

Alcatel-Lucent Enterprise OmniAccess 650 Access Point Campus Series

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

By leveraging the 6 GHz band, OmniAccess 650 Series Campus APs 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 client and IoT devices and growth in cloud. Unique to OmniAccess, the 650 Series includes ultra tri-band filtering to minimize channel interference and dual configurable 5 Gbps ethernet ports to eliminate coverage gaps, provide greater resiliency, and deliver fast, secure connectivity.



More capacity and wider channels

The 650 Series APs are designed to take advantage of the 6GHz band, which translates into far greater speeds, wider channels for multi-gigabit traffic, and less interference. It delivers 7.8 Gbps maximum aggregate data rates tri-radio, 4x4:4 uplink/downlink MIMO in all three bands (7.8 Gbps aggregate peak).

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		7.8 Gbps

Advantages of 6 GHz

Wi-Fi 6E provides up to 1200MHz in the 6GHz band for higher throughput and improved application performance. With up to seven 160MHz channels, Wi-Fi 6E can better support lowlatency, bandwidth hungry applications like high-definition video and artificial reality/virtual reality applications. Only Wi-Fi 6E capable devices can use the 6GHz band so there is no interference or slowdowns due to legacy devices.

Device class support

The 650 Series APs 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 APs.

Datasheet

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Key features

- Comprehensive tri-band coverage across 2.4GHz, 5GHz, and 6GHz to deliver 7.8 Gbps maximum aggregate 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 160MHz channels in 6GHz support low-latency, bandwidth-hungry applications like high-definition video and augmented reality/virtual reality applications
- Unique ultra tri-band filtering enables 5GHz and 6GHz to operate without restrictions or interference
- High availability with configurable 5 Gbps dual Ethernet ports for hitless failover of ethernet and power

Less interference

OmniAccess 650 Series Access Points include OmniAccess's ultra tri-band filtering, which enables enterprises to take advantage of the high end of 5GHz with the lower end of 6GHz without experiencing interference. Since there is only 50MHz between 5GHz and the 6GHz, 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 take full use of available spectrum without creating coverage gaps or islands.

Business continuity

The Series 650 APs 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 6GHz differently. The 650 Series APs 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 APs are based on the 802.11ax standard, which means that all its efficiency and security enhancements are also available on the 6GHz band. Wi-Fi 6 features such as Orthogonal Frequency Division Multiple Access (OFDMA), BSS coloring, Enhanced Open, and WPA3 are fully supported on the OmniAccess Wi-Fi 6E access points as well.

Advantages of OFDMA

This capability allows OmniAccess's APs to handle multiple 802.11ax capable clients on each channel simultaneously, regardless of device or traffic type. Channel utilization is optimized by handling each transaction via smaller sub-carriers or resource units (RUs), which means that clients are sharing a channel and not competing for airtime and bandwidth. The 650 Series APs supports up to 37 resource units, the maximum as defined in the standard for an 80MHz 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 client devices simultaneously. The 650 Series APs supports 4x4 MU-MIMO in both uplink and downlink directions.

Wi-Fi optimisation

Client optimisation

OmniAccess's patented AI-powered ClientMatch technology eliminates sticky client issues by steering a client to the AP where it receives the best radio signal. Client Match steerstraffic from the noisy 2.4GHz band to the preferred 5GHz or 6GHz band depending on client capabilities. ClientMatch also dynamically steers traffic to load balance APs to improve the user experience.

Automated Wi-Fi radio frequency management

To optimize the user experience and provide greater stability, OmniAccess AirMatch allows organization to automate network optimization using machine learning. 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 co-channel interference.

Application Assurance

With Air Slice, organizations can provide application assurance to their users that goes beyond the traditional capabilities of airtime fairness. After the SLAs are configured, Air Slice monitors network usage, automatically allocates radio resources, and dynamically adjusts radio resources as new users connect and applications sessions begin or end.

Advanced Cellular Coexistence (ACC)

Unique to OmniAccess, Advanced Cellular Coexistence 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, OmniAccess APs continuously monitor and report hardware energy usage. Unlike other vendor's access points, OmniAccess APs can also be configured to enable or disable capabilities based on available PoE power – ideal when wired switches have exhausted their power budget. Enterprises can deploy Wi-Fi 6E APs and update switching and power at a 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.

APs 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 USBport extension to provide IoT connectivity to a wider range of devices. These IoT capabilities allows organizations to leverage the OmniAccess APs as an IoT platform, which eliminates the need for an overlay infrastructure and additional IT resources and can accelerate IoT initiatives.

