Aprisa XE

POINT-TO-POINT DIGITAL MICROWAVE LINKS
300 MHz to 2.5 GHz licensed ETSI bands

## ETSI Aprisa XE: maximising spectrum use and making challenging long distance links possible

● **Efficient future-proof single-box architecture**: the Aprisa XE's built-in multiplexer and cross-connect eliminate external equipment and minimise the over-the-air requirements, with customer-configurable interface slots integrating all IP, voice and data traffic. Configuration, performance monitoring and diagnostics are easy with 4RF's embedded web-based element management system, SuperVisor.

● **High capacity**: class-leading spectral efficiency and up to 128 QAM modulation make the maximum use of the available spectrum, with industry leading capacity of up to 65.4 Mbit/s in a 14.0 MHz channel.

● **Long range**: a single Aprisa XE can link distances in excess of 150 km (100 miles), overcoming the problems of water, environmental conditions and topographical obstacles.

● **Carrier-class performance**: Aprisa XE links are engineered to achieve 'five 9s' availability, benefiting from state of the art forward error correction and inherent low latencies, for unrivalled quality of service.

● **Cost effective**: the Aprisa XE has a low total cost of ownership, providing a rapid return on investment by minimising both capital and operational expenditure.

● **Redundancy options**: Monitored Hot Standby and Hitless Space Diversity are available for protection in mission-critical applications.

● **Reliable**: the Aprisa XE has an actual MTBF of 95.72 years, and zero out-of-the-box failures in 2008. It can be relied upon to perform in the harshest and most remote environments.

The Aprisa XE in brief
● 300 MHz, 400 MHz, 600 MHz, 700 MHz, 800 MHz, 900 MHz, 1.4 GHz, 1.8 GHz, 2.0 GHz, 2.5 GHz licensed bands
● Built-in cross-connect and multiplexer
● Up to 65.4 Mbit/s capacity
● 25 kHz, 50 kHz, 75 kHz, 150 kHz, 200 kHz, 250 kHz, 500 kHz, 1.0 MHz, 1.75 MHz, 3.5 MHz, 7.0 MHz and 14.0 MHz channel sizes
● QPSK to 128 QAM modulation
● Range of 150+ km (100+ miles)
● Industry-leading reliability
● Web server and SNMP management
● All voice, data and IP applications
● MHSB and HSD protection options

Future-proof single-box architecture

4RF
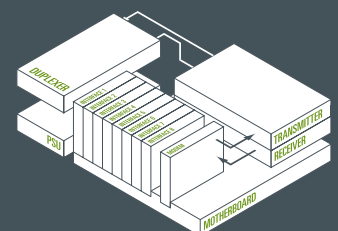
SYSTEM SPECIFICATION

RF	BAND	TUNING RANGE	SYNTHESIZER STEP SIZE
FREQUENCIES	300 MHz	330 – 400 MHz	6.25 kHz
	400 MHz	394 – 460 MHz	5.0 kHz
	400 MHz	400 – 470 MHz	6.25 kHz
	600 MHz	620 – 715 MHz	12.5 kHz
	700 MHz	698 – 806 MHz	12.5 kHz
	800 MHz	805 – 890 MHz	12.5 kHz
	900 MHz	850 – 960 MHz	12.5 kHz
	1400 MHz	1350 – 1550 MHz	12.5 kHz
	1800 MHz	1700 – 2100 MHz	62.5 kHz
	2000 MHz	1900 – 2300 MHz	62.5 kHz
	2500 MHz	2300 – 2700 MHz	62.5 kHz
MODULATION TYPES	Software configurable: QPSK / 16 / 32 / 64 / 128 QAM		
FREQUENCY STABILITY	less than ± 3 ppm		
ANTENNA CONNECTION	N-type female 50 ohm		

TRANSMITTER POWER OUTPUT	300 – 1400 MHz	1800 – 2500 MHz
QPSK	+21 to +35 dBm	+20 to +34 dBm
16 QAM	+17 to +31 dBm	+17 to +31 dBm
32 QAM	+16 to +30 dBm	+16 to +30 dBm
64 QAM	+15 to +29 dBm	+15 to +29 dBm
128 QAM	+15 to +29 dBm	+15 to +29 dBm

