ZYXEL

WAC6500 Series

802.11ac Dual Radio Unified Pro Access Point

In the Gigabit era in Wi-Fi connectivity, upgrading to the 802.11ac standard represents the next step in wireless evolution. Many enterprises looking to break the 1-Gbps Wi-Fi speed barrier face the challenge of replacing existing 802.11n access points. While 802.11n operates on both 2.4 GHz and 5 GHz frequency band, 802.11ac predominantly uses the 5 GHz band which by its nature traditionally reduces coverage when compared to 2.4 GHz. This led to costly and time consuming efforts for installers to ensure that sufficient APs were installed to give complete coverage.

Zyxel Smart Antenna technology is a groundbreaking feature of the WAC6500 Series of wireless APs that solves the coverage problem by adaptively adjusting antenna patterns to fit a variety of wireless environments. The WAC6500 Series's industry-leading RF output power and sensitivity combine to offer greater coverage and performance over traditional networks, making Zyxel's WAC6500 Series the ultimate one-to-one AP upgrade choice.

As well as Zyxel Smart Antenna technology, the WAC6500 Series includes several other new features including the innovative APFlex™, tool-less mounting bracket, and many other software enhancements such as the Zyxel One Network utilities, making the WAC6500 a complete product designed to streamline network installation and speed deployment for the best possible Wi-Fi experience.

Dual-band 2.4 GHz and 5 GHz 802.11ac Wireless Access Point

WAC6503D-S and WAC6502D-S Smart Antenna AP is ideal for high-density and interference-laden indoor environments

WAC6553D-E Outdoor AP featuring IP66-rated weather protection is ideal for harsh outdoor environments

Advanced IEEE 802.11ac delivers up to 1.75 Gbps combined data rates

Industry-leading receive sensitivity as low as -102 dBm

APFlex™, DCS and tool-less bracket design streamline deployment

Zyxel One Network is supported

Zyxel**one** network
Redefining network integration

Datasheet WAC6500 Series

Benefits

Breakthrough Smart Antenna technology for any environment

The WAC6500 Series of 802.11ac APs delivers industry leading performance, thanks in part to its innovative Smart Antenna design. Featuring more than 700 optimized antenna patterns, the Zyxel Smart Antenna continuously calculates the ideal physical-layer path for each individual client. This feature not only offers the best possible signal by shaping to various patterns, but it also mitigates interference from other wireless clients. The WAC6500 Series's ultra-fast capabilities makes it perfect for delivering premium performance in interference-laden environments, such as conference rooms, airports, educational facilities and other high-density venues. And the series' enhanced adaptability further simplifies one-to-one AP replacement.

Best-in-class coverage and performance

In a Wi-Fi market crowded with 802.11ac APs, the WAC6500 Series stands out with regard to performance and coverage due to its unique RF design. The AP's three-stream hardware configuration provides power of up to 30 dBm while providing unequaled receive sensitivity as low as -102 dBm. The Zyxel Smart Antenna doubles the WAC6500 Series' performance over conventional internal antennas, and performs three times (3x) better than legacy 802.11n APs.

Easy and instant deployment with APFlex™, DCS, and tool-less bracket design

Zyxel APFlex™ eases installation by resolving the managed/standalone AP mode configuration, automatically integrating into the network environment with or without Dynamic Host Configuration Protocol (DHCP), eliminating the need for pre-installation preparation. Other helpful features include Dynamic Channel Selection (DCS), avoid the interference of co-channel and overlapping channel at initialization. In addition to software solutions, the WAC6500 Series' simplifies installation through creative design features. For example, the universal and tool-less bracket design allows for flexible ceiling track mounting without the need for special tools. From software to hardware, the WAC6500 Series makes setup and operation fast and simple.

Efficient and reliable Wi-Fi network

The WAC6500 Series ensures users get the best possible overall network performance by utilizing load balancing and client steering. Load balancing allows administrators to set limits on network traffic and the number of clients associated with each AP. Client steering monitors the capabilities of each wireless client and steers them to the less congested band and better signal AP. When it comes to deployments in challenging cabling locations, wireless mesh networks help extend Wi-Fi coverage. Zyxel's proprietary ZyMesh creates reliable and resilient mesh links instantly. Yet the configuration is intuitive and centralized manageable on NXC controller. ZyMesh improves network reliability through true wireless connectivity with repeater APs selecting multiple routes to provide backup and failover for uninterrupted service. Together, these three technologies provide the WAC6500 Series with unbeatable efficiency and reliability.