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

OmniAccess secure infrastructure

The OmniAccess 650 Series includes build-security capabilities such as:

WPA3 and Enhanced Open

Support for stronger encryption and authentication is provided via 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 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 eliminates 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, Air Pass creates a roaming network across the OmniAccess 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 APs can operate as standalone access points or with a gateway for greater scalability, security, and manageability. APs can be deployed using zero touch provisioning – without on-site technical expertise – for ease of implementation in branch offices and for remote work.

OmniAccess APs can be managed using cloud-based or onpremises solutions for any campus, branch, or remote work environment. As the management and orchestration console for OmniAccess ESP (Edge Services Platform), OmniAccess 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

OmniAccess 650 Series Access Points are designed to take advantage of the 6GHz 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 client and IoT devices, and expanded use of cloud. With a maximum aggregate 7.8 Gbps data rate for higher throughput and faster speeds for indoor use, the 650 Series raises the bar in terms of capacity, wider channels, hitless failover, and less interference between the 5GHz and 6GHz bands.

Technical specifications

Hardware variants

- AP-655: Internal antenna models

Wi-Fi radio specifications

- AP type: Indoor, tri-radio, 2.4GHz, 5GHz and 6GHz (concurrent) 802.11ax 4x4 MIMO.
- 2.4GHz radio: Four spatial streams Single User (SU) MIMO for up to 1,147Mbps wireless data rate with 4SS HE40 802.11ax client devices, or

multiple 2SS or 1SS MU-MIMO capable 802.11ax devices.

- 5GHz radio: Four spatial streams Single User (SU) MIMO for up to 2.4Gbps wireless data rate with 4SS HE80 802.11ax client devices, or multiple 2SS or 1SS MU-MIMO capable 802.11ax devices.
- 6GHz radio: Four spatial streams Single User (SU) MIMO for up to 4.8Gbps wireless data rate with 4SS HE160 802.11ax client devices, or

multiple 2SS or 1SS MU-MIMO capable 40 802.11ax devices.

- Up to 1,024 associated client devices per radio (limited to 2,048 maximum for all three radios combined), and up to 16 BSSIDs per radio (limited to 4 for the 6GHz radio).
- Supported frequency bands (country-specific restrictions apply):
 - 2.400 to 2.4835GHz ISM
 - 5.150 to 5.250GHz U-NII-1

Datasheet

- 5.250 to 5.350GHz U-NII-2A
 - 5.470 to 5.725GHz U-NII-2C
 - 5.725 to 5.850GHz U-NII-3/ISM
 - 5.850 to 5.895GHz U-NII-4
 - 5.925 to 6.425GHz U-NII-5
 - 6.425 to 6.525GHz U-NII-6
 - 6.525 to 6.875GHz U-NII-7
 - 6.875 to 7.125GHz 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 5GHz band.
 - Supported radio technologies:
 - 802.11b: Direct-sequence spread spectrum (DSSS)
 - 802.11a/g/n/ac: Orthogonal frequency-division multiplexing (OFDM)
 - 802.11ax: Orthogonal
 - 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 1,733 (MCS0 to MCS9, NSS = 1 to 4, VHT20 to VHT160(80+80)); VHT80); 2,167 with 1024-QAM (MCS10 and MCS11, proprietary extension)
 - 802.11ax (2.4GHz): 3.6 to 1,147 (MCS0 to MCS11, NSS = 1 to 4, HE20 to HE40)
 - 802.11ax (5GHz): 3.6 to 2,402 (MCS0 to MCS11, NSS = 1 to 4, HE20 to HE160(80+80))HE80)
 - 802.11ax (6GHz): 3.6 to 4,804 (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 (2.4GHz/5GHz/6GHz): +24 dBm (18dBm per chain)
- Note: conducted transmit power levels exclude antenna gain. For total (EIRP) transmit power, add antenna gain.
- Advanced Cellular Coexistence (ACC) minimizes the impact of interference from cellular networks
 - Ultra Tri-Band (UTB) enables ultimate flexibility in 5GHz and 6GHz 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 beam-forming (TxBF) for increased signal reliability and range
 - 802.11ax Target Wait Time (TWT) to support low-power client devices

Wi-Fi antennas

- AP-655: Integrated downtilt omnidirectional antennas for 4x4 MIMO with peak antenna gain of 4.8dBi in 2.4GHz, 5.3dBi in 5GHz and 5.4dBi in 6GHz. Built-in antennas are optimized for horizontal ceiling mounted orientation of the AP. The downtilt angle for maximum gain is roughly 30 to 40 degrees.
 - Combining the patterns of each of the antennas of the MIMO radios, the peak gain of the combined, average pattern is 3.3dBi in 2.4GHz, 2.9dBi in 5GHz and 4.0dBi in 6GHz.

