dynamic bandwidth adjustments to support changing device density, enhanced roaming using an even distribution of effective isotropic radiated power (EIRP) to radios, and real-time channel assignments to mitigate cochannel interference.

Reduce interference

Unique to HPE Aruba Networking, Advanced Cellular Coexistence (ACC) uses built-in filtering to automatically minimize the impact of interference from cellular networks, distributed antenna systems (DAS), and commercial small cell or femtocell equipment.

Intelligent power monitoring (IPM)

For better insights into energy consumption, HPE Aruba Networking access points continuously monitor and report hardware energy usage. Unlike other vendor's access points, HPE Aruba Networking access points can also be configured to enable or disable capabilities based on available Power over Ethernet (PoE) power — ideal when wired switches have exhausted their power budget. Enterprises can deploy Wi-Fi 6E access points and update switching and power later if needed based on their actual usage. Other power options include adding a power injector or using Smart PoE to combine power from two cables.

Self-locating access points

Indoor location shouldn't require guesswork or costly overlay technologies. HPE Aruba Networking Wi-Fi 6 and 6E access points help organizations leverage their wireless investment to deliver indoor location — everywhere.

The 650 series campus access points include built-in GPS receivers and intelligent software to allow them automatically locate themselves accurately within the universal framework of latitude and longitude. As part of HPE Aruba Networking indoor location solution, they serve as reference points for customer devices using fine time measurements and other location technologies.

HPE Aruba Networking Wi-Fi 6 and 6E access points support Open Locate, an emerging standard that allows access points to share their location over the air and through cloud-based application programming interfaces (APIs), enabling mobile devices to locate themselves and applications to support network analytics.

Access points as an IoT platform

The 650 series includes an integrated Bluetooth 5 and 802.15.4 radio for Zigbee support to simplify deploying and managing IoT-based location services, asset tracking services, security solutions, and IoT sensors. There is also a USB-port extension to provide IoT connectivity to a wider range of devices. These IoT capabilities allow organizations to leverage the HPE Aruba Networking access points as an IoT platform, which helps eliminate the need for an overlay infrastructure and additional IT resources and can accelerate IoT initiatives.

In addition, Target Wake Time (TWT) establishes a schedule when customers need to communicate with an access point. This helps improve customer power savings and reduces airtime contention with other customers, which is ideal for IoT.

HPE Aruba Networking secure infrastructure

The HPE Aruba Networking 650 series includes build-security capabilities such as:

WPA3 and Enhanced Open

Support for stronger encryption and authentication is provided through the latest version of WPA for enterprise-protected networks. Enhanced Open offers seamless new protection for users connecting to open networks where each session is automatically encrypted to protect user passwords and data on guest networks.

WPA2-MPSK

MPSK enables simpler passkey management for WPA2 devices — should the Wi-Fi password on one device or device type change, no additional changes are needed for other devices. This capability requires HPE Aruba Networking ClearPass Policy Manager.

Simple and secure access

To improve security and ease of management, IT can centrally configure and automatically enforce role-based policies that define proper access privileges for employees, guests, contractors, and other user groups — no matter where users connect on wired and WLANs.

Dynamic segmentation helps eliminate the time consuming and error-prone task of managing complex and static VLANs, ACLs, and subnets by dynamically assigning policies and keeping traffic secure and separated.

Seamless handoffs to cellular

Built on the technical foundations of Passpoint® and Wi-Fi calling, HPE Aruba Networking Air Pass creates a roaming network across the HPE Aruba Networking enterprise customer footprint, extending cellular coverage and enhancing the visitor and subscriber experience to deliver a great experience for your guests while reducing costs and management overhead for DAS.

Flexible operation and management

Our unified access points can operate as stand-alone access points or with a gateway for greater scalability, security, and manageability.

Access points can be deployed using zero touch provisioning — without on-site technical expertise — for ease of implementation in branch offices and for remote work.

