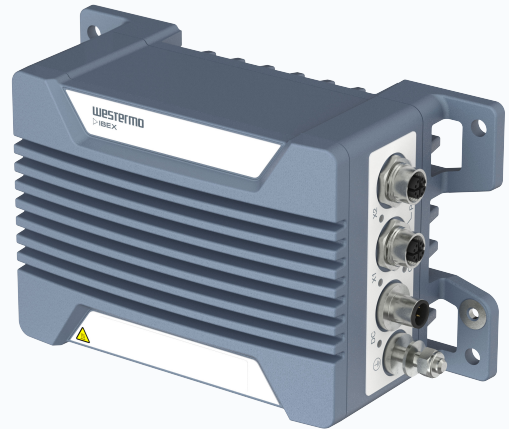


# EN 50155 Wi-Fi 7 Access Point

## Ibex-3520 series

- **Next-Gen Wireless Technology**
  - Tri-band Wi-Fi 7 (802.11be), concurrent 2.4 GHz, 5 GHz and 6 GHz operation
  - Multi-Link Operation (MLO) for higher throughput
  - Supports up to 512 clients per radio, 2x2 MU-MIMO, 4096-QAM modulation
  - BLE and GNSS
- **Designed for Onboard Rail Usage**
  - Certified for onboard rail: EN 50155 (electrical safety), EN 45545-2 (fire protection)
  - Compact metal housing with M12 connectors
  - IP66 protection, -40°C to +70°C operating range
  - Built to withstand vibration, humidity, and electromagnetic interference
- **Advanced Security & Safety Features**
  - Cybersecurity: WPA2/WPA3, 802.1X with RadSec, persistent security logs
  - OpenRoaming certified & Passpoint 2.0 ready
  - High isolation, surge protection, GORE-TEX® membrane for condensation prevention



**EN 45545-2**  
Fire Protection

**EN 50155**  
On Board Rail

### Product Overview

The is a concurrent 802.11be Wi-Fi 7 access point for onboard rail and stationary applications. It supports 2x2 MU-MIMO, Multi-Link Operation (MLO) with bandwidth support up to 320 MHz, and features 4K-QAM modulation. The device delivers reliable, efficient, high-speed data transfers, airtime fairness, band steering, client and multi-AP steering. This enables optimized use for passenger hotspot applications, remote maintenance access, data offloading, or integration into a Train Control and Management System (TCMS) network.

### Rugged Design for Rail Environments

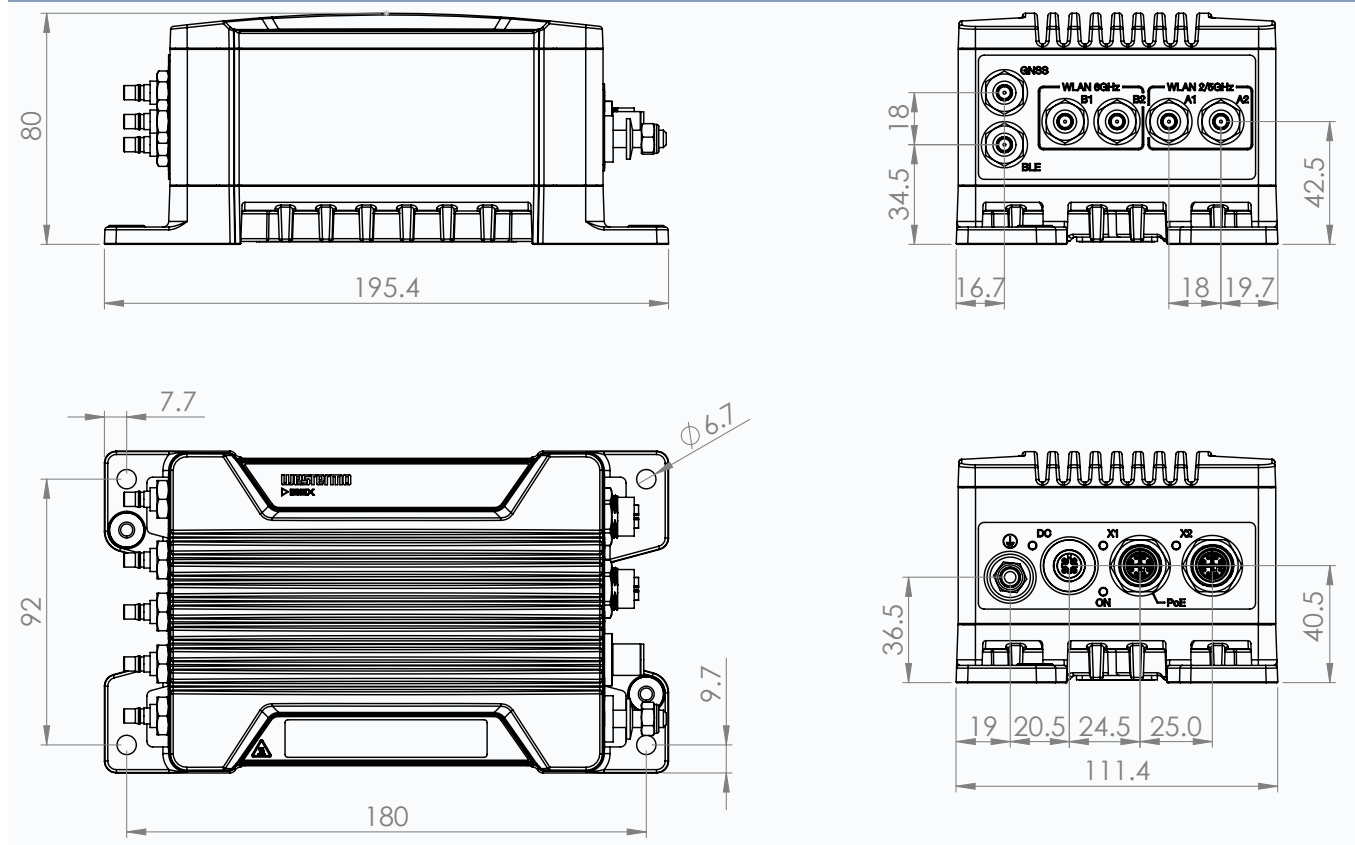
The Ibex family is engineered to withstand the tough environment onboard trains, including constant vibration, extreme temperatures, humidity, and demanding electromagnetic conditions. A GORE-TEX® membrane prevents internal condensation. High level isolation between all interfaces allows direct connectivity to vehicle auxiliary power and protects against overvoltage and surges. IP66 protection prevents ingress of water and dust, even at the quick connect QMA connectors. The compact form factor and very high MTBF enable easy integration in space-restricted installations and contribute to a low lifecycle cost.

