

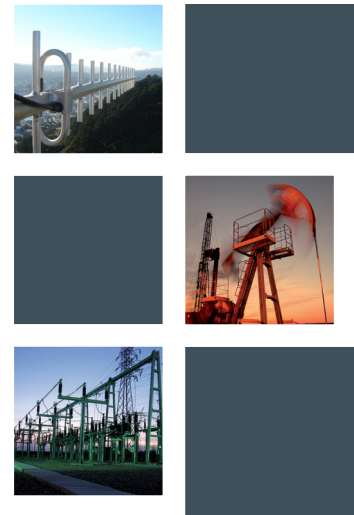
Aprisa SR+

SMART, SECURE POINT-TO-MULTIPOINT RADIO 220 MHz, UHF and 900 MHz licensed bands



Smart, secure, industry-leading speed licensed point-to-multipoint SCADA communications for industrial monitoring and control for the electricity, water, oil and gas industries

- **High capacity:** to meet the growing number of data-intensive applications in the SCADA environment, the Aprisa SR+ provides data rates of up to 216 kbit/s in 50 kHz licensed channels.
- **Secure:** with its defense in depth approach, including AES encryption, authentication, address filtering and user access control, the Aprisa SR+ protects against vulnerabilities and malicious attacks.
- **Future-proof:** the Aprisa SR+ supports multiple serial and Ethernet interfaces in a single, compact form factor, and is standards-based for long term incorporation into SCADA networks while protecting the legacy investment in serial devices.
- **Advanced L2/L3 capabilities:** 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.
- **Adaptable:** the Aprisa SR+ integrates into a range of network topologies, with each unit configurable as a base station, repeater or remote station; connect multiple RTUs / PLCs to a single radio.
- **Flexible interfaces:** the data interfaces can be configured for serial or Ethernet operation; a range of options are supported, including two serial and two Ethernet, one serial and three Ethernet, or four Ethernet ports.
- **Link efficiency:** Adaptive Coding Modulation (ACM) and forward error correction maintains the integrity of the wireless connection while an effective channel access scheme and IP routing ensures efficient transfer of data across the Aprisa SR+ network.
- **Reliable and robust:** the Aprisa SR+ requires no manual component tuning and maintains its high power output and performance over a wide temperature range.
- **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 SR+ in brief

- 220 MHz, UHF and 900 MHz licensed bands
- RS-232 and IEEE 802.3 protocols with multiple port options
- Software selectable 12.5 kHz, 25 kHz and 50 kHz channel sizes
- Full and half duplex operation
- Single or dual frequency
- Gross data rates greater than 200 kbit/s
- 256, 192 or 128 bit AES encryption
- Adaptive coding modulation: QPSK to 64 QAM
- Advanced forward error correction
- Software selectable dual / single antenna port operation
- Transparent to all common SCADA protocols
- Dedicated alarm port
- Protected station option
- Power optimized option
- -40 to +70 °C operational temperature
- 210 mm (W) x 130 mm (D) x 41.5 mm (H)
- FCC and IC standards compliant
- Seamlessly integrates with Aprisa XE point-to-point radio

Aprisa SR+ applications

Applications throughout the electricity grid and renewable energy:

- Smart grid: concentrator communications and GPRS replacement
- AMI / AMR: high density data concentrator backhaul
- Renewables: wind farm, tidal, hydro automation
- Measurement, control and protection in MV / HV distribution / transmission
- Co-generation and community energy storage monitoring and control in distributed storage and generation
- Fibre substitution in substation and feeder automation upgrades

