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Aprisa FE

Secure, narrow channel, point-to-point Ethernet radio
FCC / IC licensed bands

Aprisa FE: Smart, cost effective, narrow channel, point-to-point Ethernet radio for low capacity linking and backhaul of DMR and industrial monitoring and control

New technologies, such as digital land mobile radio, need IP connectivity while cyber security concerns are driving the need for protected operation as standard even in low end applications. Aprisa FE introduces cost effective, secure IP over Ethernet linking, while utilising the industry proven VHF, UHF and 900 MHz licensed bands – the mainstay for lower capacity linking and backhaul for public safety, transport and utility industries globally.

- **High capacity:** delivering an industry leading combination of capacity and distance the Aprisa FE provides data rates of up to 216 kbit/s in 50 kHz licensed channels.

- **Advanced IP connectivity:** selectable L2 Bridge or L3 Router modes, with VLAN, QoS and filtering attributes to support narrow bandwidth channels and mission critical traffic while meeting increasing security and IP network policy requirements.

- **Secure:** with its defence in depth approach, including AES encryption, authentication, L2 / L3 address filtering and L4 port application filtering and user access control, the Aprisa FE protects against vulnerabilities and malicious attacks.

- **Link efficiency:** adaptive modulation and forward error correction maintains the integrity of the wireless connection to ensure maximum capacity delivered continuously under varying atmospheric conditions.

- **Reliable and robust:** incorporating 4RF standard distance engineering RF design techniques, Aprisa FE maintains its high power output and performance over a wide temperature range without de-rating, delivering robust performance and long term reliability.

- **Easily managed:** an easy to use GUI supports full management of both local and remote terminals via HTTPS, and SNMP support allows network-wide monitoring and control via a third party network management system.

The Aprisa FE in brief

- Licensed narrow channel point-to-point Ethernet radio
- VHF, UHF, 900 MHz licensed bands
- Ethernet – 4 port Layer 2 and 3
- Software selectable 12.5 kHz, 25 kHz, 50 kHz channel sizes
- Gross data rates up to 216 kbit/s
- Full duplex operation
- Internal and external pass band duplexer options
- 256, 192 or 128 bit AES encryption
- Adaptive coding modulation: QPSK to 64 QAM
- Advanced forward error correction
- Dedicated alarm port
- −40 to +60 °C operational temperature
- 434 mm (W) x 295 mm (D) x 44.45 mm (H) (dependent on duplexer type)
- FCC and IC standards compliant

Aprisa FE applications

Low cost, low capacity, digital mobile radio base station backhaul:

- Mid-tier public safety, first responders
- Taxis, buses and public transport
- Construction, mining and utility service vehicles
- Backhaul for third party RoIP (radio over IP linking) legacy analog adapters
- ETSI DMR, Motorola MOTOTRBO™ IP Site Connect systems, TaitNet™ DMR, NXDN™ Conventional IP link applications

Remote control, monitoring and site security applications throughout a range of public safety, critical infrastructure and utility industries:

- SCADA point-to-multipoint radio base station to master station linking
- AMI / AMR high density data concentrator backhaul
- Renewables monitoring and disconnect
- Traffic management and electronic sign telemetry
- Agriculture and weather station linking
- Site security alarms, tower management, remote transmitter shutdown
- Low-rate high resolution CCTV and automatic number plate reader backhaul (ANPR)

Motorola and MOTOTRBO are trademarks of Motorola Solutions, Inc
Tait and TaitNet are trademarks of Tait Ltd
NXDN is a trademark of Icom Incorporated and JVC KENWOOD Corporation

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SYSTEM SPECIFICATION

GENERAL

NETWORK TOPOLOGY	Point-to-point
NETWORK INTEGRATION	Ethernet

PROTOCOLS

ETHERNET	IEEE 802.3, 802.1Q, 802.1p
WIRELESS	Proprietary

RADIO

	FREQ BAND	TUNING RANGE	TUNE STEP
FREQUENCY RANGE	900 MHz	890 – 960 MHz	6.25 kHz
	400 MHz	400 – 470 MHz	6.25 kHz
	300 MHz	320 – 400 MHz	6.25 kHz
(Note 5)	135 MHz	135 – 175 MHz	3.125 kHz
CHANNEL SIZE	12.5 kHz, 25 kHz, 50 kHz software selectable		
DUPLEX	Dual frequency full-duplex		
FREQUENCY STABILITY	± 1.0 ppm		
FREQUENCY AGING	< 1 ppm / annum		

TRANSMITTER

AVERAGE POWER OUTPUT (Note 1)	64 QAM 0.01 – 1.6 W (+10 to +32 dBm, in 1 dB steps)
	16 QAM 0.01 – 2.0 W (+10 to +33 dBm, in 1 dB steps)
	QPSK 0.01 – 3.2 W (+10 to +35 dBm, in 1 dB steps)
ADJACENT CHANNEL POWER	< −60 dBc
TRANSIENT ADJACENT CHANNEL POWER	< −60 dBc
SPURIOUS EMISSIONS	< −37 dBm