### Compliance and Security

The undergoes rigorous type testing at independent laboratories to ensure compliance with a broad range of standards, including EN 50155. Powered by IbexOS, it incorporates advanced cybersecurity features and receives regular cybersecurity updates.

## Specifications - Ibex-3520 series

### Dimensional drawing



### Technical data

<b>Dimensions (W x H x D)</b>	195 x 80 x 111 mm (7.68 x 3.15 x 4.37 inches)
<b>Housing</b>	Full metal
<b>Weight</b>	1.65 kg without antennas
<b>Operating temperature</b>	-40 to +70°C (-40 to +158°F)
<b>Ingress protection</b>	IP66
<b>MTBF</b>	300,000 hours 400,000 hours (PoE only)
<b>Rated voltage<sup>a</sup>.</b>	24 to 110 VDC or PoE IEEE 802.3 Class 4
<b>Rated power</b>	22 W
<b>Average Power</b>	9 W (idle), 17 W (load)
<b>PoE</b>	PoE Class 4 (IEEE 802.3at type 1 and 2 PD)

<sup>a</sup>DC power supply not included in "PoE only" product variants

### Interface

<b>Wireless</b>	2 x QMA compatible antenna connector for 2.4 GHz and 5 GHz (combiner) 2 x QMA compatible antenna connector for 6 GHz
<b>GNSS</b>	1 x QMA compatible antenna connector, single band, active (internal LNA)
<b>BLE</b>	1 x QMA compatible antenna connector
<b>Ethernet</b>	2 x 10/100/1000/2.5G Base-T with M12 X-coded connectors

Wireless	
<b>Operating modes</b>	Access Point, Client, Bridge
<b>Interfaces</b>	Tri-Band Concurrent 2x2/2x2 MU-MIMO (total 6 Spatial Streams)
<b>Standards</b>	IEEE 802.11g, 802.11a, 802.11n, 802.11ac, 802.11ax, 802.11be
<b>Modulation</b>	Up to 4096-QAM
<b>Frequency range</b>	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 (2x2 MU-MIMO)
<b>Data rates</b>	2.4 GHz: Up to 802.11be 40 MHz 2SS BW EHT13: 688 MBit/s 5 GHz: Up to 802.11be 80 MHz 2SS BW EHT13: 1441 MBit/s 6 GHz: Up to 802.11be 320 MHz 2SS BW EHT13: 5764 MBit/s
<b>RF transmit power 2.4 GHz<sup>a</sup></b>	Max. conducted transmit power: 25 dBm, per port: 22 dBm
<b>RF transmit power 5 GHz<sup>a</sup></b>	Max. conducted transmit power: 25 dBm, per port: 22 dBm
<b>RF transmit power 6 GHz<sup>a</sup></b>	Max. conducted transmit power: 23 dBm, per port: 20 dBm
<b>Receiver sensitivity per radio<sup>b</sup></b>	20 MHz: -94 dBm (EHT0), -68 dBm (EHT9), -63 dBm (EHT11), -58 dBm (EHT13) 40 MHz: -91 dBm (EHT0), -65 dBm (EHT9), -61 dBm (EHT11), -56 dBm (EHT13) 80 MHz: -88 dBm (EHT0), -63 dBm (EHT9), -58 dBm (EHT11), -53 dBm (EHT13) 160 MHz: -85 dBm (EHT0), -60 dBm (EHT9), -55 dBm (EHT11), -50 dBm (EHT13) 320 MHz: -82 dBm (EHT0), -57 dBm (EHT9), -52 dBm (EHT11), -48 dBm (EHT13)

