ZYXEL
NETWORKS

WBE510D
BE6500 WiFi 7 Dual-Radio NebulaFlex Pro Access Point

The WBE510D is the BE6500 (2.4GHz: 2x2:2, 5 or 6GHz: 4x4:2) dual-radio access point, offering blazingly fast WiFi 7 speeds of up to 6.5Gbps. With its built-in dual-optimized antennas, it provides the most effective solution to ensure smooth and consistently fast service to each client at all times, whether wall-mounted or ceiling-mounted.

With two additional antennas in the 5GHz/6GHz bands compared to other dual-radio (2x2 + 2x2) AP models on the market, it extends coverage range and boosts performance. Its flexible BandFlex radio can support either 5GHz or 6GHz by configuration, making it the most economical choice for fitting into your existing 5GHz coverage while future-proofing the use of 6GHz.

Coupled with Zyxel Nebula's extensive suite of management and security innovations, it guarantees robust connectivity and reliability to meet today's secure connectivity demands. The WBE510D with NebulaFlex Pro provides users with complete flexibility to switch between standalone, on-premises controller, or intuitive Nebula cloud-managed modes as needed. It comes bundled with a 1-year Nebula Professional Pack license, eliminating upfront licensing costs when transitioning to full-featured cloud management.

BE6500 (2.4GHz: 2x2:2, 5 or 6GHz: 4x4:2) dual-radio access point offers blazingly fast WiFi 7 speeds of up to 6.5Gbps, ensuring lower latency for real-time responsiveness

BandFlex design supports either 5GHz or 6GHz by configuration, fitting seamlessly into existing 5GHz coverage while futureproofing for 6GHz

The dual-optimized antenna offers wall and ceiling mounting modes to accommodate your deployment needs

WiFi 7's MLO enables simultaneous data transmission across 2.4GHz, 5GHz, and 6GHz bands, boosting speed, reducing latency, and enhancing reliability

Advanced Cellular Coexistence minimizes interferences from 4G/5G cellular networks

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

nebula

Zyxel**one**network
Redefining network integration

Benefits

Bringing next generation WiFi within reach

WiFi 7, also known as IEEE 802.11be, represents the next evolution in WiFi standards, supporting all three frequency bands – 2.4GHz, 5GHz, and 6GHz. With its revolutionary technological advancements, it promises to redefine the concept of speed, delivering unprecedented rates to elevate online experiences in the digital realm.

Coupled with Zyxel's comprehensive range of management and security innovations, the WBE510D ensures the utmost connectivity and reliability for demanding enterprise-grade connectivity.

MLO: Transforming WiFi 7 for unprecedented connectivity

Fundamentally, one of the most pioneering advancements of WiFi 7 is the introduction of MLO (Multiple Link Operation). MLO represents a WiFi technology that empowers devices linked to a WiFi access point (AP) to concurrently transmit and/or receive data through various frequency bands and channels. This entails simultaneous connections across the 2.4GHz, 5GHz, and 6GHz bands, a capability absent in earlier WiFi generations where devices were restricted to a solitary WiFi band connection.

The result is a significant amplification in data throughput, a reduction in latency, and an enhancement in reliability. These outcomes undeniably enhance the user experience and unveil novel opportunities for emerging applications such as VR/AR, online gaming, remote office setups, and cloud computing.

Superior performance with innovative "Dual-optimized" antenna

People without RF expertise may not realize that installing an AP optimized for ceiling-mount as wall-mount may cause the ceiling-mount radiation pattern to interfere with other devices up- or downstairs as well as to deliver signals with shorter-than-expected range for its clients. Designed with the innovative "Dual-optimized" antenna, the WBE510D adapts to both wall- and ceiling-mount installations. Thus, users can switch between the two optimized antenna modes easily to fit either situation. To boost WiFi speeds for your network, the WBE510D is definitely an excellent choice.

RF first by design

The advanced RF filter design eliminates interference between the 5GHz and 6GHz bands, while the built-in 4G/5G interference filter allows seamless coexistence with 4G/5G cellular networks and minimizes interference, all of which guarantees a seamless WiFi experience without interruptions.

Additionally, 4K QAM (MCS-13) requires a good Signal-to-Noise Ratio (SNR). The rectangular design helps maintain excellent isolation between antennas, meeting this requirement more effectively than a circular design.

NebulaFlex Pro – simply manage it your way!

The NebulaFlex Pro provides extended flexibility, allowing users to easily switch among standalone, on-promises controller or our intuitive NCC (Nebula Control Center) modes any time according to your needs without additional cost while protecting wireless technology investments. The privilege of one-year professional pack you can get once upon registration on Nebula includes wireless health, site-wide topology, 365-day statistics on the devices and clients monitoring along with more upcoming advanced features on NCC and its App.