Zyxel One Network experience

Aiming for relieving our customers from repetitive operations of deploying and managing a network, Zyxel One Network is designed to simplify the configuration, management, and troubleshooting, allowing our customers to focus on the business priorities. Zyxel One Network presents an easy-to-use tool, Zyxel One Network Utility (ZON Utility), to realize speed network setup. Zyxel Smart Connect allows Zyxel networking equipment to be aware and recognize each other and further facilitating the network maintenance via one-click remote functions such as factory reset or power cycling. Zyxel One Network redefines the network integration across multiple networking products from switch to Wi-Fi AP and to Gateway.

Feature Highlights

Zyxel Smart Antenna

Zyxel Smart Antenna continuously applies a unique algorithm to compute the best physical-layer path for every individual client. It not only considers best signal, but also mitigates RF interference on over 700 optimized antenna patterns. The "switch-beam" technique mitigating RF interference runs at the physical layer, requiring no effort on the part of the end-user. The adaptive antenna design handles a variety of tough deployments, including high-capacity, high-performance and interference-laden environments like conference rooms, airports, classrooms and other crowded venues.

Zyxel APFlex™

Zyxel APFlex™ includes Zero-touch AP mode changing and Automatic IP configuration. The Zero-touch AP mode setting detects if there is an existing Zyxel controller and chooses stand-alone or managed mode. The Automatic IP configuration removes manual configuration, allowing the AP to set itself to fixed or dynamic IP address automatically. With these two intelligent features, IT administrators can skip the two critical settings that were handled manually on legacy products, shifting focus to more critical configuration tasks.

WPA2 Enterprise Certified

Zyxel WAC6500 Series has been certified with industrial-strength WPA2 enterprise protection and supports a wide range of Extensible Authentication Protocol (EAP) types. It can be seamlessly integrated with deployed corporate RADIUS servers.

Zyxel One Network Utility

To streamline the management process, the WAC6500 Series comes with the Zyxel One Network (ZON) utility, allowing administrators to assign IP addresses to multiple APs through just one platform. Administrators can avoid the hassle logging into each AP to change the default IP addresses before physical installation.

Zyxel AP Configurator

While deploying a number of APs, repetitive configuration of each unit takes time and effort. Zyxel AP Configurator (ZAC) builds templates that allows users to copy one profile to several APs, allowing batch firmware upgrades and profile backups in three easy steps to significantly reduce configuration time and effort.

Tool-less Installation

WAC6500 Series features a creative mounting bracket design allowing installation of the AP in a variety of suspended ceiling tracks without the need for tools. The variable width of ceiling tracks makes our bracket universally adaptable to any building structure. Individual end-users can easily install the hardware, saving valuable time that could be better spent deploying additional APs.

