



DIGITAL MICROWAVE RADIO

- Swiftly Build Wireless Access Networks over Long Distances and Difficult Terrain
- Evolve Access Strategies for Remote Enterprises and Subscribers
- Leverage Emerging Rural Broadband Opportunities, Realizing Returns and Reducing Capital Expenditure

- Frequency Bands from 330 MHz to 2.7 GHz
- 72 kbit/s to 65 Mbit/s Transport Capacity
- 25 kHz to 14 MHz Channel Sizes
- 16, 32, 64 QAM and QPSK Modulation
- Integrated 4-port Ethernet Switch
- Built-in 8-slot Multiplexer
- Web-server and SNMP Management
- MHSB / HSD Protection Options

APPLICATIONS

The Aprisa XE digital microwave radio is a powerful point-to-point wireless access solution enabling connectivity over challenging radio paths and between two fixed points up to 100 kilometres apart. Our solutions are designed to meet ETSI requirements and provide up to 65 Mbit/s of transport capacity. The Aprisa XE provides robust, carrier-class transmission of a wide-range of broadband enabled services (including Internet, LAN interconnect, VPN, VoIP, video conferencing, and web-hosting) and integrated voice and data services (including remote monitoring and control data, phone, PBX, mobile radio, and fax).

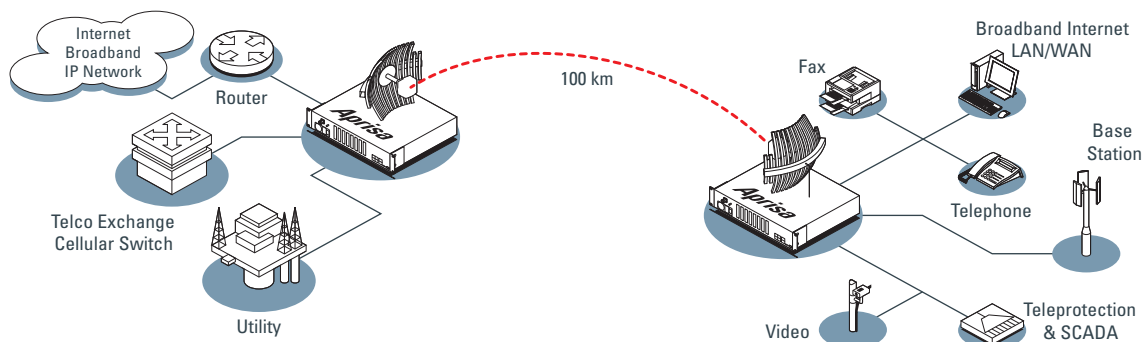
PERFORMANCE

The Aprisa XE radio operates in the sub 3 GHz licensed bands enabling exclusive frequency assignment, minimizing interference and guaranteeing performance. These bands provide highly reliable carrier-class performance over long distances and difficult terrain, particularly water and partly obscured paths. The RF design integrates high-performance digital processing techniques including FEC

(Forward Error Correction), interleaving and a 20-tap transversal adaptive equalizer. These minimize transmission degradation from interference and atmospheric or multipath effects. Sophisticated modulation techniques enable efficient transmission in narrow channels, minimizing spectrum use for situations where that resource may be limited and expensive.

INTEGRATION, CONFIGURATION AND MANAGEMENT

The Aprisa XE features a built-in multiplexer managing data, voice and IP traffic with customer-configurable interfaces enabling straightforward integration with legacy and next-generation network elements. The Aprisa XE may be easily configured using 4RF SuperVisor™ - the embedded web-based element management application. SuperVisor requires no training and runs on any web browser. The Aprisa XE also features a standard SNMP interface for efficient remote management and NMS integration.