SYSTEM SPECIFICATION

| GENERAL | | | | | | |
|---------------------------------------|---|---|---------------------------|------------|-------------|-------------|
| NETWORK TOPOLOGY | Point-to-multipoint (PMP), Repeater | | | | | |
| 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 | | | | | |
| SCADA | Transparent to all common SCADA protocols such as Modbus, IEC 60870-5-101/104, DNP3 or similar | | | | | |
| RADIO | | | | | | |
| FREQ BAND | TUNING RANGE | TUNE STEP | | | | |
| FREQUENCY RANGE | 220 MHz | 215 – 240 MHz | 3.125 kHz | | | |
| | 220 MHz | 215 – 240 MHz | 2.5 kHz | | | |
| | 400 MHz | 400 – 470 MHz | 6.25 kHz | | | |
| | (Note 7) 450 MHz | 450 – 520 MHz | 6.25 kHz | | | |
| | 896 MHz | 896 – 902 MHz | 6.25 kHz | | | |
| | 928 MHz | 928 – 960 MHz | 6.25 kHz | | | |
| CHANNEL SIZE | 12.5 kHz, 25 kHz and 50 kHz software selectable | | | | | |
| DUPLEX | Single frequency half-duplex Dual frequency half-duplex Dual frequency full-duplex (Note 4) | | | | | |
| FREQUENCY STABILITY | ± 1.0 ppm | | | | | |
| FREQUENCY AGING | < 1 ppm / annum | | | | | |
| TRANSMITTER | | | | | | |
| AVERAGE POWER OUTPUT (Note 1) | 64 QAM | 0.01 – 2.5 W (+10 to +34 dBm, in 1 dB steps) | | | | |
| | 16 QAM | 0.01 – 3.2 W (+10 to +35 dBm, in 1 dB steps) | | | | |
| | QPSK | 0.01 – 5.0 W (+10 to +37 dBm, in 1 dB steps) | | | | |
| | (Note 3) 4-CPFSK | 0.01 – 10.0 W (+10 to +40 dBm, in 1 dB steps) | | | | |
| ADJACENT CHANNEL POWER | < –60 dBc | | | | | |
| TRANSIENT ADJACENT CHANNEL POWER | < –60 dBc | | | | | |
| SPURIOUS EMISSIONS | < –37 dBm | | | | | |
| ATTACK TIME | < 1.5 ms | | | | | |
| RELEASE TIME | < 0.5 ms | | | | | |
| DATA TURNAROUND TIME | < 2 ms | | | | | |
| RECEIVER | 12.5 kHz | 25 kHz | 50 kHz | | | |
| SENSITIVITY (BER < 10 ⁻⁹) | max coded | 64 QAM | –103 dBm | –99 dBm | –96 dBm | |
| | max coded | 16 QAM | –110 dBm | –107 dBm | –104 dBm | |
| | max coded | QPSK | –115 dBm | –112 dBm | –109 dBm | |
| | min coded | 4-CPFSK | –113 dBm | –110 dBm | –107 dBm | |
| ADJACENT CHANNEL SELECTIVITY | | > –47 dBm | > –37 dBm | > –37 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 | > –35 dBm [> 60 dB Note 2] | | | | | |
| BLOCKING OR DESENSITISATION | > –17 dBm [> 78 dB Note 2] | | | | | |
| SPURIOUS RESPONSE REJECTION | > –32 dBm [> 63 dB Note 2] | | | | | |
| MODEM | 135 / 400 / 450 MHz Bands | | 220 / 896 / 928 MHz Bands | | | |
| | 12.5 kHz | 25 kHz | 12.5 kHz (6) | 25 kHz | 50 kHz | |
| GROSS DATA RATE | 64 QAM | 54 kbit/s | 96 kbit/s | 60 kbit/s | 96 kbit/s | 216 kbit/s |
| | 16 QAM | 36 kbit/s | 64 kbit/s | 40 kbit/s | 64 kbit/s | 144 kbit/s |
| | QPSK | 18 kbit/s | 32 kbit/s | 20 kbit/s | 32 kbit/s | 72 kbit/s |
| | 4-CPFSK | 9.6 kbit/s | 19.2 kbit/s | 9.6 kbit/s | 19.2 kbit/s | 38.4 kbit/s |
| OCCUPIED BANDWIDTH | 10.7 kHz | 19.8 kHz | 11.8 kHz | 19.8 kHz | 43.0 kHz | |
| FORWARD ERROR CORRECTION | Variable Reed Solomon plus convolutional code | | | | | |
| ADAPTIVE BURST SUPPORT | Adaptive FEC with Adaptive Coding Modulation | | | | | |

| SECURITY | |
|--------------------------|---|
| DATA ENCRYPTION | 256, 192 or 128 bit AES |
| DATA AUTHENTICATION | CCM |
| INTERFACES | |
| ETHERNET | 2, 3 or 4 port RJ45 10/100Base-T switch (specified at order) |
| SERIAL | 2, 1 or 0 port RJ45 RS-232 (specified at order) Additional RS-232 / RS-485 port via USB converter (optional) |
| MANAGEMENT | 1 x USB micro type B (device port) 1 x USB standard type A (host port) 1 x Alarm port RJ45 |
| ANTENNA | 2 x TNC 50 ohm female Software selectable single or dual port operation |
| LEDs | Status: OK, MODE, AUX, TX, RX Diagnostics: RSSI, traffic port status |
| TEST BUTTON | Toggles LEDs between diagnostics / status |
| PRODUCT OPTIONS | |
| DATA PORT CONFIGURATION | 2 x Ethernet ports + 2 serial ports 3 x Ethernet ports + 1 serial port 4 x Ethernet ports |
| POWER OPTIMIZED | Providing optimized power and sleep mode |
| PROTECTED STATION | Providing hot-swappable / hot-standby redundant hardware switching |
| POWER | |
| INPUT VOLTAGE | 10 – 30 VDC (13.8 V nominal) |
| RECEIVE | STANDARD < 7 W |
| | POWER OPTIMIZED < 3 W in active receive state < 2 W in idle receive state, < 0.5 W in sleep mode |
| TRANSMIT | < 35 W |
| MECHANICAL | |
| DIMENSIONS | 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 | 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 | 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 software upgrade over-the-air |
| NETWORK | SNMPv2 and SNMPv3 security support for integration with external network management systems |
| COMPLIANCE | |
| RF | FCC CFR47 Part 24 / 90 / 101, IC RSS 119 / RSS 134 FCC IDs UIPSQ400M131, UIPSQ450M140 IC ID 6772A-SQ400M131 |
| EMC | FCC CFR47 Part 15, EN 301 489 Parts 1 & 4, ICES-003 IEEE 1613 (Note 5) |
| SAFETY | EN 60950 Class 1 div 2 for hazardous locations |
| ENVIRONMENTAL | ETS 300 019 Class 3.4 Ingress Protection code IP51 |

Notes:

- The Peak Envelope Power (PEP) at maximum set power level is +41 dBm.
- 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 SR+ User Manual for a complete list of modulation and coding levels.
- Please consult 4RF for availability.
- Full duplex channel access for point to multi-point available in a future software release.
- The Aprisa SR+ has been successfully evaluated against the requirements of IEEE 1613 for class 1 performance criteria.
- The gross data rate for the 12.5 kHz channel size in the 896 / 928 MHz bands varies with regulatory compliance.
- The 450 MHz band is only available for FCC.

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.

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