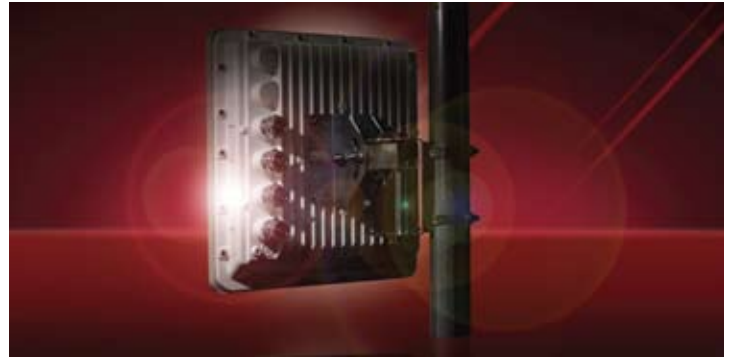




## EX-4.5r Series GigE



### All-Outdoor, Carrier-Class, 4.5 GHz Gigabit Ethernet Radio System for Secure Government and NATO Communications

The EX-4.5r GigE all-outdoor microwave radios are the first carrier-class, high capacity point-to-point microwave radios in the 4.5 GHz Federal and NATO band. The systems support up to 440 Mbps aggregate user throughput and distances greater than high-capacity millimeter wave radios, including e-Band systems. The EX-4.5r Series GigE was designed to meet the demanding backhaul requirements of government, military and homeland security organizations seeking the best performance, availability and security for field or command center communications.

**Security, Management and Data Networking.** The EX-4.5r GigE radios deliver the highest data and management security available with optional FIPS-197 certified 128-bit and 256-bit AES encryption and secure SNMP v3 management, together with enhanced fault management and diagnostic features. The 802.1Q VLAN option provides built-in network administration and security flexibility.

**Carrier TDD™.** The EX-4.5r GigE series radios combine native TDM and native Ethernet transport with low, fixed latency to deliver guaranteed throughput and service quality. Capacity can be allocated variably between TDM

and Ethernet via software, while the selectable throughput symmetry control feature enables radio capacity to efficiently match asymmetric traffic requirements. The EX-4.5r Series GigE is ideal for secure voice, data, video conferencing, and video surveillance applications.

**Industry-leading Spectrum Management.** The EX-4.5r GigE radios include selectable channel bandwidth, 1 MHz tuning resolution, selectable modulation and superior system gain to provide unparalleled interference avoidance and transmission resiliency. A built-in spectrum analyzer is even included to accelerate deployment, simplify troubleshooting and detect rogue transmitters in the band.

**ExaltSync Synchronization.** The ExaltSync technology embedded in the EX-4.5r GigE radios allows multiple radio systems to be collocated in close proximity without self-interference, minimizing antenna separation and ensuring reuse of scarce spectrum across all collocated systems. This capability is ideal for mobile command centers and field operation units seeking to maximize the communications capabilities from a single hubbing site.



Specifications	EX-4.5r GigE	EX-4.5r-c GigE
Maximum Capacity Ethernet (aggregate)	440 Mbps	
TDM	4xT/1E1s	
Frequency (GHz)	4.400 – 4.900 GHz	

## Specifications EX-4.5r Series GigE

System	
Outdoor Unit (ODU) Models	2x10/100/1000BaseT + 4xT1/E1
Frequency Band (GHz)	4.400-4.900
Tuning Resolution	1 MHz
Output Power (full power)	
QPSK	+24 dBm
16QAM	+21 dBm
Output Power (min power)	Full power minus 20 dB
Power Control Step Size	0.5 dB
User Throughput (Ethernet Mbps) – aggregate over designed distance <sup>1</sup>	
	8 MHz Channel    16 MHz Channel    32 MHz Channel    64 MHz Channel
<b>Cross polarization</b>	
QPSK	26      55      110      220
16QAM	55      110      220      440
<b>Single polarization</b>	
QPSK	13      27      55      110
16QAM	27      55      110      220
<b>Receiver Threshold (BER=10<sup>-6</sup>) over temperature</b>	
QPSK	-86      -83      -80      -77
16QAM	-78      -75      -72      -69
<b>System Gain</b>	
QPSK	110      107      104      101
16QAM	99      96      93      90
<b>Maximum RSL</b>	0 dBm no damage
QPSK	-25 dBm error-free
Throughput Symmetry Control	5 modes 20/80, 80/20, 35/65, 65/35, 50/50
Error Floor	10 <sup>-12</sup>
FEC	T=8
Adaptive Modulation	QPSK-16QAM; Errorless. Selectable and configurable with prioritization.
Latency	1ms, typical (user configurable)
Data Security	NIST FIPS-197 128-bit AES <sup>2</sup> and 256-bit AES <sup>2</sup> or 96-bit proprietary encryption
Path protection <sup>3</sup>	Errorless switching space diversity Linear combining space diversity (+3dB system gain)
Spectrum Analyzer	Embedded
Capacity Aggregation <sup>3</sup>	n+0 Ethernet aggregation
Management	In-band and out-of-band management
<b>Security</b>	SSL/SSH and secure, encrypted SNMP v3
HTTP	Embedded web server GUI (Internet Explorer, Firefox)
CLI/Telnet	via 10/100BaseT
SNMP	v1, v2c, and secure v3
MIB support	MIB I, MIB II, Exalt MIB
Installation and Management Manual	Embedded in radio, accessible via HTTP GUI
Compliance	EN 60-950, EN 301-489 FCC Part 15