<sup>a</sup>Depending on the regulatory limitations and selected antennas

<sup>b</sup>Typical, all antenna chains connected, temperature 25° C

GNSS	
<b>Receiver</b>	GPS: L1 C/A, GLONASS: L1, Galileo: E1, BDS: B1I; B1C, QZSS: L1 C/A, SBAS: L1
<b>Navigation update rate</b>	10 Hz (up to 4 concurrent GNSS receiver + QZSS)
<b>Horizontal accuracy</b>	1.5 m CEP
<b>Protocols</b>	NMEA 0183 V4.10

BLE	
<b>Standard</b>	BLE 5.2, low power
<b>RF transmit power</b>	Max. EIRP 8.3 dBm

Features	
<b>Security</b>	Wi-Fi Security Open, WPA2-Personal (CCMP), WPA2-Enterprise, WPA3-Personal (SAE/OWE), WPA3-Enterprise (Suite-B), WPA2/3-Hybrid-Mode (SAE+PSK), 802.11w, 802.1X, Security Log (persistent)
<b>Networking</b>	Fixed fallback IP, IP Aliases, MAC override, VLAN support, Interface Port Protection, Routing Static/Policy/Multicast, Multi WAN support, CARP, DHCPv4/v6 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), LACP (802.3ad and 802.1AX)  IPv6 compatible
<b>Wireless</b>	Up to 8 SSID assignments per radio, up to 512 client connections per radio, SSID Hide, AP Client Isolation, 802.11e (WME/WMM), 802.11r, 4addr, QoS (L2/L3 mapping), Access Control (ACL), Automated Channel Selection (ACS), static/dynamic VLAN per SSID, BSSID override, Multi-link Operation (MLO), Passpoint, OpenRoaming  Automated Frequency Coordination (AFC) to enable 6 GHz standard power. <sup>a</sup>
<b>VPN</b>	SSL Server/Client, IPsec, OpenVPN Client, Wireguard, GRE/GRETAP, VXLAN
<b>Discovery</b>	LLDP, SSDP, mDNS
<b>Client management</b>	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
<b>Monitoring</b>	Built-in monitoring sensors and diagnostics, SNMP notifications (TRAP/INFO), Syslog, CLI
<b>Management</b>	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
<b>SNMP MIB Support</b>	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

<sup>a</sup>Applicable to the NA product model

Approvals and Standards	
<b>Climate</b>	<ul style="list-style-type: none"> <li>• EN 50155, class OT4 Railway applications - Electronic equipment used on rolling stock</li> </ul>
<b>EMC</b>	<ul style="list-style-type: none"> <li>• EN 50155, Railway applications - Electronic equipment used on rolling stock</li> <li>• EN 50121-3-2, Railway applications - Electromagnetic compatibility, Part 3-2: Rolling stock - Apparatus</li> <li>• ETSI EN 301 489-1, Electromagnetic compatibility (EMC) and Radio spectrum Matters (ERM) for radio equipment and services - Part 1: Common technical requirements</li> <li>• 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</li> </ul>
<b>Mechanical (Shock and vibration)</b>	<ul style="list-style-type: none"> <li>• EN 61373, category 1, class B</li> </ul>
<b>Insulation (Coordination and test)</b>	<ul style="list-style-type: none"> <li>• EN 50155, Railway applications - Electronic equipment used on rolling stock</li> </ul>
<b>Radio communication</b>	<ul style="list-style-type: none"> <li>• ETSI EN 300 328, Wideband transmission systems; Data transmission equipment operating in the 2.4 GHz ISM band and using wide band modulation techniques</li> <li>• ETSI EN 301 893, 5 GHz RLAN</li> <li>• ETSI EN 300 440, 5.8 GHz, Short Range Devices</li> <li>• ETSI EN 303 687, 6 GHz RLAN</li> <li>• IEEE802.11, Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications</li> <li>• EN 301 489-19, EMC standard for Receive Only Mobile Earth Stations (ROMES)</li> </ul>
<b>Safety</b>	<ul style="list-style-type: none"> <li>• EN/IEC 62368-1, Safety requirements for audio/video, information and communication technology equipment</li> <li>• EN 45545-2, Fire protection on railway vehicles</li> </ul>

Ordering information		
Art. no.	Model	Description
3628-35201	Ibex-3520-T2G2.5 EU	Triple EN 50155 Wi-Fi 7 Access Point, 24-110 VDC, PoE PD
3628-35202	Ibex-3520-T2G2.5 NA	Triple EN 50155 Wi-Fi 7 Access Point, 24-110 VDC, PoE PD
3628-35211	Ibex-3520-T2G2.5-PoE EU	Triple EN 50155 Wi-Fi 7 Access Point, PoE PD
3628-35212	Ibex-3520-T2G2.5-PoE NA	Triple EN 50155 Wi-Fi 7 Access Point, PoE PD
3623-0799	Factory Reset Plug X-code	Accessory