Other interfaces

- E0, E1: Two Ethernet wired network ports (RJ-45)
 - Auto-sensing link speed (100/1000/2500/5000BASE-T) and MDI/MDX
 - 2.5Gbps and 5Gbps speeds comply with NBase-T and 802.3bz specifications
 - POE-PD: 48Vdc (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
- DC power interface: 12Vdc (nominal, ±5%), accepts 2.1mm/5.5mm center-positive circular plug with 9.5mm 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 6dBm transmit power and -101dBm receive sensitivity (125kbps)
 - Zigbee: up to 6dBm transmit power and -97dBm receive sensitivity (250kbps)
 - Integrated omnidirectional antenna with roughly 30 to 40 degrees downtilt and peak gain of 3.6dBi
- Advanced IOT Coexistence (AIC) allows concurrent operation of multiple radios in the 2.4GHz band
- Built-in Trusted Platform Module (TPM) for enhanced security and anti-counterfeiting
- Visual indicators (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 AP supports direct DC power and Power over Ethernet (POE) on port E0 and/or E1
- When POE power is supplied to both Ethernet ports, the AP combines power from both sources (SmartPOE 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; see the 650 Series Ordering Guide for details
- The AP supports various power modes depending on the available power source(s) and configuration.
 - With IPM disabled, the AP may apply some static restrictions, see tables below.
 - With IPM enabled, the AP 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 AP operates without restrictions.
 - Powering the AP 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).

Mounting details

A mounting bracket has been pre-installed on the back of the AP. This bracket is used to secure the AP to any of the mount kits (sold separately); see the 650 Series Ordering Guide for details.

Mechanical specifications

- Dimensions/weight (AP-655; unit without mount bracket):
 - 260mm (W) x 260mm (D) x 60mm (H)
 - 1,800g
- Dimensions/weight (AP-655; shipping):
 - 285mm (W) x 285mm (D) x 95mm (H)
 - 2,300g

Environmental specifications

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

Regulatory compliance

- FCC/ISED
- CE Marked
- RED Directive 2014/53/EU
- EMC Directive 2014/30/EU
- Low Voltage Directive 2014/35/EU
- UL/IEC/EN 60950
- IEC/EN 62368-1
- EN 60601-1-1, EN60601-1-2

For more country-specific regulatory information and approvals, please see your OmniAccess representative.

Single POE source	Class 6 (802.3bt)	Class 5 (802.3BT)	Class 4 (802.3at)	Class 3 (802.3af)
Power budget	51W	40W	25.5W	13.9W
Power mode	Unrestricted	Restricted	Restricted	Not supported
USB port	Enabled	Disabled	Disabled	Not supported
Ethernet	Dual	Single	Single	Not supported
MIMO	4x4	2x2	2x2	Not supported
Max RF power reduction	0dB	0dB	0dB	Not supported

Dual POE source	Class 5 + Class 3+	Class 4 + Class 4	Class 4 + Class 3	Class 3 + Class 3
Power budget	53.9W+	51W	39.4W	27.8W
Power mode	Unrestricted	Unrestricted	Restricted	Restricted
USB port	Enabled	Enabled	Disabled	Disabled
Ethernet	Dual	Dual	Dual	Dual
MIMO	4x4	4x4	4x4	2x2
Max RF power reduction	0dB	0dB	3dB	0dB

Regulatory model numbers

- AP-655 (all models): APIN0655

Certifications

- UL2043 plenum rating
- Wi-Fi Alliance (WFA):
 - Wi-Fi CERTIFIED a, b, g, n, ac
 - Wi-Fi CERTIFIED 6E (ax, 6GHz)
 - WPA, WPA2 and WPA3 – Enterprise with CNSA option, Personal (SAE), Enhanced Open (OWE)

- WMM, WMM-PS, Wi-Fi Vantage, W-Fi Agile Multiband
- Wi-Fi Location*
- Passpoint (release 2)
- Bluetooth SIG
- Zigbee Alliance
- Ethernet Alliance (POE, PD device, class 6)

Warranty

OmniAccess's hardware limited lifetime warranty.