Nebula, the intelligent cloud management

Nebula offers comprehensive monitoring and reporting capabilities, including real-time notifications for critical events via the mobile app. With Nebula, you can enjoy a streamlined experience for network installation and management, without the need for an additional cost for software or hardware controllers.

- **Automated WLAN management & optimization**
  With features like WiFi Aid and Wireless health, Nebula enables automated wireless network management and optimization, ensuring the best possible WiFi user experience.
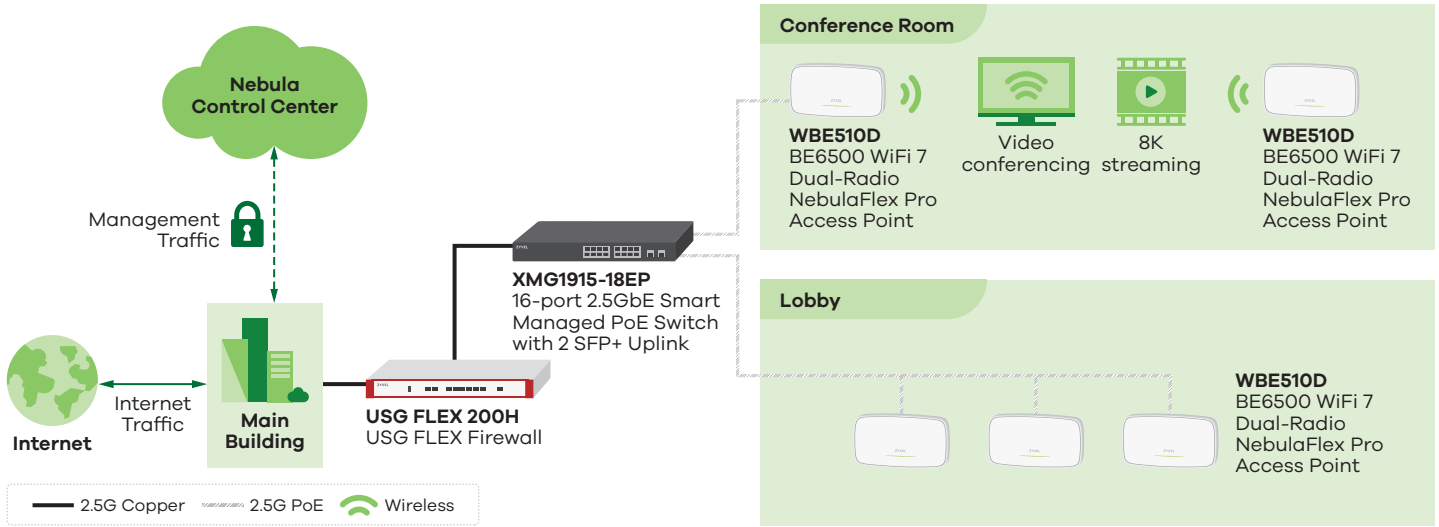
- **Enhanced privacy & security**
  A range of security add-on features like CDR, Secure WiFi, CNP+, DPPSK, and advanced authentication methods work together to create a robust and protected environment for your network.

Optimized wireless experience with advanced features

The WBE510D ensures an optimized wireless experience for users with a range of wireless features such as Dynamic Channel Selection (DCS), Load Balancing and Smart Client Steering. DCS minimizes the interference of co-channel and overlapping channels. Load Balancing enables administrators to set limits on the number of clients associated with each AP. Furthermore, Smart Client Steering features with Band Select, Signal Threshold and Band Balancing combine to deliver stable, reliable wireless connections. Band Select and Signal Threshold monitor the capabilities of each wireless client and steer them to the less-congested band and AP with better signals. Band Balancing detects dual-radio and triple-radio clients and distributes clients across 2.4GHz, 5GHz, and 6GHz bands on AP. All of these deliver a smooth, consistent and uninterrupted wireless experience to its users.

Application Diagram

Specifications

Model	WBE510D
Product name	BE6500 WiFi 7 Dual-Radio NebulaFlex Pro Access Point

Wireless		
Standard		IEEE 802.11 be/ax/ac/n/g/b/a
MIMO		MU-MIMO
Wireless speed	2.4GHz	688Mbps
	5GHz	4324Mbps
	6GHz	5764Mbps
Frequency band	2.4GHz	• USA (FCC): 2.412 to 2.462GHz • Europe (ETSI): 2.412 to 2.472GHz
	5GHz	• USA (FCC): 5.15 to 5.35GHz; 5.470 to 5.850GHz • European (ETSI): 5.15 to 5.35GHz; 5.470 to 5.725GHz
	6GHz	• USA (FCC): 5.925 to 6.425GHz; 6.525 to 7.125GHz • European (ETSI): 5.925 to 6.425GHz
Bandwidth		20-, 40-, 80-, 160-, 240- and 320-MHz
Conducted typical transmit output power*[1]	US (2.4GHz/5GHz/6GHz)	26/28/25dBm
	EU (2.4GHz/5GHz/6GHz)	19/26/22dBm

RF Design		
Antenna type		Dual-optimized antenna
Antenna gain	2.4GHz	1.49dBi, 2x2:2SS
	5GHz	2.78dBi, 4x4:2SS
	6GHz	3.17dBi, 4x4:2SS
Minimum receive sensitivity		Min. Rx sensitivity up to -99dBm

*1: Maximum transmit power is limited by local regulatory settings.

