# StarPlus 5304
## 300 Mbps MIMO Dual Radio Repeater

## OVERVIEW

The StarPlus 5304 is a high capacity dual radio repeater. StarPlus 5300 uses advanced OFDM and MIMO technologies to deliver breakthrough performance in the unlicensed band. The dual radio design of the StarPlus 5304 avoids the performance drop associated with store and forward type repeater products.

StarPlus 5304 Repeater is configured by default to support repeating in a one-to-one arrangement. With the application of a license key, the repeater functionality can be enhanced to support one-to-many applications.

The StarPlus 5304 base radio is packaged in a rugged enclosure, which is suitable for all weather conditions. The all-metal enclosure provides high EMI immunity for stable operation in interference prone environments.

## TRUSTLINK ADVANTAGE

TrustLink™ technology ensures equitable distribution of traffic to all subscriber stations and uses intelligence to determine the number of polling cycles every user gets depending on the level of its activity. This way the network resources are not wasted during the polling of inactive users due to no user data transmission. TrustLink can be employed in both point-to-point and point-to-multipoint networks and dramatically reduces the effects of unwanted interference on the wireless link.

## PRODUCT FEATURES

- One-to-One Repeater, upgradeable to One- to-Many Repeater for Multipoint Fan-out

- EION TrustLink™ Technology

- 2 x 2 MIMO with software key

- Operates in 4.9 public safety and 5.8 GHz unlicensed bands

- 4G/LTE Backhaul Ready

- Rugged construction for all weather conditions

- High spectral efficiency and robust RF network performance

- Security Management Enhancements

- Large portfolio of external panel and dish antennas

- Real Time RSSI alignment indicator

- Built-in spectrum analyzer & audible antenna alignment beeper

- Up to 300 Mbps data rate over the air, maximum Ethernet throughput is 100 Mbps

- SNMP v2c and enterprise MIB for advanced network management

- 40 MHz Turbo channel size

- 20 MHz Normal channel size

- 5 & 10 MHz Narrow band channel sizes

## RADIO SPECIFICATION

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| **Topology** | Point-to-Point Repeater (Default)<br>Point-Multipoint Repeater (Requires multiple association upgrade key) |
| **Diversity** | 1 × 1 SISO (Default)<br>2 × 2 MIMO (Requires Upgrade Key) |
| **Frequency\*** | 5.000 to 6.100 GHz (Default)<br>4.900 to 5.000 GHz (Available by Request) |
| **Channel Size\*** | Quarter: 5 MHz; Half: 10 MHz; Normal: 20 MHz; Turbo: 40 MHz |
| **Channel Spacing** | 5 MHz × channel number for CF |
| **Modulation** | MCS 0 to 15  (6.5 to 300 Mbps); BPSK, QPSK, 16-QAM and 64-QAM for LibraPlus mode (6Mbps - 54Mbps), OFDM permits NLOS deployments |
| **Antenna** | 2 × N-type female per interface, total 4 x N-type |
| **Output Power†** | +29 dBm aggregate; 2 × 26 dBm per stream (configurable from 9 dBm up to license key limit in 1 dB steps), Manually programmed fixed transmit power level |

**Receiver Sensitivity** (BER = $10^{-6}$) +/- 2dB

| | Modulation | 5 MHz | 10 MHz | 20 MHz | 40 MHz |
|---|---|---|---|---|---|
| MCS0/8 | BPSK | -101 dBm | -98 dBm | -95 dBm | -92 dBm |
| MCS1/9 | QPSK1/2 | -99 dBm | -96 dBm | -93 dBm | -90 dBm |
| MCS2/10 | QPSK3/4 | -96 dBm | -93 dBm | -90 dBm | -87 dBm |
| MCS3/11 | 16-QAM1/2 | -95 dBm | -92 dBm | -89 dBm | -84 dBm |
| MCS4/12 | 16-QAM2/3 | -91 dBm | -88 dBm | -85 dBm | -81 dBm |
| MCS5/13 | 64-QAM2/3 | -87 dBm | -84 dBm | -81 dBm | -77 dBm |
| MCS6/14 | 64-QAM3/4 | -85 dBm | -82 dBm | -79 dBm | -76 dBm |
| MCS7/15 | 64-QAM5/6 | -81 dBm | -78 dBm | -75 dBm | -74 dBm |

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| **Duplexing Format** | Dynamic Time Division Duplex (TDD), Half-Duplex |
| **Radio Feature Support** | Dynamic Frequency Selection (DFS) |
| **Spectral Efficiency** | 6.5 bits per Hertz |

† Maximum power output is set by country specific licensing key. The operator of this product must ensure compliance when selecting external antennas with the limits specified by local regulation prior to deployment

\* Frequency bands that are available to the operator are determined by country specific licensing key.

