

UTILITY-GRADE UNLICENSED NOW DOUBLE STRENGTH

915-928 MHz Industrial Licence Free Spread Spectrum



Utility-grade unlicensed radio for Aprisa edge-of-network extension and other field area network applications up to 100 km

The Aprisa SRi is a licence free 915-928 MHz ACMA / RSM AS/NZS 4268 radio with unprecedented flexibility and security. Now with the Aprisa SRi Modem 2 software update.

- Secure: with its defense in depth approach including AES encryption, authentication, address filtering
 and user access control, the Aprisa SRi protects against malicious attacks and consumer-grade wireless
 vulnerabilities.
- Flexible hopping channel and zone arrangements: full band and reduced non-overlapping zone
 options allow a tailored approach to interference mitigation. Unique combination of advanced forward
 error correction (FEC) with packet synchronized selective ARQ combats interference. Time-sliced fast hop
 and advanced access control MAC delivers more usable throughput and reduced latency.
- Future-proof: the Aprisa SRi supports dual serial and dual Ethernet ports in a single, compact form factor, designed to cryptographically secure legacy serial, protect existing device investment, and enable new applications. Old and new application protocols can be run side by side.
- Aprisa SR family: the Aprisa SRi now offers two modes, 100 kHz double strength and the original 50 kHz
 mode. The Aprisa SRi fully integrated with the Aprisa SR family and includes all family features including
 networking, management, and security. Most existing Aprisa SRi users can upgrade to Modem 2 with a
 simple firmware update.
- Advanced L2 / L3 capabilities: selectable L2 bridge, L3 router, or advanced gateway router combination L2/L3 modes with VLAN, QoS, NAT, and filtering attributes to maximize capacity in constrained bandwidth and prioritize mission critical traffic while meeting tough security and IP network policy imperatives.
- Link efficiency: Adaptive Coding and Modulation (ACM) and forward error correction maintains the
 integrity of the wireless connection while an effective channel access scheme and advanced IP routing
 features ensure efficient transfer of data across the Aprisa SRi network.
- Reliable and robust: the Aprisa SRi requires no manual component tuning and maintains its performance over a wide temperature range using full specification industrially rated components and shared Aprisa family heritage.
- Easily managed: an easy to use GUI supports local element management via HTTPS and remote element
 management over the air, and SNMP support allows network-wide monitoring and control via a third party
 network management system.









The Aprisa SRi in brief

- 915–928 MHz band
- RS-232 and IEEE 802.3 protocols
- Software selectable frequency hop sets with black list capability
- Gross data rates up to 320 kbit/s in 50 kHz mode and up to 576 kbit/s in 100 kHz mode
- Half duplex operation
- 256, 192 or 128 bit AES encryption
- Adaptive Coding and Modulation: QPSK to 256 QAM
- Enhanced Noise Rejection Mode enabled by default with programmable receive attenuator option Note 4
- 31 Level Multi-Hop Store & Forward Repeaters
- Software selectable dual / single antenna modes Note 4
- AES-CCM to NIST SP 800-38C
- 1W peak output power
- Advanced FEC, packet synchronized selective ARQ
- Dedicated alarm po
- Protected station and legacy product migration options
- Smart Sleep power option Note 4
- Layer 2 bridge (VLAN aware), layer 3 router, and advanced gateway router combination L2/L3 modes
- VLAN tagging and Q-in-Q
- Flexible QoS priority enforcement by port or traffic type, VLAN, PCP/DSCP, rule including SMAC/DMAC, IP address and IP protocol, and EtherType
- L2 / L3 / L4 filtering
- Substation hardened to IEEE 1613 class 2 and IEC
- 30 kV ESD antenna protection
- Class 1, Division 2 for hazardous protection
 - −40 to +70 °C operational temperature without fans

