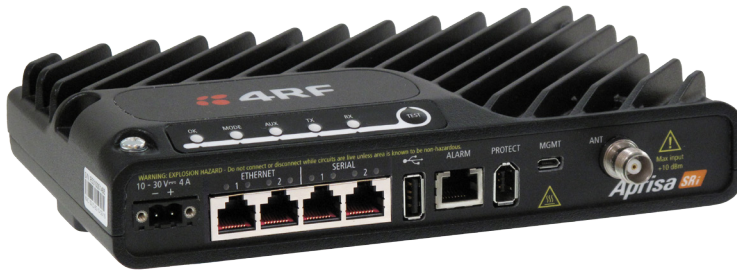


# Aprisa SRi

## UTILITY-GRADE UNLICENSED SCADA

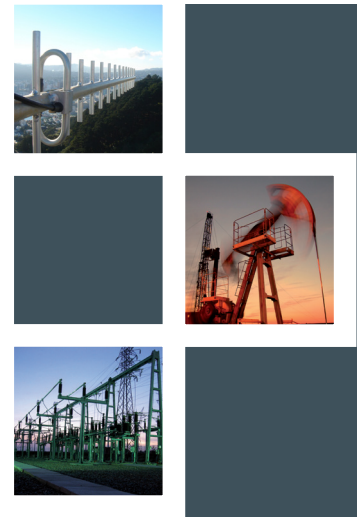
### 915-928 MHz Industrial Licence Free Spread Spectrum



#### Utility-grade unlicensed radio for Aprisa edge-of-network extension and other short-range applications

Based on proven Aprisa technology, the Aprisa SRi is a licence free 915-928 MHz ACMA / RSM AS/NZS 4268 radio with unprecedented flexibility and security.

- **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 is fully integrated with the Aprisa SR family and includes all family features including networking, management, and security. Maximize your experience with reduced training and time to value.
- **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 240 kbit/s
- Half duplex operation
- 256, 192 or 128 bit AES encryption
- Adaptive Coding and Modulation: QPSK to 64 QAM
- AES-CCM to NIST SP 800-38C
- 1W peak output power
- Advanced FEC, packet synchronized selective ARQ
- Dedicated alarm port
- 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
- IEEE 1613 and IEC 61850-3 protection
- 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

- 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 vault communications
- Medium range applications: water catchment management and coalbed methane (CBM) production

**SYSTEM SPECIFICATION**

| GENERAL                               |  |
|---------------------------------------|--|
| NETWORK TOPOLOGY                      | Point-to-multipoint (PMP)  |
| NETWORK INTEGRATION                   | Serial and Ethernet (router or bridge mode)  |
| PROTOCOLS                             |  |
| ETHERNET                              | IEEE 802.3, 802.1d/q/p   |
| SERIAL                                | Legacy RS-232 transport  |
| 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                          | 50 kHz   |
| NUMBER OF CHANNELS PER HOP ZONE       | 25   |
| NUMBER OF STANDARD HOP ZONES          | 8 (non-overlapping)  |
| FULL BAND OPTION                      | 200 channels full band single zone   |
| 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                  | 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 steps)   |
|                                       | 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                              |  |
|                                       | 50 kHz   |
| SENSITIVITY (BER < 10 <sup>-9</sup> ) | 64 QAM –96 dBm   |
|                                       | 16 QAM –104 dBm  |
|                                       | QPSK –109 dBm  |
| RECEIVER PERFORMANCE                  |  |
| ADJACENT CHANNEL SELECTIVITY          | > –37 dBm<br>(Note 1) [> 58 dB]  |
| CO-CHANNEL REJECTION QPSK             | > –10 dB   |
| CO-CHANNEL REJECTION 64 QAM           | > –20 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                                 |  |
| GROSS DATA RATE                       | 64 QAM 240 kbit/s  |
|                                       | 16 QAM 160 kbit/s  |
|                                       | QPSK 80 kbit/s   |
| OCCUPIED BANDWIDTH                    | 50 kHz   |
| FORWARD ERROR CORRECTION              | Variable Reed Solomon plus convolutional code  |
| ADAPTIVE BURST SUPPORT                | Adaptive Coding and Modulation   |

| SECURITY                 |   |
|--------------------------|---|
| DATA ENCRYPTION          | 256, 192 or 128 bit AES   |
| DATA AUTHENTICATION      | CCM   |
| INTERFACES               |   |
| ETHERNET                 | 2 ports RJ45 10/100Base-T switch  |
| SERIAL                   | 2 ports RJ45 RS-232<br>Additional RS-232 / RS-485 port via USB converter (optional)   |
| MANAGEMENT               | 1 x USB micro type B (device port)<br>1 x USB standard type A (host port)<br>1 x Alarm port RJ45  |
| ANTENNA                  | 1 x TNC 50 ohm female   |
| LEDs                     | Status: OK, MODE, AUX, TX, RX<br>Diagnostics: RSSI, traffic port status   |
| TEST BUTTON              | Toggles LEDs between diagnostics / status   |
| POWER                    |   |
| INPUT VOLTAGE            | 10 – 30 VDC (13.8 V nominal)  |
| RECEIVE                  | < 4.5 W   |
| TRANSMIT                 | < 15 W  |
| MECHANICAL               |   |
| DIMENSIONS               | 210 mm (W) x 130 mm (D) x 41.5 mm (H)<br>8.27" (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            | SSH and HTTP/S web servers with full control / diagnostics<br>Partial diagnostics via LEDs and test button<br>Software upgrade from PC or USB flash drive |
| REMOTE ELEMENT           | SSH and HTTP/S over-the-air remote element management with control / diagnostics<br>Network software upgrade over-the-air                                 |
| NETWORK                  | SNMPv2 and SNMPv3 security support for integration with external network management systems   |
| COMPLIANCE               |   |
| RF                       | AS/NZS 4268   |
| EMC                      | FCC CFR47 Part 15.209   |
| SAFETY                   | EN 60950<br>Class 1 division 2 for hazardous locations  |
| ENVIRONMENTAL            | ETS 300 019 Class 3.4, IEEE 1613 Class 2<br>IEC 61850-3, Ingress Protection IP51  |

**Notes:**

- 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 adjusted the output power to meet AS/NZS 4268 after considering cable loss and antenna gain.

**ABOUT 4RF**

Operating in more than 140 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.

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