

## Tunnel WiFi

### Outdoor WiFi for Underground Coverage



#### TUNNEL WiFi OVERVIEW

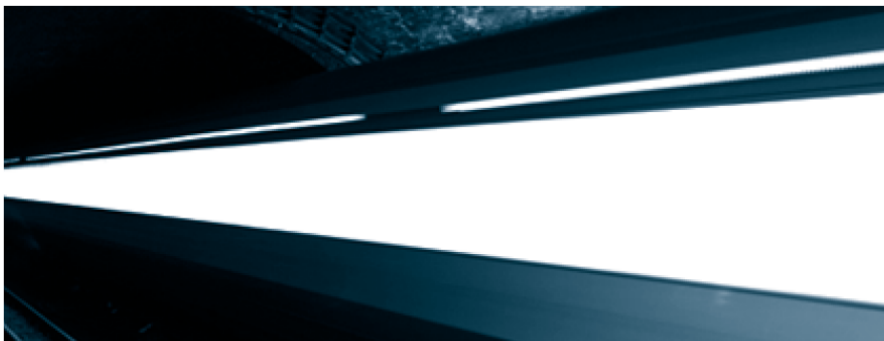
EION Tunnel WiFi is an outdoor 802.11 WiFi hotspot designed for optimal coverage inside tunnels and underground locations. The innovative helical antenna signal pattern provides exceptional coverage through the tunnel without wasting power. Typically due to reflections in tunnels such as an underpass, 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.

#### 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



*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

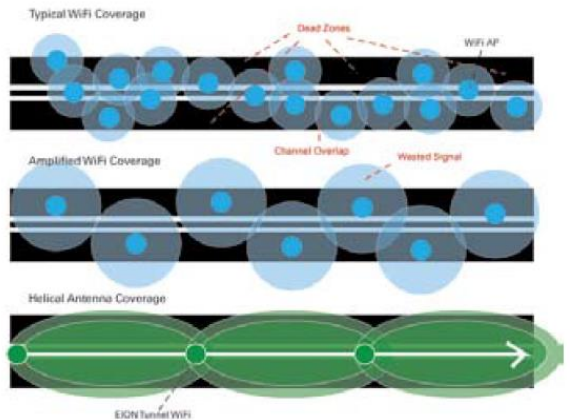
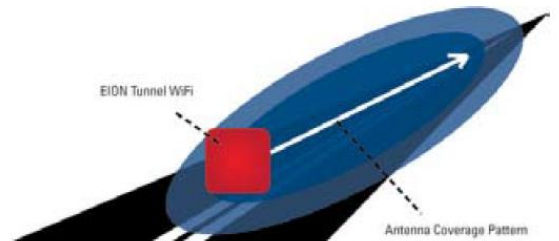
Tunnel WiFi uses circular polarization which means that the device can be pointed in any orientation for best performance. End users are not required to aim the device at the AP to get a connection.

### 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



*Tunnel WiFi uses circular polarization.*

*The device can be pointed in any orientation for best performance.*



DATASHEET

**Tunnel WiFi**

<b>Radio</b>			
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 dBm per Tx chain		
Receiver Sensitivity (BER = 10 <sup>-6</sup> ) +/- 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	-84 dBm
	MCS4 - 16-QAM2/3	-85 dBm	-81 dBm
	MCS5 - 64-QAM2/3	-81 dBm	-77 dBm
	MCS6 - 64-QAM3/4	-79 dBm	-76 dBm
MCS7 - 64-QAM5/6	-75 dBm	-74 dBm	
Duplexing Format	TDD, Half Duplex		
<b>Network Support</b>			
Medium Access Control	Standard 802.11 abgn		
Network Connection	Auto MDI-X RJ45 10100/1000 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		
<b>Wireless Networking</b>			
Output Power Management	Manual		
SSID	4 per radio		
<b>Security</b>			
Management Access	Username and Password		
Encryption	WEP Open System, WEP Shared Key, WPA-PSK, WPA2-PSK, WPA-PSK/WPA2-PSK Mixed Mode		
<b>Management</b>			
Remote Management	Web-GUI, SNMPv2		
Management Access	Over the Air & Wired		
Backup Configuration	Download backup configuration files		
Software Upgrade	via Web-GUI		
<b>Physical, Electrical &amp; Environmental</b>			
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		
<b>Ordering Information</b>			
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		
<b>Box Contents</b>			
Each Box Contains the Following	1 x Outdoor WiFi Radio with Integrated Helical Antennas 1 x GB PoE Injector 1 x Pole mounting bracket 1 x Grounding Lug 1 x Ferrite Bead 1 x Quick Start Guide		