Tunnel WiFi
Outdoor WiFi for Underground Coverage

TUNNEL WIFI PRODUCT FEATURES

- Fully integrated for quick setup and installation
- Antenna design optimized for underground tunnel coverage
- Signal propagation is enhanced, not degraded, by tunnel walls.
- Enhanced sensitivity for superior performance
- Outdoor AP supports operation in 2.4 GHz or 5.8 GHz bands
- Support for IEEE802.11a/b/g/n client devices
- Up to 300 Mbps data rate per radio
- Operates as standalone AP, or as part of a managed Campus Network
- 2 x 2 Spatial Diversity MIMO (Multiple-In/ Multiple Out) antenna with high receive sensitivity
- Gigabit Ethernet interface
- Ruggedized outdoor enclosure, IP67 for operation in harsh environmental conditions
- Tunnel/Mining SW Upgrade Package includes improved RTS CTS settings, Power settings, Modulation & BW MIMO STBC for high availability of channel
- Dual Antenna Split Systems for T Junctions up and down the tunnel from a single AP

TUNNEL WIFI OVERVIEW

EION Tunnel WiFi is an outdoor 802.11 WiFi hotspot designed for optimal coverage inside tunnels and underground locations. The innovative helical antenna signal pattern provides exceptional coverage through the tunnel without wasting power. Typically due to reflections in tunnels such as an underpass, campus tunnel or subway station, the wireless signal is attenuated. In EION Tunnel WiFi, the reflections in fact help propagation by strengthening the signal. Additionally the circular polarization of the integrated antenna means that end user devices such as laptops, smart phones and tablets do not need to be ‘aimed’ at the Street WiFi access point.

Tunnel WiFi is ideal for deploying WiFi coverage to the following locations; underpasses, campus tunnels, mining, subway stations, elevator shafts, sewer systems or any confined spaces where traditional coverage models are inefficient or impractical.

The product is fully integrated for simple outdoor installation on a pole, wall or telephone pole or light standard. Tunnel WiFi variants are available in 2.4 GHz, 5.8 GHz or dual-band operation.

The helical antenna leads to the elimination of “deadzones”, the reduction of co-channel interference and minimal spill-over
ADVANTAGES

Antenna Pattern
The lobe of coverage from the Tunnel WiFi is the ideal shape for covering a street or tunnel. This lends itself to several advantages such as the elimination of “deadzones”, reduction of co-channel interference due to efficient placement of APs and minimal spill-over into side streets.

Lower TCO
When compared to omni-based WiFi systems, the number of Access Points required to cover a given length of street is very low. For operators this means fewer nodes to manage, fewer installation sites and less equipment to purchase. The CPAEX and OPEX savings both contribute to a significant reduction in the Total Cost of Ownership for a WiFi system suited to this type of coverage.

Circular Polarization
Tunnel WiFi uses circular polarization which means that the device can be pointed in any orientation for best performance. End users are not required to aim the device at the AP to get a connection.

Multipath Reflection
The RF environment inside a confined tunnel or within an urban canyon created by rows of buildings on either side of the street is far different than an open air system. EION’s Tunnel WiFi uses these multipath reflections to its advantage to boost the signal and improve reception and reach of the system.

RANGE EXPECTATIONS
- Corridor up to 2 Km at -75 to -80 dBm predicted assuming 0-1 dBi antenna on cell phone
- No Coverage on side streets beyond 200 to 300 Meters is expected – rapid fall off
- Minimum Height of Base Antenna is 12 meters - lower too much clutter on street will block pattern

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Tunnel WiFi

Radio

Modes Supported: Access Point, Station, Station WDS, Repeater WDS, Wireless Adapter, Station + Router, Access Point + Router

Antennas: Integrated Twin-Helical Antennas, RHCP standard

Frequency: 802.11, 2.4 GHz and 5.8 GHz

Channel Size: Normal 20 MHz, Turbo 40 MHz

Modulation: Standard 802.11 rates; MCS 0 to 15 [6.5 to 300 Mbps physical data rates]; BPSK, QPSK, 16-QAM and 64-QAM

Output Power: up to +26 dB per Tx chain

Receiver Sensitivity (BER = 10^-6): +/- 2dB

Modulation 20 MHz 40 MHz

MCS0 - BPSK -95 dBm -92 dBm
MCS1 - QPSK1/2 -93 dBm -90 dBm
MCS2 - QPSK3/4 -90 dBm -87 dBm
MCS3 - 16-QAM1/2 -89 dBm -86 dBm
MCS4 - 16-QAM3/4 -85 dBm -82 dBm
MCS5 - 64-QAM1/2 -81 dBm -77 dBm
MCS6 - 64-QAM3/4 -79 dBm -76 dBm
MCS7 - 64-QAM5/6 -75 dBm -72 dBm

Duplexing Format: TDD, Half Duplex

Network Support

Medium Access Control: Standard 802.11 abgn

Network Connection: Auto MDI-X RJ45 10/100/1000 Mbps Ethernet, Auto Negotiation

Traffic Management: WMM

MAC Filtering: Filtering through Standard MAC address

DHCP: DHCP server in AP controlling wireless side, NAT

IPv6: IPv6 pass through in bridge mode

Wireless Networking

Output Power Management: Manual

SSID: 4 per radio

Security

Management Access: Username and Password

Encryption: WEP Open System, WEP Shared Key, WPA-PSK, WPA2-PSK, WPA-PSK/WPA2-PSK Mixed Mode

Management

Remote Management: Web-GUI, SNMPv2

Management Access: Over the Air & Wired

Backup Configuration: Download backup configuration files

Software Upgrade: via Web-GUI

Physical, Electrical & Environmental

Mounting Bracket: 2-Axis ruggedized bracket for pole or wall mount

Enclosure: Outdoor Die Cast Metal Ruggedized NEMA 4x; IP67

Relative Humidity: 0 to 100%, condensing

Operating Temperature: -30° C to +70° C

Dimensions: 2.4 GHz: 230mm × 230mm × 373mm 5.8 GHz: 230mm x 230mm x 330mm

Weight: 2.75 kg

Input Voltage: 100-240V, 50/60 Hz AC with 48V PoE 802.3af

Power Consumption: <16 W

Lightning Protection: Built-in ESD

Environmental: RoHS and WEEE

Ordering Information

9150-0041: Tunnel WiFi 2.4 GHz - Outdoor WiFi Access Point with integrated 2.4 GHz Helical Antenna for Coverage of Underground Locations
9150-0051: Tunnel WiFi 5.8 GHz - Outdoor WiFi Access Point with integrated 5.8 GHz Helical Antenna for Coverage of Underground Locations
9150-0061: Tunnel WiFi Dual Band - Outdoor WiFi Access Point with integrated 2.4/5.8 GHz Helical Antenna for Coverage of Underground Locations

Box Contents

Each Box Contains the Following
1 x Outdoor WiFi Radio with Integrated Helical Antennas
1 x 8B PoE Injector
1 x Pole mounting bracket
1 x Grounding Lug
1 x Ferrite Bead
1 x Quick Start Guide