Minimum operating system software versions

OmniAccessOS and OmniAccess InstantOS 8.10.0.0

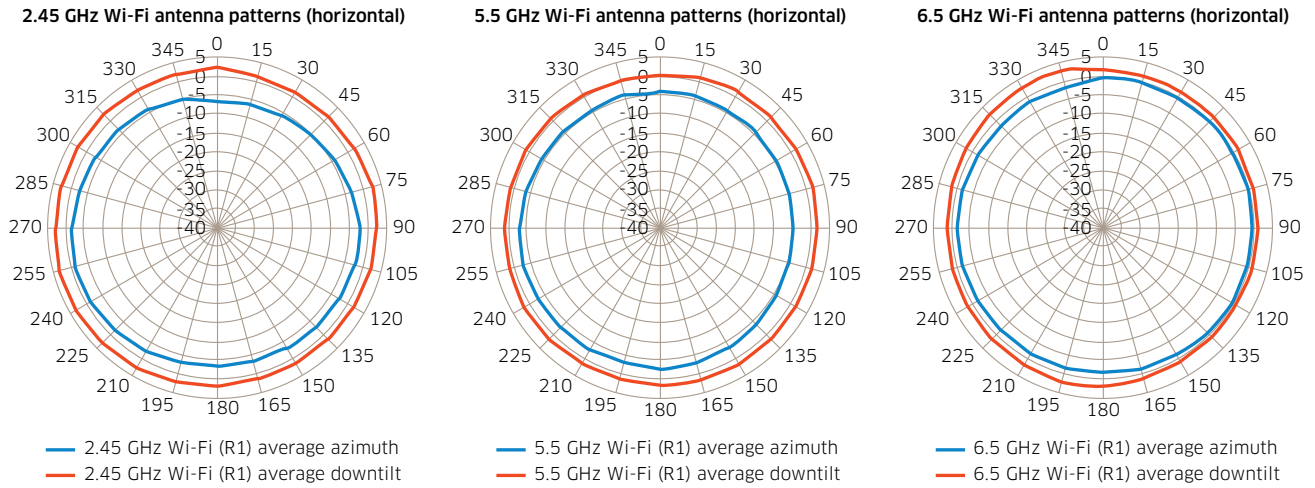
RF performance table

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	16.0	-73.0
5 GHz, 802.11n HT20/HT40		
MCS0	18.0/18.0	-88.0/-85.0
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. /-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

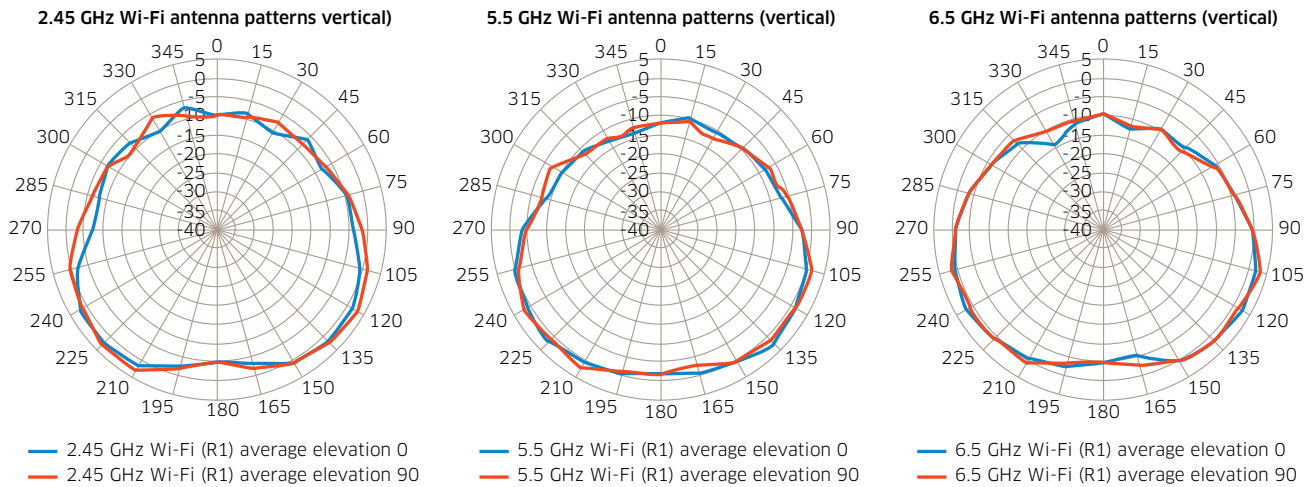
Horizontal planes (top view)

Showing both azimuth (0 degrees) and 30 degrees downtilt patterns (averaged patterns for all applicable antennas).



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

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



Ordering information

Part number	Description
OAW-AP655-EG	OmniAccess W-AP655 (EG) Tri Radio 2x2:2 802.11ax Wi-Fi 6E Internal Antennas Campus A
OAW-AP655-IS	OmniAccess W-AP655 (IS) Tri Radio 2x2:2 802.11ax Wi-Fi 6E Internal Antennas Campus AP
OAW-AP655-JP	OmniAccess W-AP655 (JP) Tri Radio 2x2:2 802.11ax Wi-Fi 6E Internal Antennas Campus AP
OAW-AP655-RW	OmniAccess W-AP655 (RW) Tri Radio 2x2:2 802.11ax Wi-Fi 6E Internal Antennas Campus AP
OAW-AP655-US	OmniAccess W-AP655 (US) Tri Radio 2x2:2 802.11ax Wi-Fi 6E Internal Antennas Campus AP