



## WAC6500 Series

### 802.11ac Dual Radio Unified Pro Access Point

Cloud management is a simpler, faster and much more efficient way to handle larger networks. However ZyXel knows that it's not always easy for administrators of busy venues to go for cloud immediately. In response to this challenge, the ZyXel WAC6500 Series featuring NebulaFlex Pro offers the full flexibility for users to switch among standalone, controller-managed and cloud-managed modes. In addition, it comes with a 1-year bundled Nebula Professional pack license\* that eliminates immediate licensing cost when migrating to full-featured cloud management.

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.

### Benefits

#### NebulaFlex Pro – simply manage it your way!

The NebulaFlex Pro provides extended flexibility, especially for those who hesitate to step up for cloud networking. You can easily switch network management modes among standalone, on-premises controller and our intuitive NCC cloud platform. You can even change your mind any time without additional cost while protecting previous investments on wireless technology. You can have the privilege to use advanced features with professional pack for one year upon registration on Nebula; these features include site-wide topology, 365-day statistics on the device and client monitoring along with more upcoming new features on NCC and its App.



NebulaFlex Pro allows users to switch among standalone, on-premises controller managed or intuitive Nebula cloud managed modes as needed



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



Smart Antenna AP is ideal for high-density and interference-laden indoor 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  
Redefining network integration

## **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 WiFi 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 unequalled 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 WiFi 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 WiFi 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.

## 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

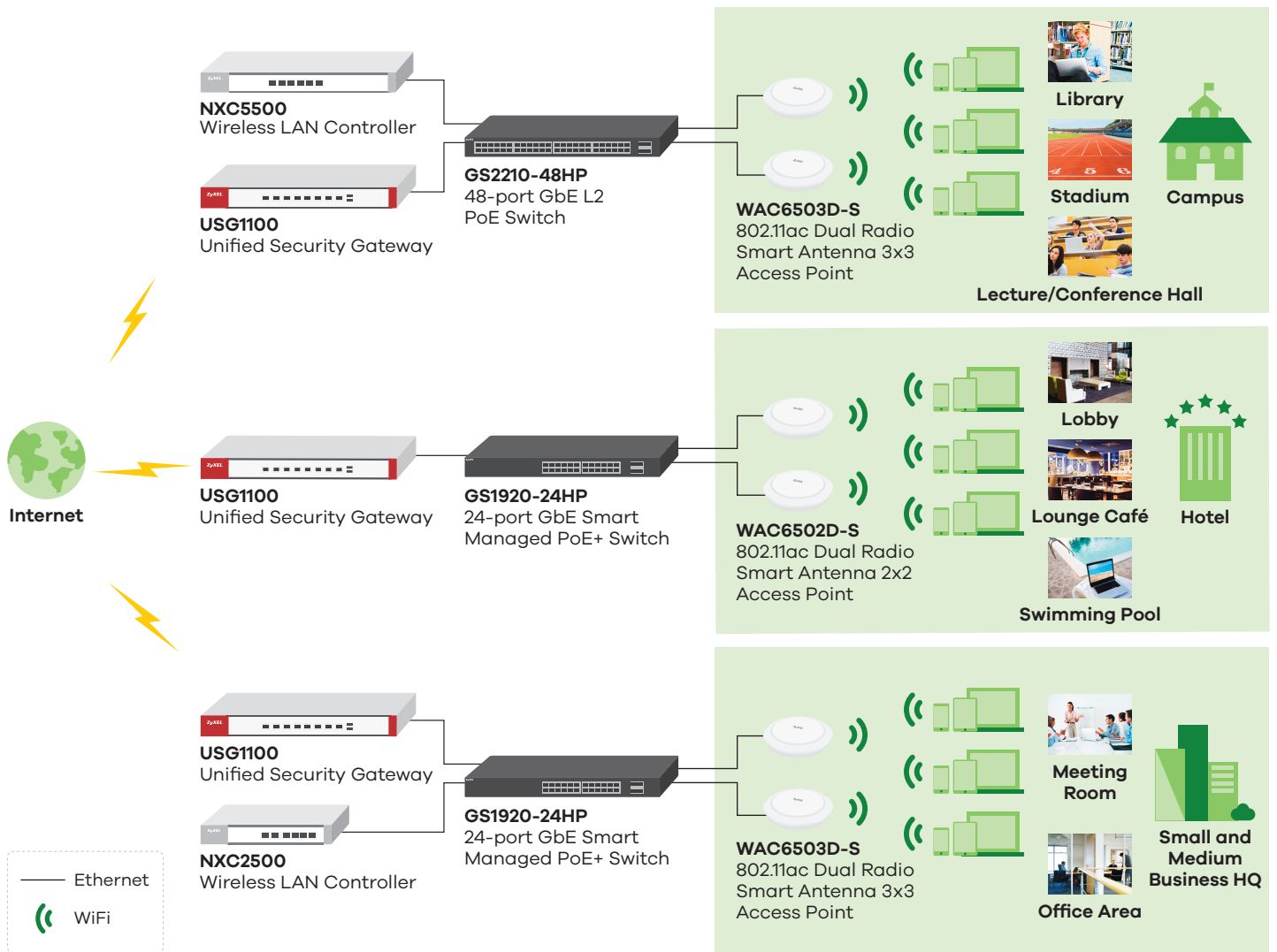
Zyxel Wireless Optimizer (ZWO) provides a powerful tool for centralized management covering initial planning, adjustment during deployment and after-sale maintenance of an AP network. Architects can simulate AP deployment on a map displaying the number of APs needed. During deployment, ZWO will also 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