HPE Aruba Networking access points can be managed using cloud-based or on-premises solutions for any campus, branch, or remote work environment. HPE Aruba Networking Central provides a single pane of glass for overseeing every aspect of wired and wireless LANs, WANs, and VPNs. AI-powered analytics, end-to-end orchestration and automation, and advanced security features are built natively into the solution.

Summary

HPE Aruba Networking 650 Series Campus Access Points are designed to take advantage of the 6 GHz band using three 4x4 MIMO radios for comprehensive tri-band coverage to meet the growing demands of Wi-Fi due to increased use of video, growth in customer and IoT devices, and expanded use of cloud. With a maximum combined 7.8 Gbps data rate for higher throughput and faster use, the 650 series raises the bar in terms of capacity, wider channels, hitless failover, and less interference between the 5 GHz and 6 GHz bands.

Technical specifications

Hardware variants

— AP-654: External antenna models

— AP-655: Internal antenna models

Wi-Fi radio specifications

— Access point type: Indoor, tri-radio, 2.4 GHz, 5 GHz and 6 GHz (concurrent) 802.11ax 4x4 MIMO

— 2.4 GHz radio: Four spatial streams MIMO for up to 1147 Mbps wireless data rate with HE40 802.11ax customer devices (574 Mbps for HE20)

— 5 GHz radio: Four spatial streams MIMO for up to 2.4 Gbps wireless data rate with HE80 802.11ax customer devices

— 6 GHz radio: Four spatial streams MIMO for up to 4.8 Gbps wireless data rate with HE160 802.11ax customer devices

— Both downlink and uplink MU-MIMO in 6 GHz and 5 GHz, downlink only in 2.4 GHz

— Up to 512 associated customer devices per radio, and up to 16 BSSIDs per radio (limited to 8 for the 6 GHz radio when using version 8 software)

— Supported frequency bands (country-specific restrictions apply):
  • 2.400 to 2.4835 GHz ISM
  • 5.150 to 5.250 GHz U-NII-1
  • 5.250 to 5.350 GHz U-NII-2A
  • 5.470 to 5.725 GHz U-NII-2C
  • 5.725 to 5.850 GHz U-NII-3/ISM
  • 5.850 to 5.895 GHz U-NII-4
  • 5.925 to 6.425 GHz U-NII-5
  • 6.425 to 6.525 GHz U-NII-6
  • 6.525 to 6.875 GHz U-NII-7
  • 6.875 to 7.125 GHz U-NII-8

— Available bands and channels: Dependent on configured regulatory domain (country)

— Dynamic frequency selection (DFS) optimizes the use of available RF spectrum in the 5 GHz band
  • Including zero wait DFS (ZWDFS) to accelerate channel changes

— Supported radio technologies:
  • 802.11b: Direct-sequence spread-spectrum (DSSS)
  • 802.11a/g/n/ac: Orthogonal
  • frequency-division multiplexing (OFDM)
  • 802.11ax: OFDMA with up to 37 resource units (for an 80 MHz channel)

— Supported modulation types:
  • 802.11b: BPSK, QPSK, CCK
  • 802.11a/g/n: BPSK, QPSK, 16-QAM, 64-QAM and 256-QAM (proprietary extension)
  • 802.11ac: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM and 1024-QAM (proprietary extension)
  • 802.11ax: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM and 1024-QAM

— 802.11n high-throughput (HT) support: HT20/40

— 802.11ac very high-throughput (VHT) support: VHT20/40/80/160 (80+80)

— 802.11ax high-efficiency (HE) support: HE20/40/80/160

— Supported data rates (Mbps):
  • 802.11b: 1, 2, 5.5, 11
  • 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54
  • 802.11n: 6.5 to 600 (MCS0 to MCS31, HT20 to HT40), 800 with 256-QAM (proprietary extension)
  • 802.11ac: 6.5 to 1733 (MCS0 to MCS9, NSS = 1 to 4, VHT20 to VHT160 [80+80]; VHT80); 2167 with 1024-QAM (MCS10 and MCS11, proprietary extension)
  • 802.11ax (2.4 GHz): 3.6 to 1147 (MCS0 to MCS11, NSS = 1 to 4, HE20 to HE40)
  • 802.11ax (5 GHz): 3.6 to 2402 (MCS0 to MCS11, NSS = 1 to 4, HE20 to HE160 [80+80] HE80)
  • 802.11ax (6 GHz): 3.6 to 4804 (MCS0 to MCS11, NSS = 1 to 4, HE20 to HE160)