GENERAL RF				POWER SUPPLY	
Frequencies ¹	Band	Range	Synthesizer step size	Input range	115 / 230 VAC ±12 VDC (10.5 – 18 VDC) consult 4RF ±24 VDC (20.5 – 30 VDC) ±48 VDC (40 – 60 VDC)
	300 MHz	330 – 400 MHz	6.25 kHz	Power consumption	63 – 180 W (dependant on interface cards fitted and radio TX power)
	400 MHz	400 – 470 MHz	6.25 kHz	OPTIONAL INTERFACES	
	600 MHz	620 – 715 MHz	12.5 kHz	Ethernet	Integrated 4-port 10 / 100Base-T switch with port-based rate limiting, VLAN tagging, and QoS support
	700 MHz	698 – 806 MHz	25.0 kHz	E1 / T1	Quad G.703 / 4 (120 ohm)
	800 MHz	805 – 890 MHz	25.0 kHz	Data	Quad asynchronous V.24 / RS232 Single synchronous X.21 / V.35 / RS449 / RS530
	900 MHz	850 – 960 MHz	25.0 kHz	Analogue	Dual 2 wire FXS / FXO (POTS) Quad 4 wire E&M
	1400 MHz	1350 – 1550 MHz	12.5 kHz	AUXILIARY INTERFACES	
	1800 MHz	1700 – 2000 MHz	62.5 kHz	Alarms	4 external alarm outputs, 2 external alarm inputs
	2000 MHz	1900 – 2300 MHz	62.5 kHz	Configuration	Embedded web server with SNMP
	2500 MHz	2300 – 2700 MHz	62.5 kHz	Management	Ethernet interface for SuperVisor™ and SNMP
Modulation types	16 / 32 / 64 QAM and QPSK, software configurable			RSSI	Front panel test point
Frequency stability	< ± 3 ppm			ENVIRONMENTAL	
Antenna connection	N-type female 50 ohm			Operating	-10 to +50° C
TRANSMITTER				Storage	-20 to +70° C
Power output (in 1 dB steps)	QPSK	300, 400, 600, 700, 800, 900 and 1400 MHz	+21 to +35 dBm	Humidity	Maximum 95 % non-condensing
	QPSK	1800, 2000 and 2500 MHz	+20 to +34 dBm	Altitude	Up to 5000 metres
	16 QAM	All bands	+17 to +31 dBm	MECHANICAL	
	32 QAM	All bands	+16 to +30 dBm	19-inch rack mount	2 U high (internal duplexer) 3 U high (external duplexer)
	64 QAM	All bands	+15 to +29 dBm	Weight	10 kg typical
RECEIVER				PROTECTED OPTIONS	
Maximum input level	-20 dBm			MHSB	≤ 3.5 dB RX splitter loss, ≤ 1.5 dB TX relay loss (system gain reduced by a maximum of 5 dB)
Dynamic range	58 to 87 dB (10 ⁻⁶ BER / 16 QAM)			HSD	< 25 ms TX switching, hitless RX switching
C/I ratio	Co-channel	QPSK	better than 16 dB	COMPLIANCE	
		16 QAM	better than 20 dB	Radio	EN 302 217, EN 301 751, EN 300 630
		32 QAM	better than 23 dB	EMI / EMC	EN 301 489 Parts 1 & 4
		64 QAM	better than 27 dB	Safety	EN 60950
	1st adj. channel		better than -5 dB	Environmental	ETS 300 019 Class 3.2, EN 50385, WEEE
	2nd adj. channel		better than -30 dB		
DUPLEXER (BANDPASS)¹					
Passband	TX / RX split	Bands			
500 kHz	≥ 5 MHz	300, 400 MHz			
2 MHz	≥ 9.45 MHz	300, 400 MHz			
3.5 MHz	≥ 20 MHz	300, 400 MHz			
7 MHz	≥ 30 MHz	700 MHz			
	≥ 45 MHz	600 MHz			
	≥ 40 MHz	800, 900 MHz			
	≥ 48 MHz	1400 MHz			
14 MHz	≥ 119 MHz	1800 MHz			
	≥ 91 MHz	2000 MHz			
	≥ 74 MHz	2500 MHz			

