



## ExtremeAir® All-Outdoor Licensed ITU/ETSI



### Fiber-Speed Microwave Systems for Ring, Aggregation and Core Applications

ExtremeAir all-outdoor radios are the world's first dual-carrier zero footprint microwave systems. Capable of operation in the 6–43 GHz bands, ExtremeAir is designed to deliver guaranteed full-duplex Ethernet throughput as high as 1000 Mbps over a distance of 24 miles. These all-outdoor microwave systems are rugged, XPIC-enabled, tower-mounted radios requiring no cabinet space. ExtremeAir provides a true line speed, low cost alternative to fiber for high capacity ring, aggregation and core applications in LTE, WiMAX and wireline service provider networks as well as campus connectivity and video surveillance applications in enterprise and government networks. Features and benefits include:

#### Unprecedented ultra-high capacity over distance.

ExtremeAir ITU/ETSI systems are the only ones to offer 80 MHz channels in the long haul 11 GHz band to deliver a total Layer 2 throughput of 1000 Mbps, a capacity previously achieved only in 60 and 80 GHz millimeter wave bands for very short haul applications. Compared to those systems, ExtremeAir can support up to 20x greater link distances at full Gbps and near-Gbps capacities, freeing users from the range constraints that have until now limited ultra-high capacity microwave, millimeter wave and wireless optical systems.

**Unique on-tower hub aggregation switching.** With up to four Gigabit Ethernet ports, ExtremeAir can aggregate edge traffic from as many as four lower capacity ExploreAir™ or ExtendAir® links without the need for an external switch or extra cables runs. All aggregated traffic can be carried over a single ultra-high capacity link to an access network element, delivering up to 1 Gbps to the element over a single CAT5 PoE cable.

**Integrated dual-carrier aggregation.** Unlike traditional 2+0 configurations, ExtremeAir's dual-carrier aggregation technology merges two single-carrier data streams into a single GbE port of a single all-outdoor system, eliminating the need for a separate switch, while avoiding the significant constraints of standards-based link aggregation.

**High performance errorless and jitterless adaptive modulation.** With a programmable adaptive modulation range of 256QAM to QPSK, ExtremeAir can deliver up to line speed capacity at even greater ranges at high availability levels, then temporarily reduce throughput in the event of a fade while still ensuring the delivery of high priority traffic based on QoS/CoS. Unlike ultra-high capacity millimeter wave systems that simply shift modulation between a high and a low state while losing data in the process, ExtremeAir provides errorless and jitterless modulation changes over any number of available modulation states.

**Data networking.** ExtremeAir systems include an integrated hardened Layer 2 switch along with up to four 10/100/1000BaseT/X ports, allowing ExtremeAir to support Carrier Ethernet backhaul requirements and features such as 802.1p (QoS), 802.1q (VLAN tagging) and rate limiting without the need for an indoor unit or external router or switch.

**Flexible remote management.** ExtremeAir systems include a full set of remote management tools such as Telnet/Command Line Interface (CLI), RS232, HTTP, HTTPS and SNMP v1, v2c and v3. In addition, the multi-port rcxx205 models provide unique out-of-band management functionality allowing both endpoints of a link to be managed independently.

Primary Specifications		ExtremeAir rcxx200 rcxx205 rcxx220	ExtremeAir rcxx210
Maximum Capacity	Ethernet (full-duplex)	1000 Mbps	
	TDM	-	4xT1/E1
Frequency	11 GHz (10.70–11.70 GHz), 13 GHz (12.75–13.25 GHz), 15 GHz (14.40–15.35), 18 GHz (17.70–19.70 GHz), 23 GHz (21.2–23.60 GHz)		