— 802.11n/ac packet aggregation: A-MPDU, A-MSDU

— Transmit power: Configurable in increments of 0.5 dBm

— Maximum (aggregate, conducted total) transmit power (limited by local regulatory requirements):
  • Per radio/band (2.4 GHz / 5 GHz / 6 GHz): +24 dBm (18 dBm per chain)
  • Note: Conducted transmit power levels exclude antenna gain. For total (EIRP) transmit power, add antenna gain

— ACC helps minimize the impact of interference from cellular networks

— Ultra tri-band (UTB) enables ultimate flexibility in 5 GHz and 6 GHz channel selection without performance degradation

— Maximum ratio combining (MRC) for improved receiver performance

— Cyclic delay / shift diversity (CDD/CSD) for improved downlink RF performance

— Space-time block coding (STBC) for increased range and improved reception

— Low-density parity check (LDPC) for high-efficiency error correction and increased throughput

— Transmit beamforming (TxBF) for increased signal reliability and range

— 802.11ax TWT to support low power customer devices

— 802.11mc fine timing measurement (FTM) for precision distance ranging Wi-Fi antennas

— AP-654: Two sets of four (female) RP-SMA connectors for external antennas (A0 through A3 corresponding with radio chains 0 through 3 for the 2.4 GHz and 5 GHz radios, and B0 through B3 corresponding with radio chains 0 through 3 for the 6 GHz radio). Worst-case internal loss between radio interface and external antenna connectors: 1.0 dB in 2.4 GHz, 1.0 dB in 5 GHz and 1.0 dB in 6 GHz

— AP-655: Integrated downtilt omnidirectional antennas for 4x4 MIMO with peak antenna gain of 4.8 dBi in 2.4 GHz, 5.3 dBi in 5 GHz, and 5.4 dBi in 6 GHz. Built-in antennas are optimized for horizontal ceiling mounted orientation of the access point. The downtilt angle for maximum gain is roughly 30° to 40°

— Combining the patterns of each of the antennas of the MIMO radios, the peak gain of the combined, average pattern is 3.3 dBi in 2.4 GHz, 2.9 dBi in 5 GHz, and 4.0 dBi in 6 GHz

Other interfaces

— E0, E1: Two Ethernet wired network ports (RJ-45)

- Auto-sensing link speed (100/1000/2500/5000BASE-T) and MDI/MDIX
- 2.5 Gbps and 5 Gbps speeds comply with NBase-T and 802.3bz specifications
- PoE-PD: 48 Vdc (nominal) 802.3af/at/bt PoE (class 3 or higher)
- 802.3az Energy Efficient Ethernet (EEE)
- Link aggregation (LACP) support between both network ports for redundancy and increased capacity

Table 2. Default PoE power modes (IPM disabled) — Single PoE source. Enable the IPM feature to manage or avoid restrictions

Single PoE source	Class 6 (802.3bt)	Class 5 (802.3bt)	Class 4 (802.3at)	Class 3 (802.3af)
Available power budget	51W	40W	25.5W	13.9W
AP power mode	Unrestricted	Restricted	Restricted	Not supported
USB port	Enabled	Disabled	Disabled	Not supported
Ethernet ports	Both ports enabled	Second port disabled	Second port disabled	Not supported
MIMO operation	4x4	2x2	2x2	Not supported
Reduced max RF transmit power	0 dB	0 dB	0 dB	Not supported

Table 3. Default PoE power modes (IPM disabled) — Dual PoE source. Enable the IPM feature to manage or avoid restrictions

