EX-s Series GigE ETSI

Split-Mount, Carrier-Class, Upgradeable Licensed-Band Systems for Medium and High Capacity TDM and Ethernet Backhaul Applications

The EX-s Series GigE split-mount microwave radios are carrier-class, point-to-point systems for the entire 7 to 40 GHz ITU/ETSI licensed spectrum. Featuring native TDM and native Gigabit Ethernet transport with over 360 Mbps full-duplex capacity per radio carrier, EX-s Series GigE systems are available with software configurable PDH or SDH interfaces up to 2xSTM-1 and up to 4x10/100/1000 BaseT ports available in the same 1RU IDU. The EX-s Series GigE systems are designed to support any mix of TDM and IP/Ethernet traffic, allowing risk-free network migration for both private and operator networks, including 3G to LTE evolution.

The Native Difference. The EX-s GigE systems deliver true carrier-class capability, made possible by running TDM and Ethernet natively. That means rock-solid TDM performance regardless of IP traffic behavior. It also means that when T1/E1 ports are added, TDM throughput is traded bit-for-bit for Ethernet throughput and vice versa, so there's never a question about available user throughput for either transport.

Adaptive Modulation. Exalt's adaptive modulation technology allows links to simultaneously support different availability levels for TDM and Ethernet. This optimizes range and performance for the most sensitive TDM traffic while ensuring high performance for inherently resilient Ethernet traffic. Links can be engineered for longer distances and Ethernet transport will respond elastically to changing link conditions without affecting TDM availability.

Capacity Aggregation. The EX-s GigE radios can aggregate capacity across multiple licensed and license-exempt microwave links to deliver a single, high speed connection of up to 1 Gbps full-duplex across a single Gigabit Ethernet interface.

Advanced Data Networking. The EX-s GigE radios offer a rich set of advanced data networking features, including a built-in Gigabit Ethernet layer 2 switch with 802.1q VLAN (single and double tag) up to 4094 VLAN IDs, plus multi-level QoS featuring 8 priority levels and 8 individual queues. Traffic can be prioritized based on 802.1p tags, VLAN ID, MAC source address or MAC destination address as required.

High Security. The EX-s GigE systems allow network managers to support the most stringent security requirements, with optional AES 128-bit and 256-bit encryption for data traffic protection and support for both encrypted SNMP v3 and SSL/SSH to ensure management security.

Advanced Spectrum Diagnostics. Exalt is the first to offer built-in spectrum analysis in a licensed radio. The spectrum analyzer simplifies site survey analysis and aids in antenna alignment, installation and RSL optimization. Once the link is commissioned, the spectrum analyzer is a useful troubleshooting tool to ensure no interference issues exist and to verify that the link is performing at optimum.

Specifications		7 GHz	8 GHz	13 GHz	15 GHz	18 GHz	23 GHz	38 GHz
Maximum Capacity	TDM	1-2xSTM-1, 16xT1/E1, 8xT1/E1, and 4xT1/E1 in various configurations						
	Ethernet	366 Mbps						
Frequency (GHz)		7.125-7.900	7.900-8.500	12.750-13.250	14.500-15.350	17.700-19.700	21.200-23.610	38.595-40.100

