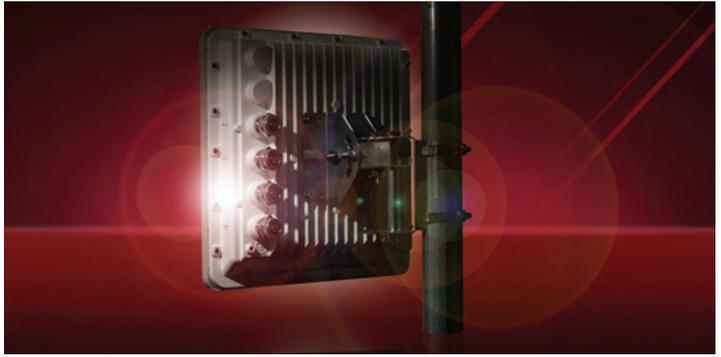


EX-4.5r Series GigE



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.

Synchronization. The Sync 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	

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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)	Full power minus 20 dB			
QPSK	+24 dBm			
16QAM	+21 dBm			
Output Power (min power)	Full power minus 20 dB			
Power Control Step Size	0.5 dB			
Throughput (Mbps aggregate) (Max system layer 1/Max Ethernet layer 2) ¹				
	10 MHz Channel	20 MHz Channel	40 MHz Channel	64 / 80 MHz ² Channel
Cross polarization				
QPSK	31 / 26	64 / 54	129 / 109	264 / 220
16QAM	64 / 54	129 / 109	264 / 220	528 / 440
Single polarization				
QPSK	15 / 13	31 / 26	64 / 54	129 / 109
16QAM	31 / 26	64 / 54	129 / 109	264 / 220
Receiver Threshold (BER=10 ⁻⁶) over temperature ³				
QPSK	-86	-83	-80	-77
16QAM	-78	-75	-72	-69
System Gain				
QPSK	110	107	104	101
16QAM	99	96	93	90
Maximum RSL	0 dBm no damage			
QPSK-16 QAM	-25 dBm error-free			
Throughput Symmetry Control	5 modes 20/80, 80/20, 35/65, 65/35, 50/50			
Error Floor	10 ⁻¹²			
FEC	Reed Solomon T=8			
Latency	1ms, typical (user configurable)			
Data Security	NIST FIPS-197 128-bit and 256-bit AES ⁴ or 96-bit proprietary encryption			
Spectrum Analyzer	Embedded			
Management	In-band and out-of-band management			
Security	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,			
Installation and Management Manual	Embedded in radio, accessible via HTTP GUI			
Compliance	EN 60-950, EN 301-489 FCC Part 15, NTIA Rev 9/09			

Physical	Integrated antenna	Connectorized
Physical Configuration	Outdoor Unit (ODU)	Outdoor Unit (ODU)
Dimensions (H x W x D)	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
Antenna Gain/3 dB Beamwidth	21 dBi / 10 degrees	
Operating Temperature	-40 to +65°C; -40 to +149°F	
Full Spec Temperature	-40 to +60°C; -40 to +140°F	
Weight	Connectorized r-c: 6 lbs; Integrated antenna r: 7 lbs	
Environmental	NEMA 4 / IP67	
Altitude	15,000 ft; 4.6 km	
Humidity	100% condensing	
Interfaces		
RF	N-type Female (EX-4.5r-c)	
Ethernet	RJ48C/RJ45 Female (x2)	
Interface Speed	10/100/1000BaseT	
Duplex	Half, Full, Auto-MDIX	
Compliance	802.3	
VLAN	802.1q, transparent, trunk, and management only; over 4,000 VLAN IDs	
QoS⁵	8 QoS Traffic Classes; Filters on: IEEE802.1p, 802.1Q VLAN ID, SA/DA MAC	
Ethernet Rate Limiting	Configurable per port via software, 1 kbps resolution	
Maximum Packet Size	2048 bytes	
T1/E1 (option)	T1 (x4) RJ48C/RJ45 Female (x2)	E1 (x4)
Impedance	100 ohms, balanced	120 ohms, balanced
Line Code	AMI, B8ZS, selectable per channel	HDB3
Data Rate	1.544 Mbps	2.048 Mbps
Compliance	ANSI T1.102-1987; ITU-T; G.823; GR-499-CORE	CEPT-1; G.703; ITU-T-G.703
Loopback Modes	Remote Internal; Remote External; Local Line RJ45 Female (x2)	
Synchronization		
Input	1pps (GPS)	
Output	Sync out	
DC Power	48 VDC (PoE), <70 W	
AC/PoE Power Adapter		
Input	100-240 VAC, 1.5 A	
Output	100 W, 48 VDC	
Warranty	Two years ⁶	