RECEIVER			
MAXIMUM INPUT LEVEL	−20 dBm		
DYNAMIC RANGE	58 to 87 dB at 10^{-6} BER		
C/I RATIO	Co-channel	QPSK	better than 16 dB
		16 QAM	better than 20 dB
		32 QAM	better than 23 dB
		64 QAM	better than 27 dB
		128 QAM	better than 30 dB
	First adjacent channel		better than −5 dB
	Second adjacent channel		better than −30 dB

DUPLEXER (bandpass)	TX / RX SPLIT	FREQUENCY BANDS
500 kHz	≥ 5 MHz	300, 400 MHz
2.0 MHz	≥ 9.45 MHz	300, 400 MHz
3.5 MHz	≥ 20 MHz	300, 400 MHz
7.0 MHz	≥ 30 MHz	700 MHz
	≥ 45 MHz	600 MHz
	≥ 40 MHz	800, 900 MHz
	≥ 48 MHz	1400 MHz
14.0 MHz	≥ 47.5 MHz	1800 MHz
	≥ 91 MHz	2000 MHz
	≥ 74 MHz	2500 MHz

POWER SUPPLY	
INPUT RANGE	115 / 230 VAC, 50 / 60 Hz
	±12 VDC (10.5 – 18 VDC), ±24 VDC (20.5 – 30 VDC), ±48 VDC (40 – 60 VDC)
	+12 VDC (10.5 – 18 VDC) Low Power Option
POWER CONSUMPTION	53 – 180 W input power (dependent on interface cards fitted and transmitter output power level)
LOW POWER OPTION (12 VDC)	41 – 53 W input power (dependent on interface cards fitted and transmitter output power level)

INTERFACES	
ETHERNET	Integrated 4-port 10 / 100Base-T switch with port-based rate limiting, VLAN tagging and QoS Support
E1 / T1	Quad 120 ohm G.703 / 4
DATA	Quad asynchronous V.24 / RS-232 Single synchronous X.21 / V.35 / RS-449 / RS-530
ANALOGUE	Dual 2-wire FXS / FXO (POTS); Quad 4-wire E&M

AUXILIARY INTERFACES	
ALARMS	4 external alarm outputs, 2 external alarm inputs
CONFIGURATION	Embedded web server with SNMP
MANAGEMENT	Ethernet interface for SuperVisor and SNMP; V.24 / RS-232 setup port
RSSI	Front panel test point

ENVIRONMENTAL	
OPERATING	−10° C to +50° C (+14° F to +122° F)
STORAGE	−20° C to +70° C (−4° F to +158° F)
HUMIDITY	Maximum 95 % non-condensing

MECHANICAL	
RACK MOUNT	19” 2U high (internal duplexer)
WEIGHT	10 kg (23 lbs) typical

PROTECTED OPTIONS	
MHSB	≤ 4 dB splitter / cable loss, ≤1 dB TX relay / cable loss (system gain reduced by a maximum of 5 dB)
HSD	≤ 1 dB TX relay / cable loss, < 25 ms TX switching / hitless RX switching

COMPLIANCE	
RADIO	EN 302 217
EMI /EMC	EN 301 489 Parts 1 & 4
SAFETY	EN 60950
ENVIRONMENTAL	ETS 300 019 Class 3.2, EN 50385, WEEE