## NETWORK SPECIFICATIONS

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| **Network Connection** | MDI-X RJ45 10/100/1000 Mbps Ethernet;<br>Auto-negotiation or configurable for full/half dulplex at 10/100 Mbps |
| **Operational Mode** | Transparent Bridging (per OSI Layer2), Multicast |
| **Quality of Service** | Advanced QoS with multiple service flows and classifier priorities, four separate levels supported;<br>• VLAN ID (IEEE 802.1q)<br>• VLAN Priority ( IEEE 802.1p)<br>• DSCP/ToS |
| **Fast Frame Aggregation** | Yes |
| **Sector Locking/Bridging** | Yes, configurable black or white Access Control Lists.<br>Supports intra-sector bridging |
| **VLAN** | Data Tagging/Untagging, 802.1q transparency, VLAN Management, QinQ |
| **NAT** | 1:N NAT configurable through CPE GUI |
| **DHCP** | DHCP server for LAN devices when in NAT mode |
| **IPv6** | IPv6 pass through enabled when CPE works in bridge mode, Tunneling in NAT mode |

## WIRELESS NETWORKING

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| **Medium Access Control** | Proprietary MAC, TrustLink™ |
| **Output Power Management** | Yes |
| **Data Rate Selection** | Dynamic Adaptive Modulation per Link or manually programmed to fixed modulation type |

## SECURITY

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| **Management Access** | RADIUS, Username and Password<br>Access is via Hypertext Transfer Protocol Secure HTTPS AES-256 (TLS 1.0+)<br>Compatible with all modern web browsers and Windows 7 OS |
| **Encryption** | WEP (64, 128, 154), WPA1 (TKIP), WPA2 (CCMP - AES 128, CBC-MAC for headers).<br>Encryption is available in factory firmware and firmware upgrades |

## MANAGEMENT

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| **Remote Monitoring** | HTML Web-GUI, SNMP v2c (Set, Get and Traps with proprietary MIB)<br>MIB files are available from eionwireless.com or can be downloaded directly from the StarPlus GUI. |
| **Management IP** | DHCP client or configurable static IP |
| **RADIUS Support** | RADIUS supported for centralized admin access with fallback mode |
| **User Management** | Profiles for multiple user roles. Individual user names and passwords are supported in fallback mode |
| **Installation Management** | Wireless Link Monitor and Diagnostic Tool;<br>• Provides noise and RSSI signal levels as well as other statistical information<br>• Measure signal strength at each StarPlus location<br>• Real-time view of available over the air bandwidth<br>• Real-Time Link Quality Metrics<br>Audible Antenna Alignment Beeper (can be switched on or off via SNMP or web GUI)<br>Visual LED Antenna Alignment<br>Built-in Spectrum Analyzer |
| **Syslog** | Built-in syslog, events can be viewed on the device or exported to an external syslog file for analysis |
| **Backup Configuration** | Save Radio Configuration to local PC |
| **Software Upgrade** | Over the Air or local, Web-based upgrade, Dual bank to allow rollback |
| **Ease of Use** | Single management view of all deployed products in EION Constellation centralized management system |
| **Location Management** | GPS location information can be entered and viewed in external geographical mapping tool |

## PHYSICAL, ELECTRICAL & ENVIRONMENTAL

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| **Power Consumption** | Typ. < 20 Watts |
| **Power Supply** | 100-240V, 50/60 Hz AC; UL/CSA approved 48 Volt POE system; DC power options available. The included power supply includes one standard Ethernet port for connection to LAN or local PC, and one PoE port for connection to the StarPlus equipment.<br>Power supply is 10/100 BaseT IEEE802.3 complaint with data rates up to 100 Mbps full duplex on both ports |
| **Temperature Range** | Operating: -30º C to +70º C<br>Storage: -40º C to +90º C |
| **Relative Humidity** | Operating: 0% to 100% (condensing); Storage: Max. 90% (non-condensing) |
| **Mounting Bracket** | Rugged outdoor mounting hardware included, 2-Axis pole/wall |

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| **Enclosure** | Single Unit, Die Cast Metal NEMA 4x; IP67<br>Each unit includes an RJ45 cable gland to provide a fully weatherproof IP67 seal once installed |
| **Weight** | 2.3 kg |
| **Dimensions** | 230 mm × 230 mm × 65 mm |
| **Lightning Protection** | Integrated, Telcordia GR-1089 compliant (Meets IEC 61000-4-2/ 4-4) |

## STANDARDS COMPLIANCE

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| **Radio and Spectrum Management** | Adheres to Industry Canada Spectrum Management and Telecommunications Radio Standards<br>Adheres to RSS-111 Issue 3 for Broadband Public Safety Equipment Operating in the band 4940-4990 MHz<br>Adheres to RSS-210 Issue 8 License-exempt Radio Apparatus (all frequency bands): Category 1 Equipment<br>Adheres to FCC Part 15<br>Approved for WPC (India) |
| **Weatherproofing** | IP67 |
| **Compliance** | RoHS/WEEE |
| **Ethernet Standards** | Complaint to IEEE 802.3i-1990 for 10 BaseT<br>Complaint to IEEE 802.2u-1995 for 100BaseT |

## ORDERING INFORMATION

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|---|---|
| **5304-00** | Dual Radio Repeater, IP67 Ruggedized, 4x N-type, GigE |
| **9530-00-00-10** | StarPlus Upgrade Speed Key to Two Streams - Upgrade StarPlus 5304 base radio to two streams MIMO |
| **7300-58-00-01** | StarPlus Multiple Association License Key - 3 Devices |
| **7300-58-00-02** | StarPlus Multiple Association License Key - 10 Devices |
| **7300-58-00-10** | StarPlus Multiple Association License Key – Unlimited Devices |