Wireless Layer-2 Isolation

The Layer-2 isolation protects private networks among client users, allowing users to access their shared devices without entering the rest of a private network for enhanced security. In addition, the intra-BSS blocking prevents different WiFi clients associated with the same AP from seeing each other and each others data.
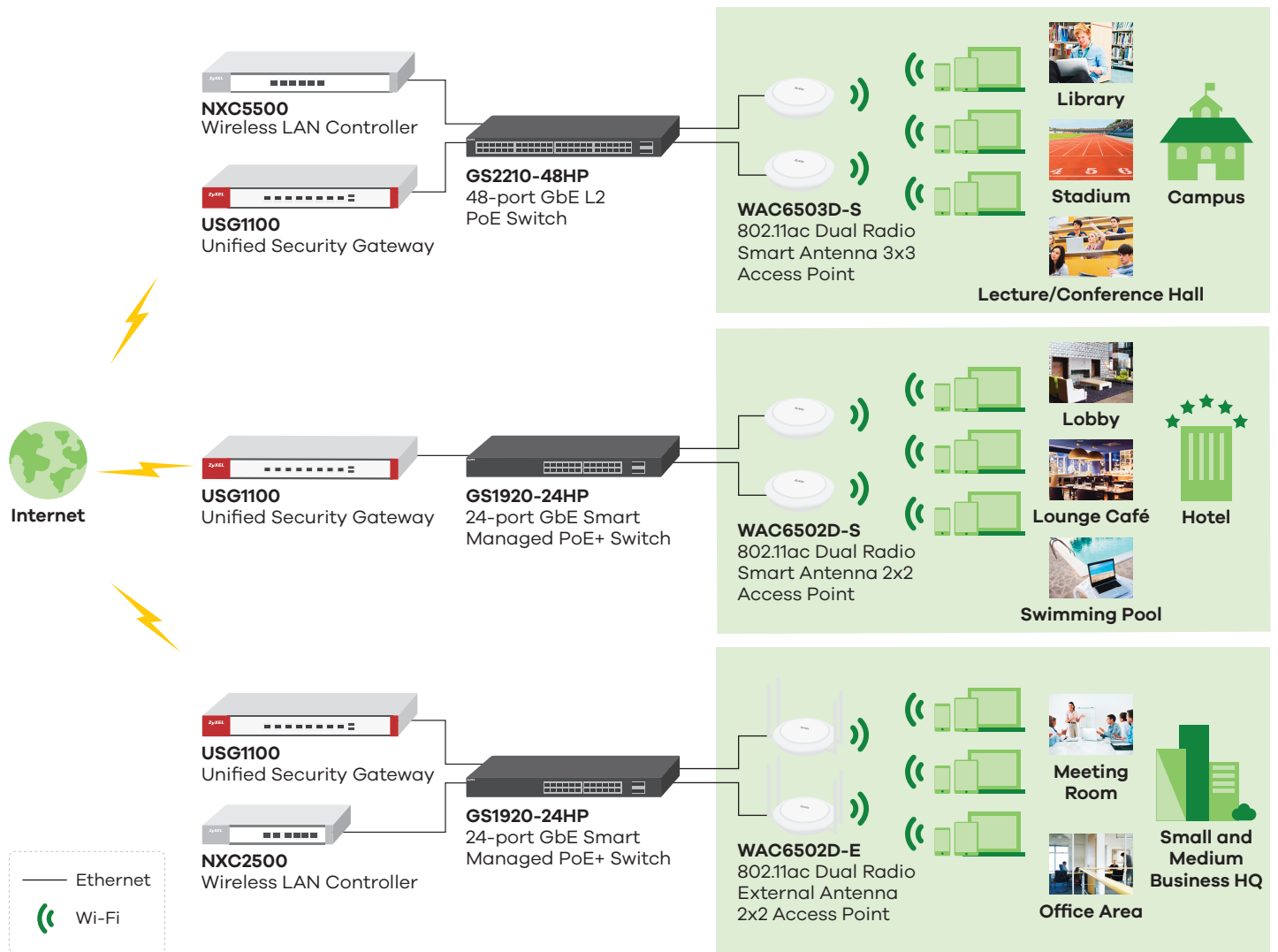
Zyxel Wireless Optimizer

Zyxel Wireless Optimizer (ZWO) provides a powerful tool for centralized management covering initial planning, adjustment during deployment and after-sale maintenance of an AP network. Architects can simulate AP deployment on a map displaying the number of APs needed. During deployment, ZWO will also map actual signal coverage for architects to adjust their AP locations or configurations. After-sale, network administrators can access key performance details from ZWO, including channel in use, transmit retry rate and frame error rate, as well as the devices on the environment map. ZWO's user-friendly presentation saves time and facilitates quick response to the network problems.

ZyMesh

Wireless Mesh is an array of access points automatically forming dynamic wireless links. Built on this foundation of mesh networking, ZyMesh is Zyxel's proprietary protocol for creating wireless mesh links for easy configuration, optimized management and enhanced reliability.

Application Diagram

Legend
- —— Ethernet
- ((Wi-Fi

Row 1
NXC5500
Wireless LAN Controller

USG1100
Unified Security Gateway

GS2210-48HP
48-port GbE L2
PoE Switch

WAC6503D-S
802.11ac Dual Radio
Smart Antenna 3x3
Access Point

Library
Stadium
Campus
Lecture/Conference Hall

Row 2
Internet

USG1100
Unified Security Gateway

GS1920-24HP
24-port GbE Smart
Managed PoE+ Switch

WAC6502D-S
802.11ac Dual Radio
Smart Antenna 2x2
Access Point

Lobby
Lounge Café
Hotel
Swimming Pool

Row 3
USG1100
Unified Security Gateway

NXC2500
Wireless LAN Controller

GS1920-24HP
24-port GbE Smart
Managed PoE+ Switch

WAC6502D-E
802.11ac Dual Radio
External Antenna
2x2 Access Point

Meeting
Room
Office Area
Small and
Medium
Business HQ

Robust Hardware & Smart Antenna

Fine art of RF design

The WAC6500 Series isolates RF circuits by solid shielding frames. Thus, RF noise and electromagnetic interference (EMI) is mitigated meanwhile RF performance is enhanced as well.