## 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	
<b>Product name</b>	802.11ac Dual Radio Smart Antenna 3x3 Access Point		802.11ac Dual Radio Smart Antenna 2x2 Access Point	
				
<b>Main Design</b>				
<b>Wireless frequency</b>	2.4 and 5 GHz		2.4 and 5 GHz	
<b>Radio</b>	2		2	
<b>RF Specifications</b>				
<b>Frequency band</b>	2.4 GHz (IEEE 802.11 b/g/n) <ul style="list-style-type: none"> <li>• USA (FCC): 2.412 to 2.462 GHz</li> <li>• Europe (ETSI): 2.412 to 2.472 GHz</li> <li>• Taiwan (TW): 2.412 to 2.462 GHz</li> </ul>		2.4 GHz (IEEE 802.11 b/g/n) <ul style="list-style-type: none"> <li>• USA (FCC): 2.412 to 2.462 GHz</li> <li>• Europe (ETSI): 2.412 to 2.472 GHz</li> <li>• Taiwan (TW): 2.412 to 2.462 GHz</li> </ul>	
<b>802.11n/ac premium features</b>	<ul style="list-style-type: none"> <li>• 3x3 Multiple-Input Multiple-Output (MIMO) with three spatial streams</li> <li>• Maximal Ratio Combining (MRC)</li> <li>• 20-, 40- and 80-MHz channels</li> <li>• Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Tx/Rx)</li> <li>• Cyclic Delay Diversity (CSD) support</li> <li>• Maximum Likelihood Demodulation (MLD) support</li> <li>• Low Density Parity Check (LDPC) support</li> </ul>		<ul style="list-style-type: none"> <li>• 2x2 Multiple-Input Multiple-Output (MIMO) with two spatial streams</li> <li>• Maximal Ratio Combining (MRC)</li> <li>• 20-, 40- and 80-MHz channels</li> <li>• Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Tx/Rx)</li> <li>• Cyclic Delay Diversity (CSD) support</li> <li>• Maximum Likelihood Demodulation (MLD) support</li> <li>• Low Density Parity Check (LDPC) support</li> </ul>	
<b>Conducted typical transmit output power*1 (limited by local regulatory requirements)</b>	<b>FCC 11b/g</b>	29	28	
	<b>FCC 11g/n</b>	29	28	
	<b>FCC 11a</b>	30	28	
	<b>FCC 11n/a (ac)</b>	30	28	
	<b>EU 11b/g</b>	15	14	
	<b>EU 11g/n</b>	15	14	
	<b>EU 11a</b>	23	22	
	<b>EU 11n/a (ac)</b>	23	22	
<b>Number of antenna*2</b>	6 embedded smart antenna		4 embedded smart antenna	
<b>Antenna gain</b>	4 dBi @2.4 GHz; 6 dBi @5 GHz		4 dBi @2.4 GHz; 6 dBi @5 GHz	
<b>Support data rate</b>	<ul style="list-style-type: none"> <li>• 802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbps</li> <li>• 802.11b: 1, 2, 5.5 and 11 Mbps</li> <li>• 802.11n: up to 450 Mbps in MCS23 (40 MHz)</li> <li>• 802.11ac: up to 1300 Mbps in MCS9 (80 MHz)</li> </ul>		<ul style="list-style-type: none"> <li>• 802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbps</li> <li>• 802.11b: 1, 2, 5.5 and 11 Mbps</li> <li>• 802.11n: up to 300 Mbps in MCS15 (40 MHz)</li> <li>• 802.11ac: up to 866 Mbps in MCS9 (80 MHz)</li> </ul>	
<b>Receive sensitivity</b>	Min. Rx sensitivity up to -102 dBm		Min. Rx sensitivity up to -100 dBm	
<b>Interfaces</b>				
<b>Number of 10/100/1000M LAN</b>	2		2	
<b>Console port</b>	RJ-45 serial		RJ-45 serial	
<b>PoE</b>	Yes		Yes	
<b>PoE power draw</b>	17.04 W		15.12 W	
<b>WLAN Features</b>				
<b>WLAN maximum throughput</b>	Up to 900 Mbps		Up to 600 Mbps	
<b>ZyMesh (Controller-managed mode)</b>	Yes		Yes	
<b>WDS/Mesh*3</b>	Yes		Yes	