Dual PoE source	Class 5 + class 3	Class 4 + class 4	Class 4 + class 3	Class 3 + class 3
Available power budget	53.9W+	51W	39.4W	27.8W
AP power mode	Unrestricted	Unrestricted	Restricted	Restricted
USB port	Enabled	Enabled	Disabled	Disabled
Ethernet ports	Both ports enabled	Both ports enabled	Both ports enabled	Both ports enabled
MIMO operation	4x4	4x4	4x4	2x2
Reduced max RF transmit power	0 dB	0 dB	-3 dB	0 dB

— DC power interface: 12 Vdc (nominal, +/5%), accepts 2.1 mm / 5.5 mm center- positive circular plug with 9.5 mm length

— USB 2.0 host interface (Type A connector) Capable of sourcing up to 1A / 5W to an attached device

— Bluetooth Low Energy (BLE5.0) and Zigbee (802.15.4) radio

- BLE: up to 6 dBm transmit power and
- –101 dBm receive sensitivity (125 kbps)
- Zigbee: up to 6 dBm transmit power and –99 dBm receive sensitivity (250 kbps)
- Integrated omnidirectional antenna with roughly 30° to 40° downtilt and peak gain of 3.6 dBi

— GNSS L1 (1575.42 MHz) receiver supporting GPS, Galileo, GLONASS, and BeiDou signal

- Receive sensitivity: –162 dBm (tracking)
- Integrated omnidirectional antenna with roughly 30° to 40° downtilt and peak gain of 3.1 dBi

— Advanced IoT Coexistence (AIC) allows concurrent operation of multiple radios in the 2.4 GHz band

— Built-in Trusted Platform Module (TPM) for enhanced security and anticounterfeiting

— Visual indictors (four multi-color LEDs): For system (1x) and radio (3x) status

— Reset button: Factory reset, LED mode control (normal/off)

— Serial console interface (proprietary, micro-B USB physical jack)

— Kensington security slot

— Automatic thermal shutdown and recovery function

Power sources and power consumption

— The access point supports direct DC power and PoE on port E0 and/or E1

— When PoE power is supplied to both Ethernet ports, the access point combines power from both sources (Smart PoE feature), using E0 as the primary source and E1 as secondary

— When both DC and PoE power sources are available, DC power takes priority over PoE

— Power sources are sold separately

— The access point supports various power modes depending on the available power sources and configuration

- With IPM disabled, the access point may apply some static restrictions, see previous table. No additional restrictions will be applied
- With IPM enabled, the access point will start up in unrestricted mode but may dynamically apply restrictions depending on the available power budget and actual consumption

The feature restrictions and order in which these get applied are configurable.

— When powered by direct DC power, the access point operates without restrictions

— Powering the access point from a single 802.3af (class 3 or lower) PoE source is not supported, regardless of IPM status

— Maximum (worst-case) power consumption (without /with a USB device attached):
  • DC powered: 36.0W/42.5W
  • PoE powered: 40.3W/46.5W
  • This assumes that up to 5W is supplied to the attached USB device
— Maximum (worst-case) power consumption in idle mode: 14.3W/20.2W (DC) or 16.9W/22.7W (PoE)
— Maximum (worst-case) power consumption in deep-sleep mode: 2.4W (DC) or 4.0W (PoE)

Using IPM to avoid platform restrictions

Operating the 650 series access point from a single 802.3at source requires some restrictions, but the IPM feature allows doing that in a flexible way.

The following configurations (with IPM enabled) are some examples of how the access point can remain within the 802.3at budget without any additional restrictions:

— No power drawn from USB, transmit power on all radios limited to 18 dBm EIRP or less
— No power drawn from USB, single Ethernet, transmit power on all radios limited to 21 dBm EIRP or less
— No power drawn from USB, single Ethernet, any one radio disabled

Mounting details

A mounting bracket has been preinstalled on the back of the access point. This bracket is used to secure the access point to any of the mount kits (sold separately).

