# WESTERMO

EN 50155 Wi-Fi 6E Access Point

Ibex-3510 series

- **Reliable, compact and secure WLAN access point**
  - Triple Wi-Fi 6 / 802.11ax WLAN interfaces
  - Concurrent 2.4 GHz, 5 GHz and 6 GHz
  - Low power consumption
  - Cybersecurity features supporting critical infrastructure installations
- **Designed for onboard usage**
  - EN 50155 and EN 45545-2 certified
  - Compact design with M12 interfaces
  - Wide temperature range
- **Latest generation 802.11 design**
  - IEEE 802.11ax for maximum efficiency
  - Client management features
  - Flexible and easy setup

CE   **EN 45545-2** Fire Protection   **EN 50155** On Board Rail
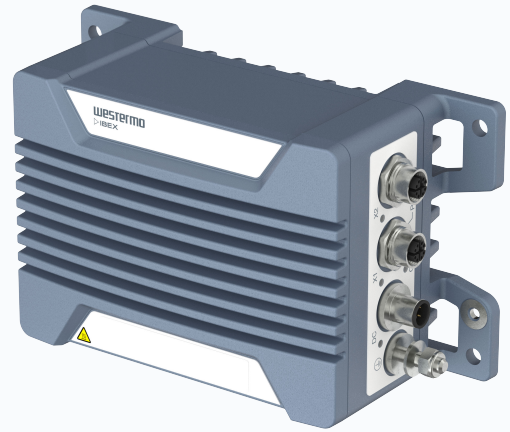
The Ibex-3510 is a concurrent triple-band 802.11ax Wi-Fi 6E access point and client product for onboard and stationary applications. It provides reliable efficient high-speed data transfers, airtime fairness, band steering, client steering and multi-AP steering. This enables optimized use for passenger hotspot applications, remote maintenance access, data offloading or it can be part of a TCMS network.

The Ibex-3510 is designed to withstand the tough environment on-board trains, exposed to constant vibration, extreme temperatures, humidity and a demanding electromagnetic environment.

A GORE-TEX® membrane prevents internal condensation. High-level isolation between all interfaces enables direct connectivity to vehicle auxiliary power and protects against overvoltage and spikes/surge. IP66 protection prevents ingress of water and dust even at the quick connect QMA connectors.

An overall optimised design results in a compact form factor in combination with very high MTBF for easy integration in space restricted installations and low lifecycle cost.

Thorough type testing at independent labs certifies the compliance to a wide range of standards, including EN 50155.

Powered by the IbexOS operating system, the Ibex-3510 is equipped with the latest cybersecurity features and updates.