\*1: Conducted typical transmit output power excludes antenna gain. For total (EIRP) transmit power, add antenna gain.

\*2: The antenna is not embedded and external antennas are separately sold.

\*3: WDS, ZyMesh, Smart Mesh and Industry's Open Mesh, Easy Mesh are different mesh systems that do not work with one another.

Model	WAC6503D-S	WAC6502D-S
<b>WLAN Features</b>		
<b>Fast roaming</b>	Pre-authentication, PMK caching and 802.11r/k/v	Pre-authentication, PMK caching and 802.11r/k/v
<b>Wireless Security</b>		
<b>WEP</b>	Yes	Yes
<b>WPA/WPA2-PSK</b>	Yes	Yes
<b>WPA/WPA2-Enterprise</b>	Yes	Yes
<b>EAP types</b>	EAP-TLS, EAP-TTLS, EAPPEAP, EAP-FAST, EAP-AKA and EAP-SIM	EAP-TLS, EAP-TTLS, EAPPEAP, EAP-FAST, EAP-AKA and EAP-SIM
<b>IEEE 802.1X</b>	Yes	Yes
<b>Number of SSID</b>	16	16
<b>Web authentication</b>	Yes	Yes
<b>MAC filtering</b>	Yes	Yes
<b>Layer-2 isolation</b>	Yes	Yes
<b>RADIUS authentication</b>	Yes	Yes
<b>Microsoft AD authentication</b>	Yes	Yes
<b>LDAP authentication</b>	Yes	Yes
<b>MAC authentication</b>	Yes	Yes
<b>Rogue AP detection</b>	Yes	Yes
<b>Rogue AP containment</b>	Yes	Yes
<b>Network</b>		
<b>IPv6 host</b>	Yes	Yes
<b>VLANs</b>	Yes	Yes
<b>DHCP client</b>	Yes	Yes
<b>QoS</b>		
<b>WMM (WiFi certified)</b>	Yes	Yes
<b>WMM power save</b>	Yes	Yes
<b>DiffServ marking</b>	Yes	Yes
<b>Management</b>		
<b>ZON utility</b>	<ul style="list-style-type: none"> <li>• Discovery of Zyxel switches, APs and gateways</li> <li>• Centralized and batch configurations <ul style="list-style-type: none"> <li>▪ IP configuration</li> <li>▪ Device locating</li> <li>▪ Password configuration</li> <li>▪ IP renew</li> <li>▪ Web GUI access</li> <li>▪ Device reboot</li> <li>▪ Firmware upgrade</li> <li>▪ One-click quick association with Zyxel AP Configurator (ZAC)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Discovery of Zyxel switches, APs and gateways</li> <li>• Centralized and batch configurations <ul style="list-style-type: none"> <li>▪ IP configuration</li> <li>▪ Device locating</li> <li>▪ Password configuration</li> <li>▪ IP renew</li> <li>▪ Web GUI access</li> <li>▪ Device reboot</li> <li>▪ Firmware upgrade</li> <li>▪ One-click quick association with Zyxel AP Configurator (ZAC)</li> </ul> </li> </ul>
<b>Smart connect</b>	<ul style="list-style-type: none"> <li>• Neighbor device discovery</li> <li>• One-click remote management access to the neighboring Zyxel devices</li> </ul>	<ul style="list-style-type: none"> <li>• Neighbor device discovery</li> <li>• One-click remote management access to the neighboring Zyxel devices</li> </ul>
<b>Zyxel AP configurator</b>	<ul style="list-style-type: none"> <li>• Batch AP configuration</li> <li>• Batch AP firmware upgrade</li> <li>• Batch AP profile backup</li> </ul>	<ul style="list-style-type: none"> <li>• Batch AP configuration</li> <li>• Batch AP firmware upgrade</li> <li>• Batch AP profile backup</li> </ul>
<b>Zyxel wireless optimizer</b>	<ul style="list-style-type: none"> <li>• WiFi AP planning</li> <li>• WiFi coverage detection</li> <li>• Wireless health management</li> </ul>	<ul style="list-style-type: none"> <li>• WiFi AP planning</li> <li>• WiFi coverage detection</li> <li>• Wireless health management</li> </ul>
<b>Standalone AP mode</b>	Yes	Yes
<b>Managed AP mode</b>	Yes	Yes
<b>CLI</b>	Yes	Yes