SYSTEM PERFORMANCE

|		QPSK	16 QAM	32 QAM	64 QAM	128 QAM [3]
25 kHz CHANNEL					SUPPORTED IN 300 MHz and 400 MHz bands	
CAPACITY [1]	gross (E1 + wayside)	N/A	72 (1 TS + 8) kbit/s	96 (1 TS + 32) kbit/s	112 (1 TS + 48) kbit/s	136 (2 TS + 8) kbit/s
RECEIVER SENSITIVITY [2]		N/A	−105 dBm	−102 dBm	−99 dBm	−96 dBm
SYSTEM GAIN [2]		N/A	136 dB	132 dB	128 dB	125 dB
50 kHz CHANNEL					SUPPORTED IN 300 MHz and 400 MHz bands	
CAPACITY [1]	gross (E1 + wayside)	80 (1 TS + 16) kbit/s	168 (2 TS + 40) kbit/s	208 (3 TS + 16) kbit/s	256 (4 TS + 0) kbit/s	296 (4 TS + 40) kbit/s
RECEIVER SENSITIVITY [2]		−109 dBm	−103 dBm	−100 dBm	−97 dBm	−94 dBm
SYSTEM GAIN [2]		144 dB	134 dB	130 dB	126 dB	123 dB
75 kHz CHANNEL				SUPPORTED IN 300 MHz, 400 MHz, 800 MHz, 900 MHz and 1400 MHz bands		
CAPACITY [1]	gross (E1 + wayside)	128 (2 TS + 0) kbit/s	264 (4 TS + 8) kbit/s	312 (4 TS +56) kbit/s	400 (6 TS + 16) kbit/s	440 (6 TS + 56) kbit/s
RECEIVER SENSITIVITY [2]		−107 dBm	−101 dBm	−98 dBm	−95 dBm	−92 dBm
SYSTEM GAIN [2]		142 dB	132 dB	128 dB	124 dB	121 dB
150 kHz CHANNEL				SUPPORTED IN 300 MHz, 400 MHz, 800 MHz, 900 MHz and 1400 MHz bands		
CAPACITY [1]	gross (E1 + wayside)	264 (4 TS + 8) kbit/s	536 (8 TS + 24) kbit/s	672 (10 TS + 32) kbit/s	808 (12 TS + 40) kbit/s	944 (14 TS + 48) kbit/s
RECEIVER SENSITIVITY [2]		−104 dBm	−98 dBm	−95 dBm	−92 dBm	−89 dBm
SYSTEM GAIN [2]		139 dB	129 dB	125 dB	121 dB	118 dB
200 kHz CHANNEL				SUPPORTED IN 300 MHz, 400 MHz, 700 MHz, 800 MHz and 900 MHz bands		
CAPACITY [1]	gross (E1 + wayside)	336 (5 TS + 16) kbit/s	680 (10 TS + 40) kbit/s	840 (13 TS + 8) kbit/s	1024 (16 TS + 0) kbit/s	1168 (18 TS + 16) kbit/s
RECEIVER SENSITIVITY [2]		−102 dBm	−96 dBm	−93 dBm	−90 dBm	−87 dBm
SYSTEM GAIN [2]		137 dB	127 dB	123 dB	119 dB	116 dB
250 kHz CHANNEL			SUPPORTED IN 300 MHz, 400 MHz, 700 MHz, 800 MHz, 900 MHz, 1400 MHz, 1800 MHz, 2000 MHz and 2500 MHz bands			
CAPACITY [1]	gross (E1 + wayside)	408 (6 TS + 24) kbit/s	824 (12 TS + 56) kbit/s	1032 (16 TS + 8) kbit/s	1240 (19 TS + 24) kbit/s	1448 (22 TS + 40) kbit/s
RECEIVER SENSITIVITY [2]		−101 dBm	−95 dBm	−92 dBm	−89 dBm	−86 dBm
SYSTEM GAIN [2]		136 dB	126 dB	122 dB	118 dB	115 dB
500 kHz CHANNEL			SUPPORTED IN 300 MHz, 400 MHz, 700 MHz, 800 MHz, 900 MHz, 1400 MHz, 1800 MHz, 2000 MHz and 2500 MHz bands			
