



**AUTOMATION  
GROUP**

## APRISA SR+

### SECURE POINT-TO-MULTIPOINT RADIO

#### THE APRISA SR+ IN BRIEF

- VHF and UHF licensed bands
- RS-232 and IEEE 802.3 protocol with multiple port options
- Software selectable 12.5 kHz, 25 kHz, 50 kHz channel sizes
- Full and half duplex operation
- Single or dual frequency
- Gross data rates up to 120 kbit/s in a 25 kHz channel and 240 kbit/s in a 50 kHz channel
- 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
- -40 to +70 C operational temperature
- 210 mm (W) x 130 mm (D) x 41.5 mm (H)
- ETSI standards compliant
- Seamlessly integrates with Aprisa XE point-to-point radio



Aprisa SR+: smart, secure, industry-leading speed, licensed, point-to-multipoint SCADA communications for industrial monitoring and control in 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 120 kbit/s in 25 kHz licensed channels and 240 kbit/s in 50 kHz licensed channels.
- Secure: with its defence 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.
- 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.



# APRISA SR+ TECHNICAL SPECIFICATIONS

## 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 user traffic; eg. Modbus, IEC 60870-5-101/10-DNP3 or similar |

## RADIO

|                                     | FREQ BAND  | TUNING RANGE | TUNE STEP |
|-------------------------------------|--|--------------|-----------|
| Frequency Range <sup>(Note 3)</sup> | 135 MHz  | 135-175 MHz  | 3.125 kHz |
|                                     | 400 MHz  | 400-470 MHz  | 6.25kHz   |
|                                     | 450 MHz  | 450-520 MHz  | 6.25kHz   |
| Channel Size                        | 12.5kHz, 25kHz and 50kHz <sup>(Note 5)</sup> software selectable   |              |           |
| Duplex                              | Single frequency half-duplex<br>Dual frequency half-duplex<br>Dual frequency full-duplex <sup>(Note 4)</sup> |              |           |

|                     |              |
|---------------------|--------------|
| Frequency Stability | ±1.0 ppm     |
| Frequency Aging     | <1 ppm/annum |

## TRANSMITTER

|  |   |  |  |
|--|---|--|--|
| Average Power output <sup>(Note 1)</sup> | 64 QAM 0.01-2.5W (+10 to + 34 dBm, in 1 dB steps)<br>16 QAM 0.01-3.2W (+10 to + 35 dBm, in 1 dB steps)<br>QPSK 0.01-5.0W (+10 to + 37 dBm, in 1 dB steps) |  |  |
| Adjacent Channel Power                   | < -60 dBc   |  |  |
| Transient Adjacent Channel Power         | < -60dBc  |  |  |
| Spurious Emissions                       | < -37 dBm   |  |  |
| Attack Time                              | < 1.5 ms  |  |  |
| Release Time                             | < 0.5 ms  |  |  |
| Data Turnaround Time                     | < 2 ms  |  |  |

## RECEIVER

|                                       |                                     | 12.5 kHz           | 25kHz            | 50kHz <sup>(5)</sup> |          |
|---------------------------------------|-------------------------------------|--------------------|------------------|----------------------|----------|
| Sensitivity (ber < 10 <sup>-5</sup> ) | 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 |
| Adjacent Channel Selectivity          | NOTE 2                              | >-47 dBm (> 48 dB) | >-37 dBm (>58dB) | >-37dBm (> 58 dB)    |          |
| Co-Channel Rejection max coded QPSK   | >-10dB                              |                    |                  |                      |          |
| Co-Channel Rejection max coded 64 QAM | >-20 dB                             |                    |                  |                      |          |
| Intermodulation Response Rejection    | >-35 dBm (>60 dB <sup>NOTE 2)</sup> |                    |                  |                      |          |
| Blocking or Desensitisation           | >-17 dBm (>78 dB <sup>NOTE 2)</sup> |                    |                  |                      |          |
| Spurious Response Rejection           | >-32 dBm (>63 dB <sup>NOTE 2)</sup> |                    |                  |                      |          |

## MODEM

|                          |   | 12.5 kHz  | 25kHz      | 50kHz <sup>(5)</sup> |
|--------------------------|---|-----------|------------|----------------------|
| Gross Data Rate          | 64 QAM  | 60 kbit/s | 120 kbit/s | 240 kbit/s           |
|                          | 16 QAM  | 40 kbit/s | 80 kbit/s  | 160 kbit/s           |
|                          | QPSK  | 20 kbit/s | 40 kbit/s  | 80 kbit/s            |
| Forward error correction | Variable length concatenated Reed Solomon plus convolutional code |           |            |                      |
| Adaptive burst support   | Adaptive FEC<br>Adaptive Coding Modulation                        |           |            |                      |

### 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 more information.
- Please consult 4RF for availability.
- Full duplex channel access for point to multi-point available in a future software release.
- Available in the 320 MHz band in Austria.
- The Aprisa SR+ has been successfully evaluated against the requirements of IEEE 1613 for class 1 performance criteria.

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## SECURITY

|                     |                        |
|---------------------|------------------------|
| Data Encryption     | 256,192 or 128 bit AES |
| Data Authentication | CCM                    |

## INTERFACES

|             |  |
|-------------|--|
| Ethernet    | 2,3 or 4 port RJ45 10/100 Base-T switch (specified at order)   |
| Serial      | 2,1 or 0 port RJ45 RS-232 (specified at order)<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             |
| LEDs        | Status: OK, Mode, AUX, TX, RX<br>Diagnostics: Rssl, Traffic port status                                      |
| Test Button | Toggles LEDs between diagnostics/status  |
| Antenna     | 2xTNC 50 ohm femal<br>Software selectable single or dual port operation                                      |

## PRODUCT OPTIONS

|                         |   |
|-------------------------|---|
| Data Port Configuration | Ethernet / Serial combinations: 4+0, 3+1, 2+2 |
| Protected Station       | Providing redundant hardware switching        |

## POWER

|                    |                             |
|--------------------|-----------------------------|
| Input Voltage      | 10 - 30 VDC (13.8V nominal) |
| Receive / Transmit | < 7 W / < 35 W              |

## MECHANICAL

|            |                                 |
|------------|---------------------------------|
| Dimensions | 210mm(W) x 130mm(D) x 41.5mm(H) |
| Weight     | 1.25kg                          |
| Mounting   | Wall, Rack or DIN rail          |

## ENVIRONMENTAL

|                       |   |
|-----------------------|---|
| Operating Temperature | -40 to +70°C, Humidity Maximum 95% non-condensing |
|-----------------------|---|

## MANAGEMENT & DIAGNOSTICS

|                |   |
|----------------|---|
| Local Element  | Web server with full control /diagnostic partial diagnostics via LEDs and test button software upgrade from PC or USB flash drive |
| Remote Element | Over-the-air remote 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            | EN 300 113  |
| EMC           | EN 301 489 Parts 1 and 5, IEEE 1613 <sup>NOTE 6</sup> |
| Safety        | EN 60950, Class 1 div 2 for hazardous locations       |
| Environmental | ETS 300 019 Class 3.4, Ingress Protection code IP51   |



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