Mechanical specifications

— Dimensions/weight (AP-655; unit without mount bracket):
  • 260 mm (W) x 260 mm (D) x 60 mm (H)
  • 1800g
— Dimensions/weight (AP-655; shipping):
  • 285 mm (W) x 285 mm (D) x 95 mm (H)
  • 2300g

Environmental specifications

— Operating conditions
  • Temperature: 0°C to +50°C / +32°F to +122°F
  • Relative humidity: 5% to 95%
  • ETS 300 019 class 3.2 environments
  • Access point is plenum rated for use in air-handling spaces
— Storage conditions
  • Temperature: –25°C to +55°C / –13°F to +131°F
  • Relative humidity: 10% to 100%
  • ETS 300 019 class 1.2 environments
— Transportation conditions
  • Temperature: –40°C to +70°C / –40°F to +158°F
  • Relative humidity: up to 95%
  • ETS 300 019 class 2.3 environments

Reliability

Mean time between failure (MTBF): 544 khrs (62 years) at +25°C operating temperature (AP-655).

Regulatory compliance

— FCC/ISED
— CE Marked
— Low Voltage Directive 2014/35/EU
— UL/IEC/EN 62368-1
— EN 60601-1-2

For more country-specific regulatory information and approvals, contact your HPE Aruba Networking representative.

Regulatory model numbers

— AP-654 (all models): APIN0654
— AP-655 (all models): APIN0655

Regulatory considerations for AP-654

The AP-654 will only be offered in countries where there's an existing or clear and defined path to allow operation of 6 GHz radios with external connectorized antennas, either as a low power indoor (LPI) or standard power (SP) product. Contact your HPE Aruba Networking representative to confirm (existing or planned) availability for the country where the access point will be deployed.

SP product class operation of the AP-634 (that is, most countries where the platform is supported) is only supported on HPE Aruba Networking Wireless Operating System software release 10.7.0.0 and later deployments and HPE Aruba Networking Wireless Operating System software release 8.12.0.0 and later deployments that include a HPE Aruba Networking Virtual Mobility Conductor. SP operation is not supported on InstantOS deployments or 8.x OS deployments without a HPE Aruba Networking Virtual Mobility Conductor.

Certifications

— UL2043 plenum rating
— Wi-Fi Alliance (WFA):
  • Wi-Fi CERTIFIED a, b, g, n, ac
  • Wi-Fi CERTIFIED 6E (ax, 6 GHz)
  • WPA, WPA2, and WPA3 — Enterprise with CNSA option, Personal (SAE), Enhanced Open (OWE)
  • WMM, WMM-PS, W-Fi Agile Multiband
— Bluetooth SIG
— Ethernet Alliance (PoE, PD device, class 6)

Warranty

HPE Aruba Networking hardware limited lifetime warranty.

Minimum operating system software versions

— AP-654 (excluding 6 GHz support):
  • HPE Aruba Networking Wireless Operating System and HPE Aruba Networking InstantOS 8.11.2.0, HPE Aruba Networking Wireless Operating System 10.6.0.0
— AP-654 (including 6 GHz support):
  • HPE Aruba Networking Wireless Operating System and HPE Aruba Networking InstantOS 8.12.0.0, HPE Aruba Networking Wireless Operating System 10.7.0.0[1]
— AP-655:
  • HPE Aruba Networking Wireless Operating System and HPE Aruba Networking InstantOS 8.10.0.1, HPE Aruba Networking Wireless Operating System 10.4.0.0

[1] SP product class operation of the AP-654 (that is, most countries where the platform is supported) is only supported on ArubaOS 10.7.0.0 and later deployments and ArubaOS 8.12.0.0 and later deployments that include a Mobility Conductor. SP operation is not supported on InstantOS deployments or 8.x ArubaOS deployments without a Mobility Conductor.