## Specifications

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### System

Models <sup>1</sup>	rcxx205: 1x10/100/1000BaseT PoE + 3x10/100/1000BaseT rcxx210: 1x10/100/1000BaseT PoE + 1x10/100/1000BaseT+ 4xT1/E1 rcxx220: 2x10/100/1000BaseT + 1x1000BaseX (SFP) rcxx230: 1x10/100/1000BaseT PoE + 2x10/100/1000BaseT + 1x 1000BaseT (IEEE1588 v2)
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Frequency Bands	11 GHz	13 GHz	15 GHz	18 GHz	23 GHz	38 GHz
FCC Part 101	10.70–11.70 GHz	12.75–13.250	14.40–15.35	17.70–19.70	21.20–23.60	37.04–40.00
TR Spacing (MHz)	490 / 500	266	315, 420, 490, 728	1010	1008, 1232	1260
Channel Bandwidth (MHz)	30, 40, 80 <sup>2</sup>	14, 28, 56	14, 28, 56	14, 28, 56	14, 28, 56	14, 28, 56
Antenna Interface	19.05 mm / 0.750 in Dia	15.79 mm / 0.620 in Dia	14.20 mm / 0.559 in Dia	11.56 mm / 0.455 in Dia	9.40 mm / 0.370 in Dia	5.56 mm / 0.219 in Dia
Output Power (dBm) <sup>3</sup>	Standard/Power Upgrade <sup>4</sup>					
QPSK	24 / 26	23	22	22	20	19
16QAM	22 / 26	21	20	20	18	17
32QAM	21 / 26	20	20	20	17	16
64QAM	20 / 25	20	19	19	16	15
128QAM	19 / 25	19	18	18	15	14
256QAM	18 / 23	18	17	17	14	12
<b>Receiver Threshold (BER=10<sup>-6</sup> typical (dBm))<sup>5</sup></b>						
QPSK	14 MHz	-87	-87	-86	-85	-84
	27.5 / 28 MHz	-84	-84	-84	-82	-81
	40 MHz	-78	-	-	-	-
	56 MHz	-	-80	-80	-80	-79
	80 MHz	-75	-	-	-	-
16QAM	14 MHz	-	-80	-80	-79	-78
	27.5 / 28 MHz	-78	-77	-77	-78	-76
	40 MHz	-	-	-	-	-
	56 MHz	-	-74	-74	-74	-73
	80 MHz	-73	-	-	-	-
32QAM	14 MHz	-	-77	-77	-76	-75
	27.5 / 28 MHz	-74	-74	-74	-75	-73
	40 MHz	-73	-	-	-	-
	56 MHz	-	-71	-71	-71	-70
	80 MHz	-70	-	-	-	-
64QAM	14 MHz	-	-74	-74	-73	-72
	27.5 / 28 MHz	-71	-71	-71	-70	-69
	40 MHz	-70	-	-	-	-
	56 MHz	-	-68	-68	-67	-66
	80 MHz	-67	-	-	-	-
128QAM	14 MHz	-	-71	-71	-70	-69
	27.5 / 28 MHz	-68	-68	-68	-68	-66
	40 MHz	-67	-	-	-	-
	56 MHz	-	-65	-65	-64	-64
	80 MHz	-64	-	-	-	-
256QAM	14 MHz	-	-68	-68	-67	-66
	27.5 / 28 MHz	-65	-65	-65	-65	-63
	40 MHz	-64	-	-	-	-
	56 MHz	-	-62	-62	-61	-60
	80 MHz	-61	-	-	-	-

**Specifications (Cont.)**
**ExtremeAir All-Outdoor Licensed ITU/ETSI**
**Throughput (Mbps full-duplex) (Max system layer 1/Max Ethernet layer 2)<sup>4</sup>**

		QPSK	16 QAM	32 QAM	64 QAM	128 QAM	256 QAM
11 GHz	27.5 / 28 MHz	116 / 104	226 / 182	282 / 228	340 / 274	396 / 320	454 / 366
	40 MHz	154 / 124	308 / 248	384 / 310	462 / 372	538 / 436	616 / 498
	80 MHz	314 / 256	630 / 316	788 / 646	946 / 774	1000 / 904	1000 / 986
All other bands	14 MHz	54 / 44	108 / 88	134 / 108	162 / 130	198 / 152	216 / 174
	27.5 / 28 MHz	116 / 104	226 / 182	282 / 228	340 / 274	396 / 320	454 / 366
	56 MHz	216 / 174	432 / 348	538 / 436	646 / 522	798 / 644	912 / 740

Maximum RSL	0 dBm no damage
	QPSK -25 dBm error-free
	16QAM-256QAM -30 dBm error-free

Output Power (min power)	0 dBm
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Power Control Step Size	0.5 dB
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Error Floor	10 <sup>-12</sup>
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FEC	Reed Solomon T=8
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TDM latency	<250 μs typical
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Ethernet latency	40-125μs (<100μs typical) at full throughput (GigE) with AES encryption enabled
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Data Security	NIST FIPS 197-compliant 128-bit AES and 256-bit AES <sup>5</sup> or 96-bit proprietary encryption
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Adaptive Modulation	QPSK-256QAM fully configurable; errorless and jitterless
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XPIC	Embedded
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Spectrum Analyzer <sup>6</sup>	Embedded
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**RF Sub-bands**

11 GHz TR 490 / 500 MHz Hi / Lo	13 GHz TR 266 MHz Hi / Lo	15 GHz TR 315 MHz Hi / Lo	15 GHz TR 490 MHz Hi / Lo	18 GHz TR 1010 MHz Hi / Lo
Band 1: 10.70-10.90 GHz / 11.20-11.40 GHz	Band 1: 13.02-13.08 / 12.75-12.81 GHz	Band 1: 14.94-15.05 / 14.63-14.73 GHz	Band 1: 14.89-15.01 / 14.40-14.52 GHz	Band 1: 18.7-19.0 / 17.69-17.99 GHz
Band 2: 10.85-11.05 GHz / 11.35-11.55 GHz	Band 2: 13.07-13.14 / 12.81-12.87 GHz	Band 2: 15.04-15.16 / 14.73-14.84 GHz	Band 2: 15.01-15.12 / 14.52-14.63 GHz	Band 2: 18.94-19.24 / 17.93-18.23 GHz
Band 3: 11.00-11.20 GHz / 11.50-11.70 GHz	Band 3: 13.13-13.19 / 12.86-12.93 GHz	Band 3: 15.14-15.24 / 14.82-14.93 GHz	Band 3: 15.12-15.24 / 14.63-14.75 GHz	Band 3: 19.19-19.49 / 18.18-18.48 GHz
	Band 4: 13.19-13.25 / 12.92-12.98 GHz		Band 4: 15.23-15.35 / 14.74-14.86 GHz	Band 4: 19.41-19.71 / 18.40-18.70 GHz