Aprisa SRi applications

- Electricity grid: distribution automation DA/DFA/DR and Volt/VAR cap banks
- Smart grid: concentrator communications and GPRS replacement
- Renewables: distributed energy DER/DERM for solar and wind farms
- Water and wastewater: flow, level, and pressure modulation
- Oil & Gas: wellhead automation, production metering, lift pump automation

Aprisa SRi typical application deployment

- Relieve capacity constrained unlicensed field area networks
- On site applications: intra-substation 'inside the fence' MV substation automation, water treatment plants, single and multi-well pads
- Tail-end links: Aprisa SR licensed network extensions and secure communications
 - Medium range applications: water catchment management and coalbed methane (CBM) production production





ACMA / RSM 915-928 MHz unlicensed

SYSTEM SPECIFICATION

GENERAL NETWORK TOPOLOGY	Point-to-multipoint (PMP), Base, Remote, Repeater	
NETWORK IDPOLOGY NETWORK INTEGRATION	Serial and Ethernet (router or bridge mode)	
	Serial and Ethernet (router or bridge mode)	
PROTOCOLS	IFFF 002 2 002 14/m/m	
ETHERNET SERIAL	IEEE 802.3, 802.1d/q/p	
SERIAL	Legacy RS-232 transport, Mirrored Bits ®, SLIP and Terminal Server support	
WIRELESS	Proprietary FHSS	
SCADA	Transparent to all common SCADA protocols such as	
	Modbus, IEC 60870-5-101/104, DNP3 or similar	
RADIO		
FREQUENCY BAND	915 – 928 MHz	
CHANNEL SIZE	100 kHz and 50 kHz	
NUMBER OF CHANNELS PER HOP ZONE	25 in 50 kHz mode, 14 in 100 kHz mode	
NUMBER OF STANDARD HOP ZONES	8 (non-overlapping)	
FULL BAND OPTION	200 channels in 50 kHz mode 112 channels in 100 kHz mode	
ZONE / CHANNEL SELECTION	Zone selection list and channel black list	
FREQUENCY STABILITY	± 1.0 ppm	
FREQUENCY AGING	< 1 ppm / annum	
TRANSMITTER		
MAX PEAK ENVELOPE POWER (PEP)	1.0 W (+30 dBm)	
AVERAGE POWER OUTPUT	256 QAM 0.01 - 0.16 W (+10 to +22 dBm, in 1 dB step	
	64 QAM 0.01 – 0.2 W (+10 to +23 dBm, in 1 dB steps	
	16 QAM 0.01 – 0.25 W (+10 to +24 dBm, in 1 dB step	
	QPSK 0.01 – 0.4 W (+10 to +26 dBm, in 1 dB steps	
SPURIOUS EMISSIONS	< –37 dBm	
ATTACK TIME	< 1.5 ms	
RELEASE TIME	< 0.5 ms	
DATA TURNAROUND TIME	< 2 ms	
RECEIVER	100 kHz 50 kHz	
SENSITIVITY (BER < 10 ⁻⁶)	256 QAM —87 dBm —90 dBm	
	64 QAM —93 dBm —96 dBm	
	16 QAM —101 dBm —104 dBm	
	QPSK -106 dBm -109 dBm	
RECEIVER PERFORMANCE		
ADJACENT CHANNEL SELECTIVITY	> –37 dBm	
(Note 1	⁽¹⁾ [> 58 dB]	
CO-CHANNEL REJECTION QPSK	>-10 dB	
CO-CHANNEL REJECTION 256 QAM	> -26 dB	
INTERMODULATION RESPONSE REJECTION	> -35 dBm [> 60 dB Note 1]	
BLOCKING OR DESENSITISATION	> -17 dBm [> 78 dB Note 1]	
SPURIOUS RESPONSE REJECTION	> -32 dBm [> 63 dB Note 1]	
MODEM	100 kHz 50 kHz	
GROSS DATA RATE	256 QAM 576 kbit/s 320 kbit/s	
	64 QAM 432 kbit/s 240 kbit/s	
	16 QAM 288 kbit/s 160 kbit/s	
	QPSK 144 kbit/s 80 kbit/s	
OCCUPIED BANDWIDTH	50 kHz or 100 kHz	
FORWARD ERROR CORRECTION	Variable Reed Solomon plus convolutional code	
ADAPTIVE BURST SUPPORT	Adaptive Coding and Modulation	