Specifications - Ibex-3510 series
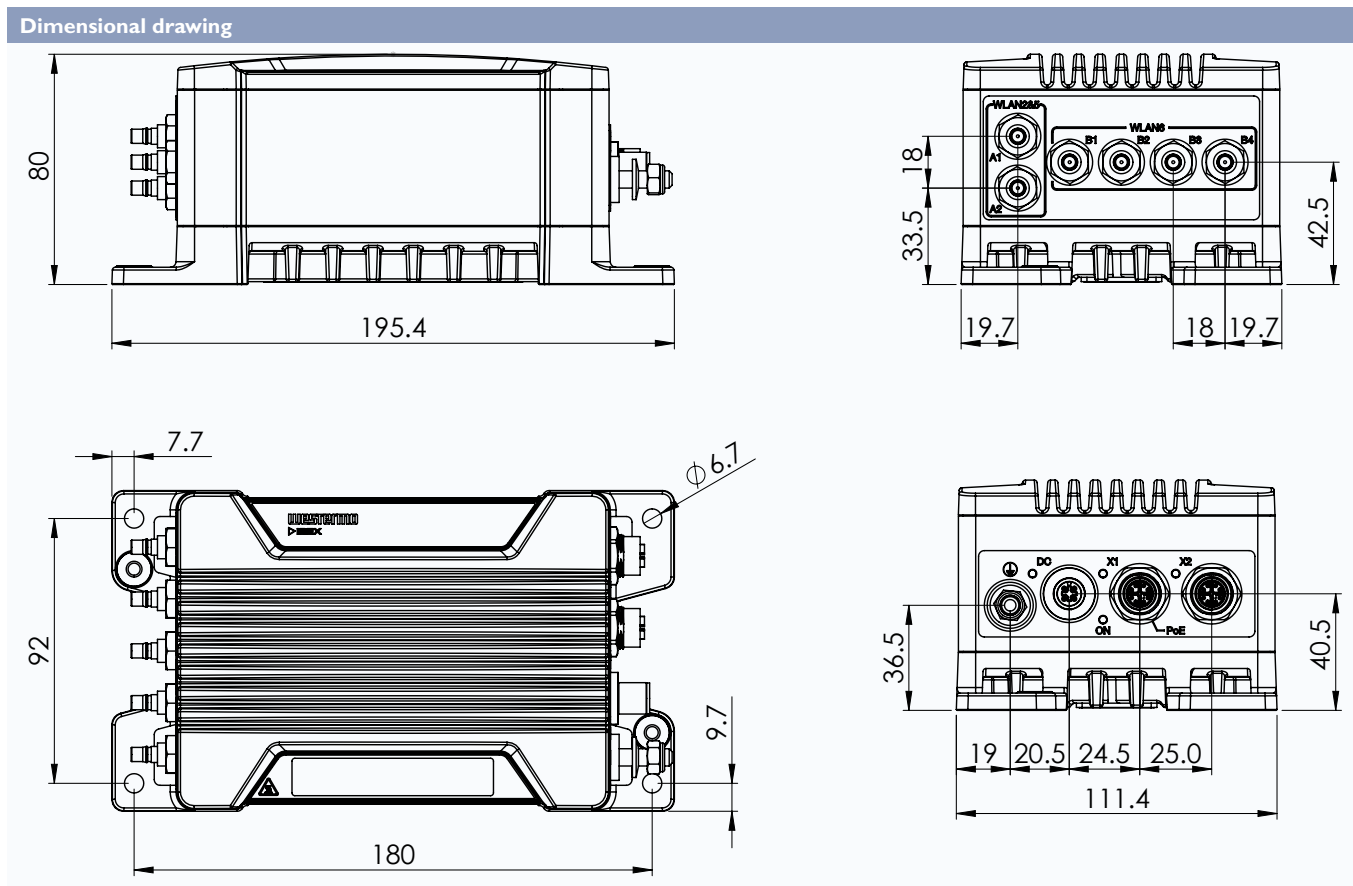
Technical data

Dimensions (W x H x D)	195 x 80 x 111 mm (7.68 x 3.15 x 4.37 inches)
Housing	Full metal
Weight	1.65 kg without antennas
Operating temperature	-40 to +70°C (-40 to +158°F)
Ingress protection	IP66
MTBF	319,000 hours
	377,000 hours (PoE only)
Rated voltage[a]	24 to 110 VDC or IEEE 802.3 PoE Class 4
Rated power	17 W
PoE	PoE Class 4 (IEEE 802.3at type 1 and 2 PD)

[a] DC power supply not included in "PoE only" product variants

Interface

RF antenna	2 x QMA compatible antenna connector for Wi-Fi 6 2.4 Ghz and 5 GHz (combiner) 4 x QMA compatible antenna connector for Wi-Fi 6E for 6 GHz
Ethernet	2 x 10/100/1000/2.5G Base-T, 2 x M12 X-coded connectors

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Wireless	
Operating modes	Access Point, Client, Bridge
Interfaces	Tri-Band Concurrent 2x2/4x4 MU-MIMO (total 8 Spatial Streams)
Standards supported	IEEE 802.11g, 802.11a, 802.11n, 802.11ac, 802.11ax
Frequency range	2.400 to 2.4835 GHz (2x2 MU-MIMO) 5.150 to 5.350 GHz, 5.470 to 5.725 GHz, 5.725 to 5.875 GHz (2x2 MU-MIMO) 5.925 to 7.125 GHz (4x4 MU-MIMO)
Data rates supported	2.4 GHz: Up to 802.11ax 40 MHz 2SS BW HE11: 573 MBit/s 5 GHz: Up to 802.11ax 80 MHz 2SS BW HE11: 1201 MBit/s 6 GHz (Wi-Fi 6E): Up to 802.11ax 160 MHz 4SS BW HE11: 4804 MBit/s
RF transmit power 2.4 GHz[a.]	Max. conducted transmit power: 25 dBm, per port: 22 dBm
RF transmit power 5 GHz[a.]	Max. conducted transmit power: 25 dBm, per port: 22 dBm
RF transmit power 6 GHz[a.]	Max. conducted transmit power: 26 dBm, per port: 20 dBm
Receiver sensitivity per radio[b.]	20 MHz: -94 dBm (HE0), -68 dBm (HE9), -63 dBm (HE11) 40 MHz: -91 dBm (HE0), -65 dBm (HE9), -61 dBm (HE11) 80 MHz: -88 dBm (HE0), -63 dBm (HE9), -58 dBm (HE11) 160 MHz: -85 dBm (HE0), -60 dBm (HE9), -55 dBm (HE11)