23 GHz TR 1232 MHz Hi / Lo	23 GHz TR 1008 MHz Hi / Lo	15 GHz TR 420 MHz Hi / Lo	15 GHz TR 728 MHz Hi / Lo	38 GHz TR 1260 MHz Hi / Lo
Band 1: 22.43-22.85 / 21.2-21.62 GHz	Band 1: 23.01-23.32 / 22.00-22.31 GHz	Band 1: 14.92-15.03 / 14.50-14.61 GHz	Band 1: 15.23-15.34 / 14.50-14.62 GHz	Band 1: 38.304-38.892 / 37.044-37.632
Band 2: 22.81-23.23 / 21.57-21.99 GHz	Band 2: 23.29-23.61 / 22.29-22.60 GHz	Band 2: 15.03-15.15 / 14.61-14.73 GHz		Band 2: 38.864-39.452 / 37.604-38.192
Band 3: 23.18-23.60 / 21.95-22.37 GHz		Band 3: 15.14-15.26 / 14.72-14.84 GHz		
		Band 4: 15.24-15.35 / 14.82-14.93 GHz		

**Management**
**In-band management; Out-of-band management (xx105 models only)**

Security	SSL/SSH and secure, encrypted SNMPv3
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HTTP	Embedded web server GUI (Internet Explorer, Firefox, Safari, Chrome)
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CLI/Telnet	via 10/100/1000BaseT
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SNMP	v1, v2c, and secure v3
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MIB support	MIB I, MIB II, Exalt MIB
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Installation and Management Manual	Embedded in radio, accessible via HTTP GUI
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Compliance	SNMP v1, v2c, v3
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	EN 302 217-2-2 v1.4.1 (2010-03)
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	EN 301 126-2-2 v1.1.1 (2000-11)
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	EN 301 489-4
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	EN 60950-1, IEC 60950-1
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**Specifications (Cont.)**
**ExtremeAir All-Outdoors Licensed ITU/ETSI**

Physical	
Dimensions (H x W x D)	23.9 cm x 23.9 cm x 13.3 cm 9.4" x 9.4" x 5.25"
Operating Temperature	-40 to +65 °C; -40 to +149 °F
Full Spec Temperature	-40 to +60 °C; -40 to +140 °F
Weight	3.6 kg / 8.2 lbs.
Environmental	NEMA 4 / IP66
Altitude	4600m / 15,000 ft.
Humidity	100% condensing
Interfaces	
Ethernet	RJ48C/RJ45 Female (1, 2 or 4 depending on model)
Interface Speed	10/100/1000BaseT (PoE or PoE + ETH2 + ETH3)
Duplex	Half, Full, Auto
Compliance	802.3 with MDIX
VLAN	802.1q, transparent, trunk, and management only
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
Maximum Packet Size	9728 bytes
E1/T1 (xx110 models only)	RJ48C/RJ45 Female (x2)
	<b>E1 (x4)</b> <span style="float: right;"><b>T1 (x4)</b></span>
Impedance	120 ohms, balanced <span style="float: right;">100 ohms, balanced</span>
Line Code	HDB3 <span style="float: right;">AMI, B8ZS, selectable per channel</span>
Data Rate	2.048 Mbps <span style="float: right;">1.544 Mbps</span>
Compliance	CEPT-1; G.703; ITU-T-G.703 <span style="float: right;">ANSI T1.102-1987; ITU-T; G.823; GR-499-CORE</span>
Loopback Modes	Remote Internal; Remote External; Local Line
AC Power Adapter	
Input	100–240 VAC, 2.3 A
Output	130 W, 55 VDC
Operating Temperature	0 to +50 °C; +32 to +122 °F
Warranty	Two years <sup>7</sup>

<sup>1</sup> Consult with your Exalt sales representative for availability.

<sup>2</sup> Not available in all countries by regulation.

<sup>3</sup> ± 1 dB over temperature.

<sup>4</sup> Maximum Layer 1 throughput as measured with 64-byte packets and maximum Layer 2 Ethernet with 1536-byte packets. In both cases throughput includes source address, destination address and CRC overhead.

<sup>5</sup> Software license key option.

<sup>6</sup> Software upgrade required.

<sup>7</sup> Terms and conditions apply. Consult your Exalt sales representative for details.