CAPACITY [1]	gross (E1 + wayside)	792 (12 TS + 24) kbit/s	1592 (24 TS + 56) kbit/s	1992 (31 TS + 8) kbit/s	2392 (1 E1 + 304) kbit/s	2792 (1 E1 + 704) kbit/s
RECEIVER SENSITIVITY [2]		−99 dBm	−93 dBm	−90 dBm	−87 dBm	−84 dBm
SYSTEM GAIN [2]		134 dB	124 dB	120 dB	116 dB	113 dB
1.0 MHz CHANNEL			SUPPORTED IN 300 MHz, 400 MHz, 700 MHz, 800 MHz, 900 MHz, 1400 MHz, 1800 MHz, 2000 MHz and 2500 MHz bands			
CAPACITY [1]	gross (E1 + wayside)	1624 (25 TS + 24) kbit/s	3256 (1 E1 + 1168) kbit/s	4072 (1 E1 + 1984) kbit/s	4888 (2 E1 + 712) kbit/s	5704 (2 E1 + 1528) kbit/s
RECEIVER SENSITIVITY [2]		−96 dBm	−90 dBm	−87 dBm	−84 dBm	−81 dBm
SYSTEM GAIN [2]		131 dB	121 dB	117 dB	113 dB	110 dB
1.75 MHz CHANNEL			SUPPORTED IN 300 MHz, 400 MHz, 600 MHz, 700 MHz, 800 MHz, 900 MHz, 1400 MHz, 1800 MHz, 2000 MHz and 2500 MHz bands			
CAPACITY [1]	gross (E1 + wayside)	2872 (1 E1 + 784) kbit/s	5752 (2 E1 + 1576) kbit/s	7192 (3 E1 + 928) kbit/s	8632 (4 E1 + 280) kbit/s	10072 (4 E1 + 1720) kbit/s
RECEIVER SENSITIVITY [2]		−94 dBm	−88 dBm	−85 dBm	−82 dBm	−79 dBm
SYSTEM GAIN [2]		129 dB	119 dB	115 dB	111 dB	108 dB
3.5 MHz CHANNEL			SUPPORTED IN 300 MHz, 400 MHz, 600 MHz, 700 MHz, 800 MHz, 900 MHz, 1400 MHz, 1800 MHz, 2000 MHz and 2500 MHz bands			
CAPACITY [1]	gross (E1 + wayside)	5720 (2 E1 + 1544) kbit/s	11448 (5 E1 + 1008) kbit/s	14312 (6 E1 + 1784) kbit/s	17176 (8 E1 + 472) kbit/s	20040 (9 E1 + 1248) kbit/s
RECEIVER SENSITIVITY [2]		−90 dBm	−84 dBm	−81 dBm	−78 dBm	−75 dBm
SYSTEM GAIN [2]		125 dB	115 dB	111 dB	107 dB	104 dB
7.0 MHz CHANNEL					SUPPORTED IN 1400 MHz, 1800 MHz, 2000 MHz and 2500 MHz bands	
CAPACITY [1]	gross (E1 + wayside)	11832 (5 E1 + 1392) kbit/s	23672 (11 E1 + 704) kbit/s	29592 (14 E1 + 360) kbit/s	35512 (17 E1 + 16) kbit/s	41432 (19 E1 + 1760) kbit/s
RECEIVER SENSITIVITY [2]		−87 dBm	−81 dBm	−78 dBm	−75 dBm	−72 dBm
SYSTEM GAIN [2]		122 dB	112 dB	108 dB	104 dB	101 dB
14.0 MHz CHANNEL					SUPPORTED IN 1800 MHz, 2000 MHz and 2500 MHz bands	
CAPACITY [1]	gross (E1 + wayside)	23992 (11 E1 + 1024) kbit/s	47992 (22 E1 + 2056) kbit/s	59992 (28 E1 + 1528) kbit/s	65464 (28 E1 + 7000) kbit/s	65400 (28 E1 + 6936) kbit/s
RECEIVER SENSITIVITY [2]		−84 dBm	−78 dBm	−75 dBm	−72 dBm	−69 dBm
SYSTEM GAIN [2]		119 dB	109 dB	105 dB	101 dB	98 dB