SYSTEM PERFORMANCE							
Channel size		Capacity ⁴				Receiver sensitivity ^{2,5}	System gain ^{2,6}
		QPSK	16 QAM	32 QAM	64 QAM	16 QAM	16 QAM
25 kHz ⁷	Gross	-	72 kbit/s	96 kbit/s	112 kbit/s	-105 dBm	136 dB
	E1 + wayside	-	1 TS + 8 kbit/s	1 TS + 32 kbit/s	1 TS + 48 kbit/s		
50 kHz ⁷	Gross	80 kbit/s	168 kbit/s	208 kbit/s	256 kbit/s	-103 dBm	134 dB
	E1 + wayside	TS + 16 kbit/s	2 TS + 40 kbit/s	3 TS + 16 kbit/s	4 TS + 0 kbit/s		
75 kHz ⁸	Gross	128 kbit/s	264 kbit/s	312 kbit/s	400 kbit/s	-101 dBm	132 dB
	E1 + wayside	2 TS + 0 kbit/s	4 TS + 8 kbit/s	4 TS + 56 kbit/s	6 TS + 16 kbit/s		
150 kHz ⁸	Gross	264 kbit/s	536 kbit/s	672 kbit/s	808 kbit/s	-98 dBm	129 dB
	E1 + wayside	4 TS + 8 kbit/s	8 TS + 24 kbit/s	10 TS + 32 kbit/s	12 TS + 40 kbit/s		
200 kHz ⁹	Gross	336 kbit/s	680 kbit/s	840 kbit/s	1024 kbit/s	-96 dBm	127 dB
	E1 + wayside	5 TS + 16 kbit/s	10 TS + 40 kbit/s	13 TS + 8 kbit/s	16 TS + 0 kbit/s		
250 kHz	Gross	408 kbit/s	824 kbit/s	1032 kbit/s	1240 kbit/s	-95 dBm	126 dB
	E1 + wayside	6 TS + 24 kbit/s	12 TS + 56 kbit/s	16 TS + 8 kbit/s	19 TS + 24 kbit/s		
500 kHz	Gross	792 kbit/s	1592 kbit/s	1992 kbit/s	2392 kbit/s	-93 dBm	124 dB
	E1 + wayside	12 TS + 24 kbit/s	24 TS + 56 kbit/s	31 TS + 8 kbit/s	1 E1s + 304 kbit/s		
1 MHz	Gross	1624 kbit/s	3256 kbit/s	4072 kbit/s	4888 kbit/s	-90 dBm	121 dB
	E1 + wayside	25 TS + 24 kbit/s	1 E1s + 1168 kbit/s	1 E1s + 1984 kbit/s	2 E1s + 712 kbit/s		
1.75 MHz	Gross	2872 kbit/s	5752 kbit/s	7192 kbit/s	8632 kbit/s	-88 dBm	119 dB
	E1 + wayside	1 E1s + 784 kbit/s	2 E1s + 1576 kbit/s	3 E1s + 928 kbit/s	4 E1s + 280 kbit/s		
3.5 MHz	Gross	5720 kbit/s	11448 kbit/s	14312 kbit/s	17176 kbit/s	-84 dBm	115 dB
	E1 + wayside	2 E1s + 1544 kbit/s	5 E1s + 1008 kbit/s	6 E1s + 1784 kbit/s	8 E1s + 472 kbit/s		
7 MHz ¹⁰	Gross	11832 kbit/s	23672 kbit/s	29592 kbit/s	35512 kbit/s	-81 dBm	112 dB
	E1 + wayside	5 E1s + 1392 kbit/s	11 E1s + 704 kbit/s	14 E1s + 360 kbit/s	17 E1s + 16 kbit/s		
14 MHz ¹¹	Gross	23992 kbit/s	47992 kbit/s	59992 kbit/s	65464 kbit/s	-78 dBm	109 dB
	E1 + wayside	11 E1s + 1024 kbit/s	22 E1s + 2056 kbit/s	28 E1s + 1528 kbit/s	28 E1s + 7000 kbit/s		

Specifications are typical unless stated otherwise and are subject to change without notice.

- Contact 4RF for other duplexer and frequency options.
- Performance specified at the antenna port for 10⁻⁶ BER. Figures for 10⁻³ BER are typically 1 dB better.
- E1 capacities specified as unframed.
The management ethernet capacity must be subtracted from the gross capacity (default 64 kbit/s).
- Receiver sensitivities reduce by 3 dB for 32 QAM and 6 dB for 64 QAM.
Receiver sensitivities increase by 6 dB for QPSK.
- System gains reduce by 4 dB for 32 QAM and 8 dB for 64 QAM.
System gains increase by 10 dB for QPSK (9 dB for QPSK in 2000 and 2500 MHz bands).
- Only available in the 300 and 400 MHz bands.
- Only available in the 300, 400, 800, 900 and 1400 MHz bands.
- Only available in the 700, 800 and 900 MHz bands.
- Only available in the 1400, 1800, 2000 and 2500 MHz bands.
- Only available in the 1800, 2000 and 2500 MHz bands.