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System	
IDU Models[1]	
8-1000E	8xT1/E1 + 4xGbE
16-1000E	16xT1/E1 + 4xGbE
2STM1/4-1000E	2xSTM-1 + 4xT1/E1 + 4xGbE
Power Control Step Size	0.5 dB
Maximum RSL	
64QAM	-25 dBm error-free
128QAM	-27 dBm error-free
256QAM	-30 dBm error-free
Error Floor	10^{-12}
Power Control Range	20 dB
ATPC	Yes
Adaptive Modulation	QPSK - 256QAM; Selectable, fully configurable with prioritization
Latency	<100µs at full throughput (GbE)
Data Security	AES and 256-bit AES[2] or 96-bit proprietary encryption
Path Protection	Space diversity with errorless switching[1]
Capacity aggregation	Polarization aggregation with XPIC
	N+0 link aggregation
T1/E1 Cross-connect	Built-in, software controlled T1/E1 port cross-connection between endpoints
T1/E1 Prioritization	Software controlled T1/E1 prioritization
Spectrum management	Built-in spectrum analyzer
Installation and Management Manual	Embedded in radio, accessible via HTTP GUI
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	10/100/1000BaseT or serial craft port
SNMP	v1, v2c, and secure v3
MIB support	MIB I, MIB II, Exalt MIB
XML	XML configuration file
Compliance	
RF	EN 302 217
EMI	EN 301 489-4
Safety	EN 60950-1, IEC 60950-1
Physical	
Dimensions (H x W x D)	
IDU	1 RU: 1.7 x 17 x 11 in / 44 x 43 x 28 cm
ODU	10.9 x 9.4 x 3.6 in / 27.7 x 23.9 x 9 cm
Weight	IDU: 9 lbs/4 kg
	ODU: ≤9.5 lbs/ 4.3 kg
Full Specification Temperature	IDU: -5 to +50°C / 23 to + 122°F
	ODU: -33 to +50°C / -27 to + 122°F
Operating Temperature	IDU: -10 to +55°C / 14 to +131°F
	ODU: -40 to +55°C / -40 to +131°F
Altitude	15,000 ft/4.6 km
Humidity	IDU: 95% non-condensing
	ODU: 100% non-condensing

Interfaces			
IDU to ODU	N-type Female, impedance 50 ohm		
TDM (Native)	STM-1	T1	E1
Connector	SFP, Single Mode LC Transceiver	RJ48C/RJ45 Female (x16)	RJ48C/RJ45 Female (x16)
Impedance	-	100 ohms, balanced	120 ohms, balanced
Line Code	Binary Scrambled NRZ CMI	AMI, B8ZS, selectable per channel	HDB3
Clocking Speed	155.52MHz	1.544 MHz	2.048 MHz
Compliance	ITU-T G.957 G.703	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		
RX/TX	1310 nm (Short Range 15 km). Rx: -31 to -7 dBm Tx: -15 to -8 dBm	-	-
	1310 nm (Long Range 40 km). Rx:-35 to 0 dBm. Tx: -5 to 0 dBm	-	-
Ethernet (Native)	RJ45 Female (x2), auto-MDIX	SFP (x2)	
Interface Speed	10/100/1000BaseT	1000BaseT/X	
Duplex	Half, Full, Auto	Half, Full, Auto	
Compliance	802.3	802.3	
Maximum Packet Size	9728 bytes	9728 bytes	
VLAN	802.1q, transparent, trunk, and management only; over 4,000 VLAN IDs		
QoS	8 priority levels, 8 queues 802.1p, 802.1q (VLAN ID), source MAC address, destination MAC address		
Ethernet Rate Limiting	Configurable per port via software, 1 Kbps resolution		
1+1 Protection Port	1x RJ48C/RJ45 Female, proprietary control		
Expansion Port	1x RJ48C/RJ45 Female, proprietary control		
Console (Serial)	9-pin Sub-D (F)		
Speed	9600 bps		
Compliance	EIA-574 (RS-232)		
Alarm	9-pin Sub-D (F)		
	Inputs (2) TTL/Closure		
	Outputs (2) Relay (Form C)		
DC Power	3-pin barrier strip		
Input Voltage	-48 VDC		
Consumption	<115W (48V:<2.5A, 24V:<5A)		
AC Power Adapter (optional accessory)	EIC-to-NEMA 5-15		
Input	100-240VAC, 2.5A		
Output	48VDC, 3A, 150W		

[1] Consult your Exalt sales representative for availability

[2] Software license key option

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Specifications (Cont.) EX-s Series GigE ETSI