Solid capacitor for longevity

All-solid capacitor design provides up to 6 times lifespan than electrolytic capacitors that delivers better stability and reliability.

Zyxel Smart Antenna

- Over 700 optimized antenna patterns create the best path for clients at a range of angles.
- WAC6500 Series delivers true ultra-fast wireless performance by eliminating the need for beam-forming through individual wireless client support.

Specifications

Model	WAC6503D-S	WAC6502D-S	WAC6502D-E	WAC6553D-E
Product name	802.11ac Dual Radio Smart Antenna 3x3 Access Point	802.11ac Dual Radio Smart Antenna 2x2 Access Point	802.11ac Dual Radio External Antenna 2x2 Access Point	802.11ac Dual Radio External Antenna 3x3 Outdoor Access Point

Main Design				
Wireless frequency	2.4 and 5 GHz	2.4 and 5 GHz	2.4 and 5 GHz	2.4 and 5 GHz
Radio	2	2	2	2

RF Specifications				
Frequency band	2.4 GHz (IEEE 802.11 b/g/n) • USA (FCC): 2.412 to 2.462 GHz • Europe (ETSI): 2.412 to 2.472 GHz • Taiwan (TW): 2.412 to 2.462 GHz		5 GHz (IEEE 802.11 a/n/ac) • USA (FCC): 5.15 to 5.35 GHz; 5.725 to 5.850 GHz • European (ETSI): 5.15 to 5.35 GHz; 5.470 to 5.725 GHz • Taiwan (TW): 5.25 to 5.35 GHz; 5.725 to 5.850 GHz	
802.11n/ac premium features	• 3x3 Multiple-Input Multiple-Output (MIMO) with three spatial streams • Maximal Ratio Combining (MRC) • 20-, 40- and 80-MHz channels • Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Tx/Rx) • Cyclic Delay Diversity (CSD) support • Maximum Likelihood Demodulation (MLD) support • Low Density Parity Check (LDPC) support	• 2x2 Multiple-Input Multiple-Output (MIMO) with two spatial streams • Maximal Ratio Combining (MRC) • 20-, 40- and 80-MHz channels • Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Tx/Rx) • Cyclic Delay Diversity (CSD) support • Maximum Likelihood Demodulation (MLD) support • Low Density Parity Check (LDPC) support		• 3x3 Multiple-Input Multiple-Output (MIMO) with three spatial streams • Maximal Ratio Combining (MRC) • 20-, 40- and 80-MHz channels • Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Tx/Rx) • Cyclic Delay diversity (CSD) support • Maximum Likelihood Demodulation (MLD) support • Low Density Parity Check (LDPC) support

Typical transmit output power (Conducted)	**FCC 11b/g**	29	28	28	29
	FCC 11g/n	29	28	28	29
	FCC 11a	30	28	28	29
	FCC 11n/a (ac)	30	28	28	29
	EU 11b/g	15	14	14	15
	EU 11g/n	15	14	14	15
	EU 11a	23	22	22	23
	EU 11n/a (ac)	23	22	22	23

		WAC6503D-S	WAC6502D-S	WAC6502D-E	WAC6553D-E
Number of antenna		6 embedded smart antenna	4 embedded smart antenna	4 external	6 N-type connectors*
Antenna gain		4 dBi @2.4 GHz 6 dBi @5 GHz	4 dBi @2.4 GHz 6 dBi @5 GHz	5 dBi @2.4 GHz 7 dBi @5 GHz	-

* The antenna is not embedded and external antennas are separately sold.