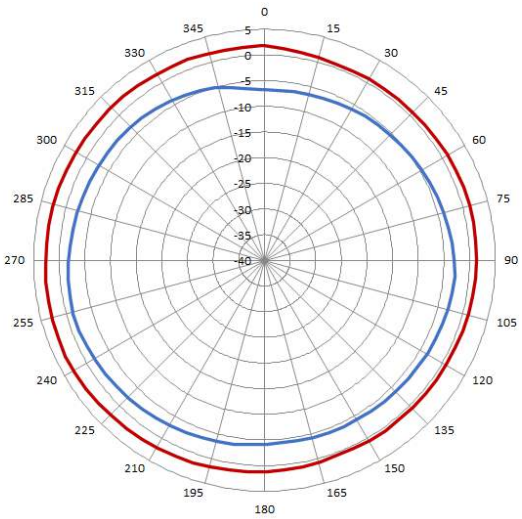
Table 4. RF performance table

Band, rate	Maximum transmit power (dBm) per transmit chain	Receiver sensitivity (dBm) per receive chain
2.4 GHz, 802.11b		
1 Mbps	18.0	–98.0
11 Mbps	18.0	–89.0
2.4 GHz, 802.11g		
6 Mbps	18.0	–92.0
54 Mbps	18.0	–76.0
2.4 GHz, 802.11n HT20		
MCS0	18.0	–93.0
MCS7	17.0	–74.0
2.4 GHz, 802.11ax HE20		
MCS0	18.0	–93.0
MCS7	16.0	–74.0
MCS9	15.0	–70.0
MCS11	13.0	–64.0
5 GHz, 802.11a		
6 Mbps	18.0	–91.0
54 Mbps	18.0	–73.0
5 GHz, 802.11n HT20 / HT40		
MCS0	18.0/18.0	–91.0/–88.0
MCS7	16.0/16.0	–70.0/–67.0
5 GHz, 802.11ac VHT20/VHT40/VHT80/VHT (80+80)		
MCS0	18.0/18.0/18.0	–91.0/–88.0/–85.0/–82.0
MCS7	16.0/16.0/16.0/16.0	–71.0/–68.0/–65.0/–62.0
5 GHz, 802.11ax HE20/HE40/HE80/HE (80+80)		
MCS0	18.0/18.0/18.0/18.0	–91.0/–88.0/–85.0/–82.0
MCS7	16.0/16.0/16.0/16.0	–71.0/–68.0/–65.0/–62.0
MCS9	15.0/15.0/15.0/15.0	–66.0/–63.0/–60.0/–57.0
MCS11	13.0/13.0/13.0/13.0	–62.0/–59.0/–56.0/–53.0
6 GHz, 802.11ax HE20/HE40/HE80/HE160		
MCS0	18.0/18.0/18.0/18.0	–90.0/–87.0/–84.0/–81.0
MCS7	16.0/16.0/16.0/16.0	–74.0/–71.0/–68.0/–65.0
MCS9	15.0/15.0/15.0/15.0	–68.0/–65.0/–62.0/–59.0
MCS11	13.0/13.0/13.0/13.0	–63.0/–60.0/–57.0/–54.0

Antenna patterns AP-655

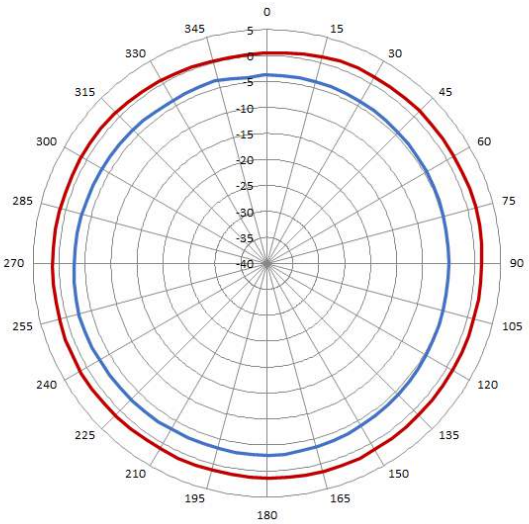
Horizontal planes (top view)

Showing azimuth (0°) and 30° downtilt patterns (averaged patterns for all applicable antennas)