No	tes:
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- 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 coded FEC.
- This device must be professionally installed. The installer must adjust the output power to meet AS/NZS 4268 after considering cable loss and antenna gain.
- 3. Modem 2 software available for Hardware Type B and later, 100 kHz channels available only on Type C and later.
- 4. Switchable front-end attenuator, dual antennas, and Smart Sleep available only for Hardware Type D and later.

DATA ENCRYPTION 256, 192 or 128 bit AES DATA AUTHENTICATION CCM CRYPTOGRAPHIC PROTECTION FIPS 140-2 IPSEC Tansparent TIMERFACES ETHERNET 2 ports RJ45 10/1008ase-T switch SERIAL 2 ports RJ45 10/1008ase-T switch SERIAL 2 ports RJ45 RS-232 Additional RS-222 / RS-485 port via USB converter (optional) GPS RECEIVER Support for NMEA GPS receiver with radio coordinates MANAGEMENT 1 x USB micro type B (device port) 1 x USB standard type A (host port) 1 x USB	CECURITY		
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SERIAL 2 ports R145 RS-232 Additional RS-232 / RS-485 port via USB converter (optional) GPS RECEIVER Support for NMEA GPS receiver with radio coordinates MANAGEMENT 1 x USB micro type B (device port) 1 x USB standard type A (host port) 1 x USB micro type B (device port) 1 x USB standard type A (host port) 1 x USB standard type A (host port) 1 x USB standard type A (host port) 1 x USB micro type B (device port) 1 x USB standard type A (host port) 1 x USB micro type B (device port) 1 x USB standard type A (host port) 1 x USB standard type A (host port) 1 x USB standard type A (host port) 1 x USB micro type B (device port) 1 x USB standard type A (host port) 1 x USB standard type A (host port) 1 x USB micro type B (device port) 1 x USB standard type A (host port) 1 x USB micro type B (device port) 1 x USB standard type A (host port) 1 x USB standard type A (host port) 1 x USB standard type A (host port) 1 x USB micro type B (device port) 1 x USB standard type A (host port) 1 x USB micro type B (device port) 1 x USB standard type A (host port) 1 x USB stand			2
Additional RS-232 / RS-485 port via USB converter (optional) GPS RECEIVER Support for NMEA GPS receiver with radio coordinates MANAGEMENT 1 x USB micro type B (device port) 1 x USB standard type A (host port) 1 x USB standard type A (host port) 1 x X alarm port RI45 ANTENNA 2 x TNC 50 ohm female ANT 1 & ANT 2 LEDS Status: OK, MODE, AUX, TX, RX Diagnostics: RSSI, traffic port status TEST BUTTON Toggles LEDs between diagnostics / status PRODUCT OPTIONS (specified at order) PROTECTED STATION OPTION Providing hot-swappable / hot-standby redundant hardware switching (10-60 VDC) POWER INPUT VOLTAGE Radio 10 – 30 VDC negative earth Protected Station 10 – 60 VDC floating RECEIVE 4.5 W (326 mA at 13.8 VDC) in active receive state 2.0 W (145 mA at 13.8 VDC) in lidle receive state 3.0 SW (145 mA at 13.8 VDC) in spep mode 4.0.5 W (366 mA at 13.8 VDC) in spep mode 4.0.6 W (3 mA at 13.8 VDC) in spep mode 5.0 SW (366 mA at 13.8 VDC) in spep mode 10 – 40 W (3 mA at 13.8 VDC) in spep mode 11 SW (1086 mA at 13.8 VDC) MECHANICAL DIMENSIONS Radio 210 mm (W) x 130 mm (D) x 41.5 mm (H) 8.27" (W) x 5.12" (D) x 1.63" (H) 8.27" (W) x 5.12" (D) x 1.63" (H) 9.27" (W) x 5.12" (D) x 1.63" (H) 9.27" (W) x 5.12" (D) x 1.63" (H) 9.27" (W) x 5.12" (D) x 1.63" (H) 9.28" (M) x 5.12" (D) x 1.63" (D) x 41.5 mm (H) 9.28" (M) x 5.12" (D) x 1.63" (D) x 41.5 mm (H) 9.28" (M) x 5.12" (D) x 1.63" (D) x 41.5 mm (H) 9.28" (M) x 5.12" (D) x 41.5 mm (H) 9.28" (M) x 5.12" (D) x 41.5 mm (H) 9.28" (M) x 5.12" (D) x 41.5 mm (H) 9.			
MANAGEMENT 1 x USB micro type B (device port) 1 x USB standard type A (host port) 1 x USB standard type A (host port) 1 x Alarm port RJ45 ANTENNA 2 x TNC 50 ohm Female ANT 1 & ANT 2 LEDS Status: OK, MODE, AUX, TX, RX Diagnostics: RSSI, traffic port status TEST BUTTON PRODUCT OPTIONS (specified at order) PROTECTED STATION OPTION PROVER INPUT VOLTAGE Radio Protected Station Protected Station Protected Station 10 – 60 VDC floating RECEIVE 4.5 W (326 mA at 13.8 VDC) in active receive state 4.0.9 W (145 mA at 13.8 VDC) in sleep mode 4.0.94 W (3 mA at 13.8 VDC) in sleep mode TRANSMIT 4.5 W (1086 mA at 13.8 VDC) MECHANICAL DIMENSIONS Radio 210 mm (W) x 130 mm (D) x 41.5 mm (H) 8.27" (W) x 5.12" (D) x 1.63" (H) WEIGHT 1.25 kg (2.81 lbs) MOUNTING WAIL, Rack or DIN rail ENVIRONMENTAL OPERATING TEMPERATURE 40 to +70"C (-40 to +158 °F) HUMIDITY MANAGEMENT & DIAGNOSTICS REMOTE ELEMENT SSH and HTTP/S web servers with full control / diagnostics was LEDs and test button Software upgrade from PC or USB flash drive SHANDER SHANPEY Security Support for integration with external network management systems OVER THE AIR LOW ALS A 268 EMC FC C C FRAT PART 15.209 SAFETY EN 60950 CIAST 34, Ingress Protection IP51	SERIAL		Additional RS-232 / RS-485 port via USB converter
ANTENNA 2 x TNC 50 ohm female ANT 1 & ANT 2 LEDs Status: OK, MODE, AUX, TX, RX Diagnostics: RSSI, traffic port status TEST BUTTON Toggles LEDs between diagnostics / status PRODUCT OPTIONS (specified at order) PROTECTED STATION OPTION Providing hot-swappable / hot-standby redundant hardware switching (10-60 VDC) POWER INPUT VOLTAGE Radio 10 – 30 VDC negative earth Protected Station 10 – 60 VDC floating RECEIVE < 4.5 W (326 mA at 13.8 VDC) in active receive state < 2.0 W (145 mA at 13.8 VDC) in lide receive state < 2.0 W (145 mA at 13.8 VDC) in smart sleep mode < 0.04 W (3 mA at 13.8 VDC) in smart sleep mode TRANSMIT < 15 W (1086 mA at 13.8 VDC) MECHANICAL DIMENSIONS Radio 210 mm (W) x 130 mm (D) x 41.5 mm (H) 8.2" (W) x 5.12" (D) x 1.63" (H) WEIGHT 1.25 kg (2.81 lbs) MOUNTING Wall, Rack or DIN rail ENVIRONMENTAL OPERATING TEMPERATURE -40 to +70 "C (-40 to +158 "F) HUMIDITY Maximum 95 % non-condensing MANAGEMENT & DIAGNOSTICS LOCAL ELEMENT SHAM MAY SHAM WAS SHAM	GPS RECEIVER		Support for NMEA GPS receiver with radio coordinates