Model	WAC6503D-S	WAC6502D-S	WAC6502D-E	WAC6553D-E
RF Specifications				
Support data rate	• 802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbps • 802.11b: 1, 2, 5.5 and 11 Mbps • 802.11n: up to 450 Mbps in MCS23 (40 MHz) • 802.11ac: up to 1300 Mbps in MCS9 (80 MHz)	• 802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbps • 802.11b: 1, 2, 5.5 and 11 Mbps • 802.11n: up to 300 Mbps in MCS15 (40 MHz) • 802.11ac: up to 866 Mbps in MCS9 (80 MHz)		• 802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbps • 802.11b: 1, 2, 5.5 and 11 Mbps • 802.11n: up to 450 Mbps in MCS23 (40 MHz) • 802.11ac: up to 1300 Mbps in MCS9 (80 MHz)
Receive sensitivity	Min. Rx sensitivity up to -102 dBm	Min. Rx sensitivity up to -100 dBm	Min. Rx sensitivity up to -100 dBm	Min. Rx sensitivity up to -102 dBm
Interfaces				
Number of 10/100/1000M LAN	2	2	2	1
Console port	RJ-45 serial	RJ-45 serial	RJ-45 serial	RJ-45 serial
PoE	Yes	Yes	Yes	Yes
PoE power draw	17.04W	15.12W	15.12W	25W
WLAN Features				
WLAN maximum throughput	Up to 900 Mbps	Up to 600 Mbps	Up to 600 Mbps	Up to 900 Mbps
Mesh AP (By license)[1]	Yes[1]	Yes[1]	Yes[1]	Yes[1]
Mesh AP for multiple SSID with VLAN (through tunnel mode)[1]	Yes[1]	Yes[1]	Yes[1]	Yes[1]
Fast roaming	Pre-authentication, PMK caching and 802.11r	Pre-authentication, PMK caching and 802.11r	Pre-authentication, PMK caching and 802.11r	Pre-authentication, PMK caching and 802.11r
Wireless Security				
WEP	Yes	Yes	Yes	Yes
WPA/WPA2-PSK	Yes	Yes	Yes	Yes
WPA/WPA2-Enterprise	Yes	Yes	Yes	Yes
EAP types	EAP-TLS, EAP-TTLS, EAPPEAP, EAP-FAST, EAP-AKA and EAP-SIM	EAP-TLS, EAP-TTLS, EAPPEAP, EAP-FAST, EAP-AKA and EAP-SIM	EAP-TLS, EAP-TTLS, EAPPEAP, EAP-FAST, EAP-AKA and EAP-SIM	EAP-TLS, EAP-TTLS, EAPPEAP, EAP-FAST, EAP-AKA and EAP-SIM
IEEE 802.1X	Yes	Yes	Yes	Yes
Number of SSID	16	16	16	16
Web authentication[1]	Yes	Yes	Yes	Yes
MAC filtering	Yes	Yes	Yes	Yes
Layer-2 isolation	Yes	Yes	Yes	Yes
RADIUS authentication	Yes	Yes	Yes	Yes
Microsoft AD authentication[1]	Yes	Yes	Yes	Yes
LDAP authentication[1]	Yes	Yes	Yes	Yes
MAC authentication[1]	Yes	Yes	Yes	Yes
Rogue AP detection[1]	Yes	Yes	Yes	Yes
Rogue AP containment[1]	Yes	Yes	Yes	Yes