Physical	Integrated antenna	Connectorized
<b>Physical Configuration</b>	Outdoor Unit (ODU)	Outdoor Unit (ODU)
<b>Dimensions (H x W x D)</b>	14.6 x 14.6 x 3.8 in 35.6 x 35.6 x 9.7 cm	14 x 14 x 2.5 in 35.6 x 35.6 x 6.4 cm
<b>Antenna Gain/3 dB Beamwidth</b>	21 dBi / 10 degrees	
<b>Operating Temperature</b>	-40 to +65°C; -40 to +149°F	
<b>Full Spec Temperature</b>	-40 to +60°C; -40 to +140°F	
<b>Weight</b>	Connectorized r-c: 6 lbs; Integrated antenna r: 7 lbs	
<b>Environmental</b>	NEMA 4/IP56	
<b>Altitude</b>	15,000 ft; 4.6 km	
<b>Humidity</b>	100% condensing	
Interfaces		
<b>RF</b>	N-type Female (EX-4.5r-c)	
<b>Ethernet</b>	RJ48C/RJ45 Female (x2)	
<b>Interface Speed</b>	10/100/1000BaseT	
<b>Duplex</b>	Half, Full, Auto-MDIX	
<b>Compliance</b>	802.3	
<b>VLAN</b>	802.1q, transparent, trunk, and management only; over 4,000 VLAN IDs	
<b>QoS<sup>3</sup></b>	8 QoS Traffic Classes; Filters on: IEEE802.1p, 802.1Q VLAN ID, SA/DA MAC	
<b>Ethernet Rate Limiting</b>	Configurable per port via software, 1 kbps resolution	
<b>Maximum Packet Size</b>	2048 bytes	
<b>T1/E1<sup>2</sup> option)</b>	T1 (x4) RJ48C/RJ45 Female (x2)	E1 (x4)
<b>Impedance</b>	100 ohms, balanced	120 ohms, balanced
<b>Line Code</b>	AMI, B8ZS, selectable per channel	HDB3
<b>Data Rate</b>	1.544 Mbps	2.048 Mbps
<b>Compliance</b>	ANSI T1.102-1987; ITU-T; G.823; GR-499-CORE	CEPT-1; G.703; ITU-T-G.703
<b>Loopback Modes</b>	Remote Internal; Remote External; Local Line	
<b>ExaltSync Synchronization</b>	RJ45 Female (x2)	
<b>Input</b>	1pps (GPS)	
<b>Output</b>	Sync out	
<b>DC Power</b>	48VDC (PoE), <70W	
<b>AC/PoE Power Adapter</b>		
<b>Input</b>	100-240VAC, 1.5A	
<b>Output</b>	100W, 48VDC	
<b>Warranty</b>	2 years (with product registration)	
System Components		
<b>Complete Link</b>	Two terminals, each with AC/PoE adapter, mounting kit, & accessory kit	
<b>Single Terminal</b>	One terminal with AC/PoE adapter, mounting kit, & accessory kit	
<b>Accessory Kit</b>	DC power connector, power injector, grounding hardware, water-proofing tape (spare)	
<b>AC/PoE Adapter</b>	AC/PoE adapter (spare)	
<b>Mounting Kits</b>	Available for r and r-c models (spare)	
<b>ExaltSync GPS Sync Kit</b>	GPS receiver and mounting bracket (optional)	
<b>DC Power Injector</b>	PoE injector, plus connector (spare)	

<sup>1</sup> Maximum aggregate user throughput (not over-the-air modulated data rate). Aggregate user throughput varies over different combinations of link distance and selected frame size (latency) relative to the configured bandwidth and modulation settings

<sup>2</sup> Software license key option

<sup>3</sup> Software upgrade required