NOTES

1 E1 capacities are specified as unframed. The management Ethernet capacity must be subtracted from the gross capacity (default 64 kbit/s).

2 Performance specified at the antenna port for 10^{-6} BER. Figures for 10^{-3} BER are typically 1 dB better.

3 Unreleased: Please contact 4RF for availability.

WHEN YOUR CONNECTIVITY REQUIREMENTS ARE DEMANDING...

Customers in over 110 countries have chosen 4RF, not just because of the unbeatable value and performance of our products, but also because they know they can rely on our comprehensive range of network planning, equipment installation and support services.
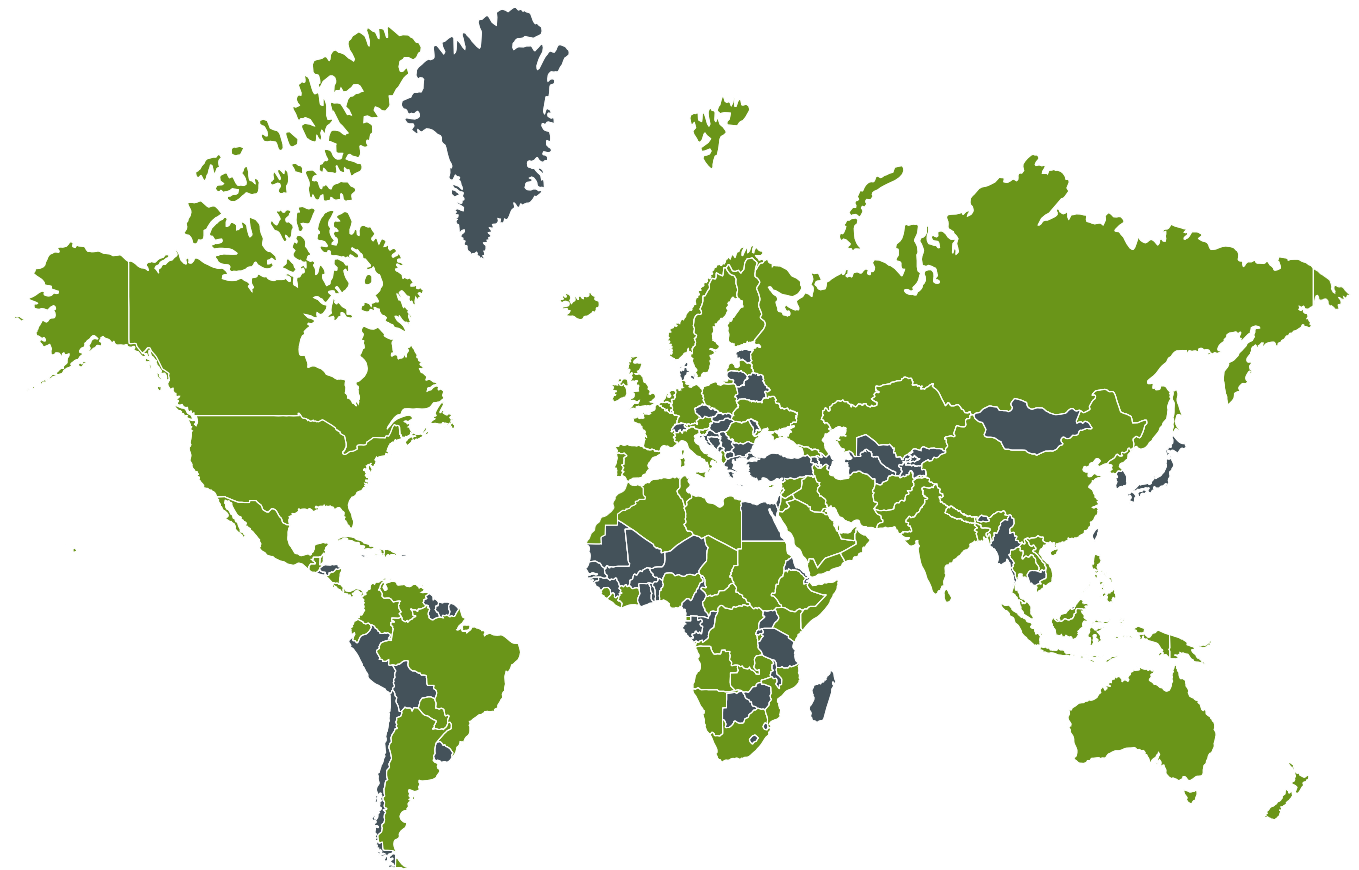
...DEMAND 4RF COMMUNICATIONS

Combining a low total cost of ownership with unbeatable performance, 4RF delivers a solution that is significantly cheaper than copper wire or fibre deployment and provides considerable technical and cost benefits over satellite and high frequency microwave links.

Utilities, oil and gas companies, international aid and peacekeeping organisations, transport operators, broadcasters, enterprises, and all types of fixed and wireless telecoms operators all use 4RF's products. The applications are limitless, including remote monitoring and control, transmitter and base station linking and backhaul for mobile radio networks, and all types of fixed and mobile telecoms networks.

All 4RF products are optimised for performance in harsh climates and difficult terrain, and support legacy analogue, serial data, PDH and IP applications.

4RF

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