*1: Features supported when working with Zyxel NXC controller series (ZyMesh feature on WAC6500 Series is available from FW release 4.21 or above.)
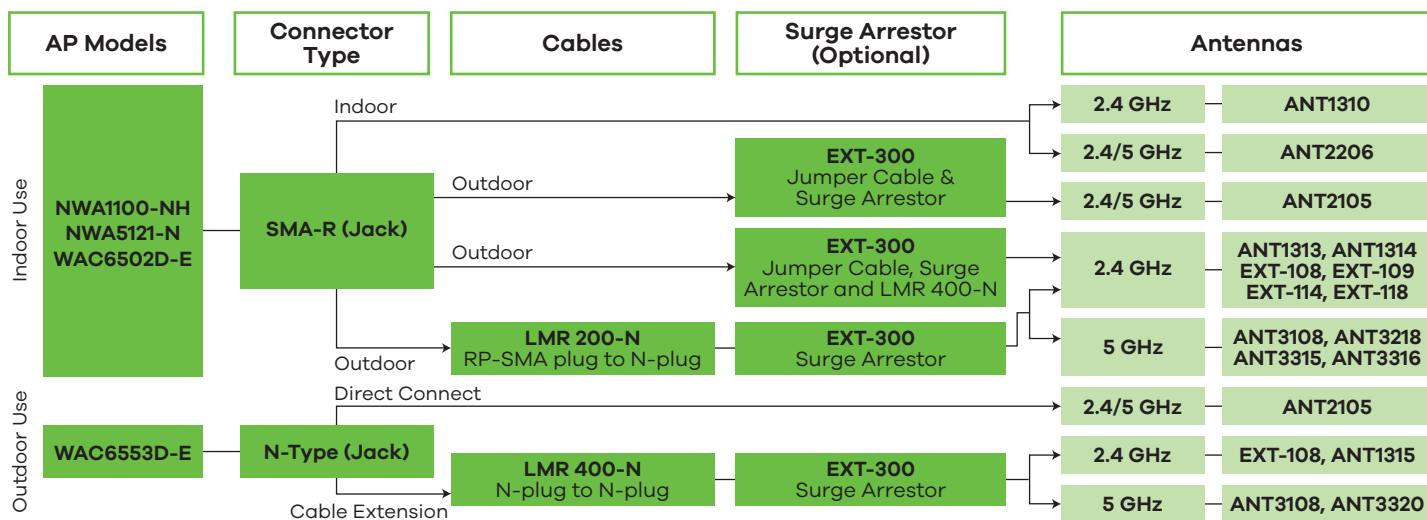
Model	WAC6503D-S	WAC6502D-S	WAC6502D-E	WAC6553D-E
Network				
IPv6 host	Yes	Yes	Yes	Yes
VLANs	Yes	Yes	Yes	Yes
DHCP client	Yes	Yes	Yes	Yes
QoS				
WMM (Wi-Fi certified)	Yes	Yes	Yes	Yes
WMM power save	Yes	Yes	Yes	Yes
DiffServ marking	Yes	Yes	Yes	Yes
Management				

ZON utility	• Discovery of Zyxel switches, APs and gateways
	• Centralized and batch configurations
	  ▪ IP configuration ▪ IP renew ▪ Device reboot
	  ▪ Device locating ▪ Web GUI access ▪ Firmware upgrade
	  ▪ Password configuration ▪ One-click quick association with Zyxel AP Configurator (ZAC)			

Smart connect	• Neighbor device discovery • One-click remote management access to the neighboring Zyxel devices			
Zyxel AP configurator	• Batch AP configuration • Batch AP firmware upgrade • Batch AP profile backup			
Zyxel wireless optimizer	• Wi-Fi AP Planning • Wi-Fi coverage detection • Wireless health management			
Standalone AP mode	Yes	Yes	Yes	Yes
Managed AP mode	Yes	Yes	Yes	Yes
CLI	Yes	Yes	Yes	Yes
Web UI	Yes	Yes	Yes	Yes
SNMP	v2c/v3	v2c/v3	v2c/v3	v2c/v3
Others				
Plenum rating	Yes	Yes	Yes	Yes
Kensington lock support	Yes	Yes	Yes	–
Input power	DC input: 12VDC 2A; PoE: 802.3at compliant (Power adapter is sold separately)			PoE: 802.3at compliant
MTBF (hr)	1,202,489	1,407,374	1,427,755	562,413
Standard Compliance				
Ethernet	• IEEE 802.3 • IEEE 802.3u • IEEE 802.11ab • IEEE 802.3au • IEEE 802.3az • IEEE 802.3at	• IEEE 802.3 • IEEE 802.3u • IEEE 802.11ab • IEEE 802.3au • IEEE 802.3az • IEEE 802.3at	• IEEE 802.3 • IEEE 802.3u • IEEE 802.11ab • IEEE 802.3au • IEEE 802.3az • IEEE 802.3at	• IEEE 802.3 • IEEE 802.3u • IEEE 802.11ab • IEEE 802.3au • IEEE 802.3az • IEEE 802.3at
PoE	IEEE 802.3at[*1]	IEEE 802.3at[*1]	IEEE 802.3at[*1]	IEEE 802.3at
WLAN	• 802.11b: DBPSK, DQPSK, CCK • 802.11a: BPSK, QPSK, 16-QAM, 64-QAM • 802.11ac: BPSK, QPSK, 64-QAM, 256-QAM		• 802.11g: BPSK, QPSK, 16-QAM, 64-QAM • 802.11n: BPSK, QPSK, 16-QAM, 64-QAM	
Certifications				
Radio	FCC Part 15C, FCC Part 15E, ETSI EN 300 328, EN 301 893, LP0002			
EMC	FCC Part 15B, EN 301 489-1, EN 301 489-17, EN55022, EN55024, EN61000-3-2/-3, EN60601-1-2, BSMI CNS13438			
Safety	Safety EN 60950-1, IEC 60950-1, BSMI CNS14336-1			