[a.]Depending on the regulatory limitations and selected antennas

[b.]Typical, all antenna chains connected, temperature 25° C

Features	
Security	WPA2-Personal (CCMP), WPA2-Enterprise, WPA3-Personal (SAE/OWE), WPA3-Enterprise (Suite-B), 802.11w, 802.1X, SecureBoot (TPM), Security Log (persistent)
Networking	Fixed fallback IP, IP Aliases, MAC override, VLAN support, Interface Port Protection, Routing Static/Policy/Multicast, Multi WAN support, CARP, DHCP Server/Client/Relay, DNS Server/Client, NTP Server/Client, RSTP, Firewall Filter/Mangle (L2 stateless/L3 stateful), IP Masquerading (NAT/NAPT), Port Forwarding (DNAT/SNAT), Stateless NAT (1-1 NAT)
Wireless	802.11r, 4addr, QoS (L2/L3 mapping), Access Control (ACL), Automated Channel Selection (ACS), AP Client Isolation, SSID Hide, BSSID override
VPN	SSL Server/Client, IPsec, OpenVPN Client, Wireguard, GRE/GRETAP, VXLAN
Discovery	LLDP, SSDP, mDNS
Client management	ATF (Air Time Fairness), Client Steering and Load Balancing between 2.4 GHz, 5 GHz and 6 GHz, Multi-AP Client Steering, 802.11k, 802.11v
Monitoring	Built-in monitoring sensors and diagnostics, SNMP notifications (TRAP/INFO), Syslog, CLI
Management	SNMP v2c/v3 with USM authentication and encryption support, HTTP/HTTPS web interface and WebAPI with user authentication (local or LDAP), CLI (SSH and Telnet), Certificate Management (SCEP), Dual Firmware Primary/Backup
SNMP MIB Support	MIB-2, RFC1213, HOST-RESOURCES, BRIDGE, ETHERLIKE, IF-MIB, LLDP-MIB, UCD-SNMP-MIB, WESTERMO-SW6-MIB, WESTERMO-SW6-BRIDGE-MIB, WESTERMO-SW6-FIREWALL-MIB, WESTERMO-SW6-ICL-MIB, WESTERMO-SW6-NWM-MIB, WESTERMO-SW6-PWN-MIB

Approvals and Standards

Climate	• EN 50155, class OT4 Railway applications - Electronic equipment used on rolling stock
EMC	• EN 50155, Railway applications - Electronic equipment used on rolling stock • EN 50121-3-2, Railway applications – Electromagnetic compatibility, Part 3-2: Rolling stock – Apparatus • ETSI EN 301 489-1, Electromagnetic compatibility (EMC) and Radio spectrum Matters (ERM) for radio equipment and services - Part 1: Common technical requirements • ETSI EN 301 489-17, Electromagnetic compatibility (EMC) and Radio spectrum Matters (ERM) for radio equipment - Part 17: Specific conditions for Broadband Data Transmission Systems
Mechanical (Shock and vibration)	• EN 61373, category 1, class B
Insulation (Coordination and test)	• EN 50155, Railway applications - Electronic equipment used on rolling stock
Radio communication	• ETSI EN 300 328, Wideband transmission systems; Data transmission equipment operating in the 2.4 GHz ISM band and using wide band modulation techniques • ETSI EN 301 893, 5 GHz RLAN • ETSI EN 300 440, 5.8GHz, Short Range Devices • ETSI EN 303 687, 6 GHz RLAN • IEEE802.11, Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications
Safety	• EN/IEC 61010-1, Safety requirements for electrical equipment for measurement, control, and laboratory use • EN 45545-2, Fire protection on railway vehicles

Ordering information

Art. no.	Model	Description
3628-35101	Ibex-3510-T2G2.5 EU	Triple EN 50155 Wi-Fi 6E Access Point, 24...110 VDC, PoE PD
3628-35102	Ibex-3510-T2G2.5 NA[a.]	Triple EN 50155 Wi-Fi 6E Access Point, 24...110 VDC, PoE PD
3628-35111	Ibex-3510-T2G2.5-PoE EU	Triple EN 50155 Wi-Fi 6E Access Point, PoE PD
3628-35112	Ibex-3510-T2G2.5-PoE NA[a.]	Triple EN 50155 Wi-Fi 6E Access Point, PoE PD
3623-0799	Factory Reset Plug X-code	Accessory

[a.]FCC approval pending