Model	WBE510D
WLAN Feature	
Band steering	Yes
WDS/Mesh*²	Yes
Fast roaming	Pre-authentication, PMK caching and 802.11r/k/v
DCS	Yes
Load balancing	Yes
Advanced cellular coexistence	Yes
Security	
Encryption	WEP/WPA/WPA2/WPA3
Authentication	IEEE 802.1X/RADIUS authentication
Access management	L2-isolation/MAC filtering/Rogue AP detection
Networking	
IPv6	Yes
VLANs	Yes
WMM	Yes
U-APSD	Yes
Management	
Operating mode	Nebula Cloud managed/controller-managed/standalone
ZON Utility	• Discovery of Zyxel switches, APs and gateways • Centralized and batch configurations ▪ IP configuration ▪ Web GUI access ▪ IP renew ▪ Firmware upgrade ▪ Device reboot ▪ Password configuration ▪ Device locating
Web UI/CLI	Yes
SNMP	Yes

Physical Specifications		
Item	Dimensions (WxDxH)(mm/in.)	250 x 160 x 47/9.84 x 6.30 x 1.85
	Weight (g/lb.)	810/1.79
Packing	Dimensions (WxDxH)(mm/in.)	279.5 x 180.5 x 66/11.00 x 7.11 x 2.60
	Weight (g/lb.)	1035/2.28
Included accessories		• Mount plate • Mounting screws
MTBF (hr)		691,722

Physical Interfaces		
Ethernet port		1 x 1/2.5GbE LAN
Power		• PoE (802.3at): power draw 21.5W • DC input: USB PD 15 VDC 2A (Type C)
PoE modes	IEEE 802.3af	No wireless
	IEEE 802.3at	Unrestricted
	IEEE 802.3bt	Unrestricted

Environmental Specifications		
Operating	Temperature	0°C to 50°C/32°F to 122°F
	Humidity	10% to 95% (non-condensing)
Storage	Temperature	-40°C to 70°C/-40°F to 158°F
	Humidity	10% to 90% (non-condensing)

Certifications	
Radio	FCC Part 15C, FCC Part 15E, FCC Part 2.1091, ETSI EN 300 328, EN 301 893, Draft EN 303 687, EN 50385, EN 50665, EN IEC 62311, LP0002
EMC	FCC Part 15B, EN 301 489-1, EN 301 489-17, EN55032, EN55035, EN61000-3-2/-3, EN60601-1-2, BSMI CNS15936
Safety	EN 62368-1, IEC 62368-1, BSMI CNS15598-1

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

Recommended Accessories

Mounting Accessory

Model	ACCESSORY-ZZ0105F
Product photo	
Description	BAR ceiling clips for ceiling mount Zyxel AP (5 sets)

PoE Injector

Product	PoE12-30W	PoE12-60W	PoE12-90W
	2.5G PoE+ Injector	5G PoE++ Injector	10G PoE++ Injector
Specifications	• Support speed: 100M/1G/2.5G • 2.5G data/PoE+ ports • 30W power budget • Complies with IEEE 802.3af PoE, 802.3at PoE+ standards • Easy plug-and-play desktop or wall-mounted installation	• Support speed: 100M/1G/2.5G/5G/10G* • 10G* data/PoE++ ports • 60W power budget • Complies with IEEE 802.3af PoE, 802.3at PoE+, 802.3bt PoE++ 60W standards • Easy plug-and-play desktop or wall-mounted installation	• Support speed: 100M/1G/2.5G/5G/10G • 10G data/PoE++ ports • 90W power budget • Complies with IEEE 802.3af PoE, 802.3at PoE+, 802.3bt PoE++ 90W standards • Easy plug-and-play desktop or wall-mounted installation
Dimensions (WxDxH)(mm/in.)	140 x 45.5 x 30/ 5.51 x 1.79 x 1.18	140 x 65 x 38.5/ 5.51 x 2.56 x 1.52	196.25 x 80 x 39.8/ 7.73 x 3.15 x 1.57

* PoE12-60W supports 10G speeds with deployments using Cat 6a cable or higher, up to a maximum length of 30 meters.

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Datasheet WBE510D