*1: Compatible with 802.3af mode with restricted function: 1x3 MIMO or 1x2 MIMO with 1 spatial stream.

Model	WAC6503D-S	WAC6502D-S	WAC6502D-E	WAC6553D-E
Physical Specifications				
Item — Dimensions (WxDxH)(mm/in.)	236 x 227 x 62/ 9.28 x 8.95 x 2.43	236 x 227 x 62/ 9.28 x 8.95 x 2.43	236 x 227 x 62/ 9.28 x 8.95 x 2.43	255 x 256 x 62/ 10.04 x 10.08 x 2.44
Weight (g/lb.)	982/2.17	961/2.12	841/1.86	1708/3.77
Packing — Dimensions (WxDxH)(mm/in.)	308 x 323 x 127/ 12.13 x 12.72 x 5.00	308 x 323 x 127/ 12.13 x 12.72 x 5.00	308 x 323 x 127/ 12.13 x 12.72 x 5.00	393 x 158 x 430/ 15.47 x 6.22 x 16.93
Weight (g/lb.)	1743/3.85	1722/3.81	1699/3.75	3904/8.63
Included accessories	• Ceiling mount plate • Mounting screws	• Ceiling mount plate • Mounting screws	• External antenna • Ceiling mount plate • Mounting screws	• Pole/wall mounting kits • PoE injector (optional) • Power cord (optional)
Environmental Specifications				
Weather protection	-	-	-	IP66 (Embedded heater for harsh weather)
Operating environment — Temperature	0°C to 50°C/ 32°F to 122°F	0°C to 50°C/ 32°F to 122°F	-20°C to 60°C/ -4°F to 140°F	-40°C to 60°C/ -40°F to 140°F
Humidity	10% to 90% (non-condensing)	10% to 90% (non-condensing)	10% to 90% (non-condensing)	10% to 90% (non-condensing)
Storage environment — Temperature	-40°C to 70°C/ -40°F to 158°F	-40°C to 70°C/ -40°F to 158°F	-40°C to 70°C/ -40°F to 158°F	-40°C to 70°C/ -40°F to 158°F
Humidity	10% to 90% (non-condensing)	10% to 90% (non-condensing)	10% to 90% (non-condensing)	10% to 90% (non-condensing)

Optional Accessories

Antenna & Cable Compatibility

AP Models	Connector Type	Cables	Surge Arrestor (Optional)	Antennas	
Indoor Use NWA1100-NH NWA5121-N WAC6502D-E	SMA-R (Jack)	Indoor		2.4 GHz	ANT1310
				2.4/5 GHz	ANT2206
		Outdoor	EXT-300 Jumper Cable & Surge Arrestor	2.4/5 GHz	ANT2105
		Outdoor	EXT-300 Jumper Cable, Surge Arrestor and LMR 400-N	2.4 GHz	ANT1313, ANT1314 EXT-108, EXT-109 EXT-114, EXT-118
		Outdoor — LMR 200-N RP-SMA plug to N-plug	EXT-300 Surge Arrestor	5 GHz	ANT3108, ANT3218 ANT3315, ANT3316
Outdoor Use WAC6553D-E	N-Type (Jack)	Direct Connect		2.4/5 GHz	ANT2105
		Cable Extension — LMR 400-N N-plug to N-plug	EXT-300 Surge Arrestor	2.4 GHz	EXT-108, ANT1315
				5 GHz	ANT3108, ANT3320

Power Modules

Part Number	Description
ACCESSORY-ZZ0101F	Universal power adapter (12V/2A)
POE12-HP-EU0102F	802.3at PoE injector, ROHS
POE12-HP-US0102F	802.3at PoE injector, ROHS

FC CE RoHS VERIFIED