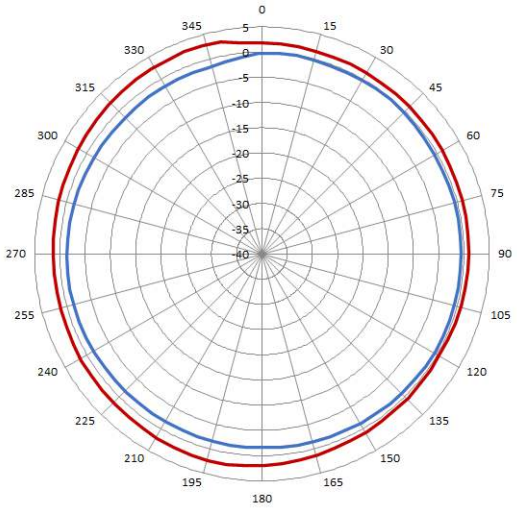
2.45 GHz Wi-Fi (R1) Average Azimuth — 2.45 GHz Wi-Fi (R1) Average Downtilt

Figure 1. 2.45 GHz Wi-Fi antenna patterns (horizontal)



5.5 GHz Wi-Fi (R0) Average Azimuth — 5.5 GHz Wi-Fi (R0) Average Downtilt

Figure 2. 5.5 GHz Wi-Fi antenna patterns (horizontal)



6.5 GHz Wi-Fi (R2) Average Azimuth — 6.5 GHz Wi-Fi (R2) Average Downtilt

Figure 3. 6.5 GHz Wi-Fi antenna patterns (horizontal)

Antenna patterns AP-655

Vertical (elevation) planes (side view, AP facing down)

Showing side view with AP rotated 0° and 90° (averaged patterns for all applicable antennas)

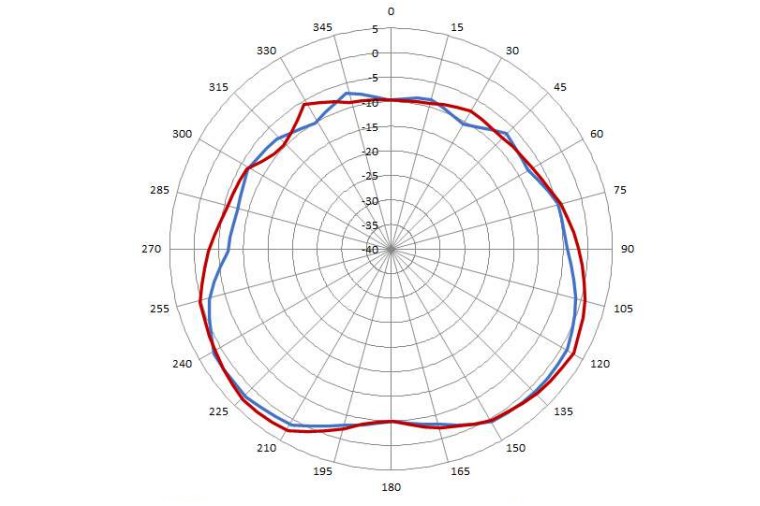


Figure 4. 2.45 GHz Wi-Fi antenna patterns (vertical)

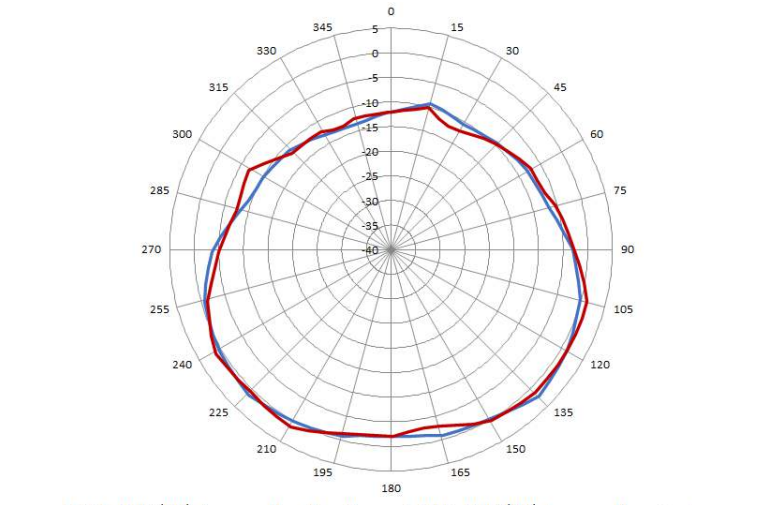


Figure 5. 5.5 GHz Wi-Fi antenna patterns (vertical)