Frequency Bands[1]		7 GHz	8 GHz	13 GHz	15 GHz	18 GHz	23 GHz	38 GHz
Frequency Range (GHz)		7.125-7.900	7.900-8.500	12.750-13.250	14.500-15.350	17.700-19700	21.200-23.610	38.595-40.100
TR Spacing (MHz)		154,161,168,196,245	119, 266, 311.32	266	315, 420, 490, 728	1010	1008, 1232	1260
Channel Spacing (MHz)		7, 14, 28, 56	7, 14, 28, 56	7, 14, 28, 56	7, 14, 28, 56	7, 14, 28, 56	7, 14, 28, 56	7, 14, 28, 56
Antenna interface		WR-112	WR-112	WR-75	WR-62	WR-42	WR-42	0.219 dia
System Capacity (Ethernet Mbps) – full-duplex								
QPSK	7 MHz	11	11	11	11	11	11	11
	14 MHz	21	21	21	21	21	21	21
	28 MHz	43	43	43	43	43	43	43
	56 MHz	86	86	86	86	86	86	86
16QAM	7 MHz	21	21	21	21	21	21	21
	14 MHz	43	43	43	43	43	43	43
	28 MHz	86	86	86	86	86	86	86
	56 MHz	171	171	171	171	171	171	171
32QAM	7 MHz	27	27	27	27	27	27	27
	14 MHz	54	54	54	54	54	54	54
	28 MHz	107	107	107	107	107	107	107
	56 MHz	214	214	214	214	214	214	214
64QAM	7 MHz	32	32	32	32	32	32	32
	14 MHz	64	64	64	64	64	64	64
	28 MHz	129	129	129	129	129	129	129
	56 MHz	257	257	257	257	257	257	257
128QAM	7 MHz	37	37	37	37	37	37	37
	14 MHz	75	75	75	75	75	75	75
	28 MHz	159	159	159	159	159	159	159
	56 MHz	318	318	318	318	318	318	318
256QAM	7 MHz	43	43	43	43	43	43	-
	14 MHz	86	86	86	86	86	86	-
	28 MHz	171	171	171	171	171	171	-
	56 MHz	366	366	366	366	366	366	-
Receiver Threshold (dBm) (guaranteed over temperature BER 10-6)								
QPSK	7 MHz	-89	-88	-89	-89	-89	-87	-86
	14 MHz	-86	-85	-86	-86	-86	-84	-83
	28 MHz	-83	-82	-83	-83	-83	-81	-80
	56 MHz	-80	-79	-80	-80	-80	-78	-77
16QAM	7 MHz	-82	-82	-82	-82	-82	-81	-80
	14 MHz	-79	-79	-79	-79	-79	-78	-77
	28 MHz	-76	-76	-76	-76	-76	-75	-74
	56 MHz	-73	-73	-73	-73	-73	-72	-71
32QAM	7 MHz	-78	-78	-78	-78	-78	-77	-76
	14 MHz	-76	-76	-76	-76	-76	-75	-74
	28 MHz	-73	-73	-73	-73	-73	-72	-71
	56 MHz	-70	-70	-70	-70	-70	-69	-68
64QAM	7 MHz	-76	-76	-76	-76	-76	-75	-74
	14 MHz	-73	-73	-73	-73	-73	-72	-71
	28 MHz	-70	-70	-70	-70	-70	-69	-68
	56 MHz	-67	-67	-67	-67	-67	-66	-65
128QAM	7 MHz	-73	-73	-73	-73	-73	-72	-71
	14 MHz	-70	-70	-70	-70	-70	-69	-68
	28 MHz	-67	-67	-67	-67	-67	-66	-65
	56 MHz	-64	-64	-64	-64	-64	-63	-62
256QAM	7 MHz	-70	-70	-70	-70	-70	-69	-
	14 MHz	-67	-67	-67	-67	-67	-66	-
	28 MHz	-64	-64	-64	-64	-64	-63	-
	56 MHz	-61	-61	-61	-61	-61	-60	-
Output Power (dBm)								
QPSK		25.5	25.5	24.5	24.5	22.5	22.5	23
16QAM		21	21	19.5	19.5	18.5	18.5	19.5
32QAM		21.5	21.5	20	20	19	19	20
64QAM		20.5	20.5	18.5	18.5	17.5	16.5	16.5
128QAM		20	20	18	18	17	16	16
256QAM		18.5	18.5	16.5	16.5	15.5	14.5	-

[1] Consult your Exalt sales representative for availability

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