RECEIVER

		12.5 kHz	25 kHz	50 kHz
SENSITIVITY (BER < 10^{-6})	max coded 64 QAM	−101 dBm	−97 dBm	−94 dBm
	max coded 16 QAM	−108 dBm	−105 dBm	−102 dBm
	max coded QPSK	−113 dBm	−110 dBm	−107 dBm
ADJACENT CHANNEL SELECTIVITY		> −45 dBm	> −35 dBm	> −35 dBm
	(Note 2)	[> 48 dB]	[> 58 dB]	[> 58 dB]
CO-CHANNEL REJECTION max coded QPSK	> −10 dB			
CO-CHANNEL REJECTION max coded 64 QAM	> −20 dB			
INTERMODULATION RESPONSE REJECTION	> −33 dBm [> 60 dB Note 2]			
BLOCKING OR DESENSITISATION	> −15 dBm [> 78 dB Note 2]			
SPURIOUS RESPONSE REJECTION	> −30 dBm [> 63 dB Note 2]			

MODEM

		12.5 kHz	25 kHz	50 kHz
GROSS DATA RATE (Note 3)	64 QAM	54 kbit/s	102 kbit/s	216 kbit/s
	16 QAM	36 kbit/s	68 kbit/s	144 kbit/s
	QPSK	18 kbit/s	34 kbit/s	72 kbit/s
FORWARD ERROR CORRECTION	Concatenated Reed Solomon plus variable coding rate convolutional code			
ADAPTIVE BURST SUPPORT	Adaptive FEC Adaptive modulation			

DUPLEXER

	MOUNTING	PASS BAND	TX / RX SPLIT	FREQUENCY BANDS
	External	0.5 MHz	≥ 4.6 MHz	135 MHz
	Internal / External (1U)	0.5 MHz	≥ 5.0 MHz	300, 400 MHz
	Internal / External (1U)	2.0 MHz	≥ 9.45 MHz	300, 400 MHz
	Internal	1.0 MHz	≥ 9.0 MHz	900 MHz
	External (2U)	0.5 MHz	≥ 3.6 MHz	900 MHz

SECURITY

DATA ENCRYPTION	256, 192 or 128 bit AES
DATA AUTHENTICATION	CCM

INTERFACES

ETHERNET	4 port RJ45 10/100Base-T switch
MANAGEMENT	1 x USB micro type B (device port) 1 x USB standard type A (host port) 1 x Alarm port RJ45
ANTENNA	1 x N-type Female 50 ohm
LEDs	Status: OK, MODE, AUX, TX, RX Diagnostics: RSSI, traffic port status
RSSI BUTTON	Toggles LEDs between RSSI test / product status

POWER

INPUT VOLTAGE	10 – 30 VDC (13.8 V nominal)
RECEIVE	< 6 W, Full Ethernet activity < 4.5 W, No Ethernet activity
TRANSMIT	< 35 W

MECHANICAL

DIMENSIONS	434 mm (W) x 295 mm (D) x 44.45 mm (H) 17.1″ (W) x 11.6″ (D) x 1.75″ (H)
WEIGHT	5.0 kg (11.3 lbs) (dependant on duplexer type)
MOUNTING	Rack mount 19″ 1U high (internal duplexer)

ENVIRONMENTAL

OPERATING TEMPERATURE	−40 to +60 ℃ (−40 to +140 ℉)
HUMIDITY	Maximum 95 % non-condensing

MANAGEMENT & DIAGNOSTICS

LOCAL ELEMENT	Web server with full control / diagnostics Partial diagnostics via LEDs and test button Software upgrade from PC or USB flash drive
REMOTE ELEMENT	Over-the-air remote element management with control / diagnostics
NETWORK	SNMPv2 and SNMPv3 security support for integration with external network management systems

COMPLIANCE

RF	FCC CFR47 Part 90, Part 101 RSS 119
EMC	FCC CFR 47 Part 15 ICES-003 IEEE 1613 (Note 4)
SAFETY	EN 60950
ENVIRONMENTAL	ETS 300 019 Class 3.4

Notes:

1. The Peak Envelope Power (PEP) at maximum set power level is +39 dBm.
2. The receiver figures are shown in typical fixed interference dBm values and dB values [in brackets] relative to the sensitivity. Relative values are given for QPSK modulation and max coded FEC. Refer to the Aprisa FE User Manual for a complete list of modulation and coding levels.
   Blocking (desensitisation), intermodulation, spurious response rejection, and adjacent channel selectivity values determined according to the methods introduced in V1.7.1 of ETSI standards EN 300 113-1.
3. Minor optimization of data rates is required to meet additional FCC / IC compliance requirements (see Aprisa FE User Manual RF specifications).
4. The Aprisa FE has been successfully evaluated against the requirements of IEEE 1613 for class 1 performance criteria.
5. Please consult 4RF for availability.

ABOUT 4RF

Operating in more than 130 countries, 4RF provides radio communications equipment for critical infrastructure applications. Customers include utilities, oil and gas companies, transport companies, telecommunications operators, international aid organisations, public safety, military and security organisations. 4RF point-to-point and point-to-multipoint products are optimized for performance in harsh climates and difficult terrain, supporting IP, legacy analogue, serial data and PDH applications.

4RF

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