Model	WAC6503D-S		WAC6502D-S	
<b>Management</b>				
Web UI	Yes		Yes	
SNMP	v2c/v3		v2c/v3	
<b>Others</b>				
Plenum rating	Yes		Yes	
Kensington lock support	Yes		Yes	
Input power	DC input: 12 VDC 2 A PoE: 802.3at compliant (Power adapter is sold separately)		DC input: 12 VDC 2 A PoE: 802.3at compliant (Power adapter is sold separately)	
MTBF (hr)	1,202,489		1,407,374	
<b>Standard Compliance</b>				
Ethernet	<ul style="list-style-type: none"> <li>• IEEE 802.3</li> <li>• IEEE 802.3u</li> <li>• IEEE 802.11ab</li> </ul>	<ul style="list-style-type: none"> <li>• IEEE 802.3au</li> <li>• IEEE 802.3az</li> <li>• IEEE 802.3at</li> </ul>	<ul style="list-style-type: none"> <li>• IEEE 802.3</li> <li>• IEEE 802.3u</li> <li>• IEEE 802.11ab</li> </ul>	<ul style="list-style-type: none"> <li>• IEEE 802.3au</li> <li>• IEEE 802.3az</li> <li>• IEEE 802.3at</li> </ul>
PoE	IEEE 802.3at*4		IEEE 802.3at*4	
WLAN	<ul style="list-style-type: none"> <li>• 802.11b: DBPSK, DQPSK, CCK</li> <li>• 802.11a: BPSK, QPSK, 16-QAM, 64-QAM</li> <li>• 802.11ac: BPSK, QPSK, 64-QAM, 256-QAM</li> </ul>		<ul style="list-style-type: none"> <li>• 802.11b: DBPSK, DQPSK, CCK</li> <li>• 802.11a: BPSK, QPSK, 16-QAM, 64-QAM</li> <li>• 802.11ac: BPSK, QPSK, 64-QAM, 256-QAM</li> </ul>	
<b>Certifications</b>				
Radio	FCC Part 15C, FCC Part 15E, ETSI EN 300 328, EN 301 893, LP0002		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		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		Safety EN 60950-1, IEC 60950-1, BSMI CNS14336-1	
<b>Physical Specifications</b>				
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	
	Weight (g/lb.)	982/2.17	961/2.12	
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	
	Weight (g/lb.)	1743/3.85	1722/3.81	
Included accessories	<ul style="list-style-type: none"> <li>• Ceiling mount plate</li> <li>• Mounting screws</li> </ul>		<ul style="list-style-type: none"> <li>• Ceiling mount plate</li> <li>• Mounting screws</li> </ul>	
<b>Environmental Specifications</b>				
Operating environment	Temperature	0°C to 50°C/32°F to 122°F		0°C to 50°C/32°F to 122°F
	Humidity	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
	Humidity	10% to 90% (non-condensing)		10% to 90% (non-condensing)

\*4: Compatible with 802.3af mode with restricted function: 1x3 MIMO or 1x2 MIMO with 1 spatial stream.

## Optional Accessories

### Power Modules

Part Number	Description
ACCESSORY-ZZ0104F	Universal power adapter (12 V/2.5 A)
POE12-HP-EU0102F	802.3at PoE injector, ROHS
POE12-HP-US0102F	802.3at PoE injector, ROHS



For more product information, visit us on the web at [www.zyxel.com](http://www.zyxel.com)

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