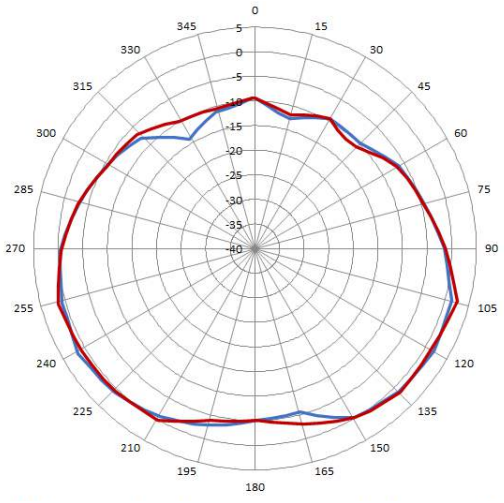


Figure 6. 6.5 GHz Wi-Fi antenna patterns (vertical)

Table 5. Ordering information

Part number	Description
Internal antenna access points	
R7J35A	HPE Aruba Networking AP-655 (EG) Tri-radio 4x4:4 802.11ax Wi-Fi 6E Internal Antennas Campus AP
R7J36A	HPE Aruba Networking AP-655 (IL) Tri-radio 4x4:4 802.11ax Wi-Fi 6E Internal Antennas Campus AP
R7J37A	HPE Aruba Networking AP-655 (JP) Tri-radio 4x4:4 802.11ax Wi-Fi 6E Internal Antennas Campus AP
R7J38A	HPE Aruba Networking AP-655 (RW) Tri-radio 4x4:4 802.11ax Wi-Fi 6E Internal Antennas Campus AP
R7J39A	HPE Aruba Networking AP-655 (US) Tri-radio 4x4:4 802.11ax Wi-Fi 6E Internal Antennas Campus AP
S5E08A	HPE Aruba Networking AP-655 (ID) Tri Radio 4x4 802.11ax Wi-Fi 6E Internal Antennas Campus AP
External antenna access points	
S1G53A	HPE Aruba Networking AP-654-RW Tri-radio 4x4:4 Wi-Fi 6E External Antennas Campus AP
S1G54A	HPE Aruba Networking AP-654-US Tri-radio 4x4:4 Wi-Fi 6E External Antennas Campus AP
Internal antenna access points — TAA models	
R7J40A	HPE Aruba Networking AP-655 (EG) TAA Tri-radio 4x4:4 802.11ax Wi-Fi 6E Internal Antennas Campus AP
R7J41A	HPE Aruba Networking AP-655 (IL) TAA Tri-radio 4x4:4 802.11ax Wi-Fi 6E Internal Antennas Campus AP
R7J42A	HPE Aruba Networking AP-655 (JP) TAA Tri-radio 4x4:4 802.11ax Wi-Fi 6E Internal Antennas Campus AP
R7J43A	HPE Aruba Networking AP-655 (RW) TAA Tri-radio 4x4:4 802.11ax Wi-Fi 6E Internal Antennas Campus AP
R7J44A	HPE Aruba Networking AP-655 (US) TAA Tri-radio 4x4:4 802.11ax Wi-Fi 6E Internal Antennas Campus AP
External antenna access points — TAA models	
S1G55A	HPE Aruba Networking AP-654-RWF1 TAA Tri-radio 4x4:4 Wi-Fi 6E External Antennas Campus AP
S1G56A	HPE Aruba Networking AP-654-USF1 TAA Tri-radio 4x4:4 Wi-Fi 6E External Antennas Campus AP

For compatible accessories, see the 650 series ordering guide.

Learn more at

HPE.com/us/en/aruba-access-points

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