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RECEIVE Radio 10 - 30 VDC negative earth		N OPTION	
Protected Station 10 – 60 VDC floating RECEIVE < 4.5 W (326 mA at 13.8 VDC) in active receive state < 2.0 W (145 mA at 13.8 VDC) in idle receive state < 0.5 W (36 mA at 13.8 VDC) in idle receive state < 0.04 W (3 mA at 13.8 VDC) in sleep mode < 0.04 W (3 mA at 13.8 VDC) in smart sleep mode TRANSMIT < 15 W (1086 mA at 13.8 VDC) MECHANICAL DIMENSIONS Radio 210 mm (W) x 130 mm (D) x 41.5 mm (H) 8.27" (W) x 5.12" (D) x 1.63" (H) Protected Station 434 mm (W) x 372 mm (D) x 88.9 mm (H) 2 RU 17.1" (W) 14.6" (D) 3.5" (H) WEIGHT 1.25 kg (2.81 lbs) MOUNTING Wall, Rack or DIN rail ENVIRONMENTAL OPERATING TEMPERATURE -40 to +70 °C (-40 to +158 °F) HUMIDITY Maximum 95 % non-condensing MANAGEMENT & DIAGNOSTICS LOCAL ELEMENT SSH and HTTP/5 web servers with full control / diagnostics Partial diagnostics via LEDs and test button Software upgrade from PC or USB flash drive SSH and HTTP/5 over-the-air remote element management with control / diagnostics Network software upgrade over-the-air NETWORK SMMPV3 security support for integration with external network management systems OVER THE AIR Low overhead SuperVisor Extended Network Management (EXM) COMPLIANCE RF AS/NZS 4268 EMC FCC CFR47 Part 15.209 Class 1 division 2 for hazardous locations ENVIRONMENTAL ETS 300 019 Class 3.4, Ingress Protection IP51		Padio	10 20 VDC
RECEIVE 4.5 W (326 mA at 13.8 VDC) in active receive state 2.0 W (145 mA at 13.8 VDC) in idle receive state 4.5 W (36 mA at 13.8 VDC) in sleep mode 4.0.4 W (3 mA at 13.8 VDC) in smart sleep mode 7.5 W (1086 mA at 13.8 VDC) 8.2 MECHANICAL DIMENSIONS 8.2 Radio 2.10 mm (W) x 130 mm (D) x 41.5 mm (H) 8.27" (W) x 5.12" (D) x 1.63" (H) Protected Station 434 mm (W) x 372 mm (D) x 88.9 mm (H) 2 RU 17.1" (W) 14.6" (D) 3.5" (H) WEIGHT 1.25 kg (2.81 lbs) MOUNTING Wall, Rack or DIN rail ENVIRONMENTAL OPERATING TEMPERATURE 40 to +70 °C (-40 to +158 °F) HUMIDITY MAXIMUM 95 % non-condensing MANAGEMENT & DIAGNOSTICS LOCAL ELEMENT SSH and HTTP/S web servers with full control / diagnostics via LEDs and test button Software upgrade from PC or USB flash drive SSH and HTTP/S over-the-air remote element management with control / diagnostics Network software upgrade over-the-air NETWORK SNMPv2 and SNMPv3 security support for integration with external network management systems OVER THE AIR Low overhead SuperVisor Extended Network Management (EXM) COMPLIANCE RF AS/NZS 4268 EMC FCC CFR47 Part 15.209 SAFETY EN 60950 Class 1 division 2 for hazardous locations ENVIRONMENTAL ETS 300 019 Class 3.4, Ingress Protection IP51	VOLIAGE		
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ABOUT 4RF

Operating in more than 150 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.

Made in USA from local and imported parts.

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