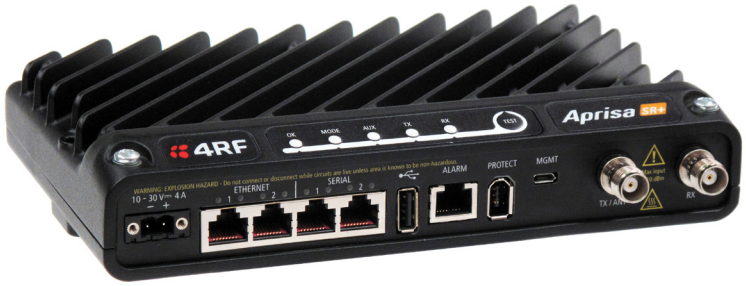
Aprisa SR+

SMART, SECURE POINT-TO-MULTIPOINT RADIO

VHF, 220 MHz, and UHF 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 120 kbit/s in 25 kHz licensed channels and 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 including RADIUS, 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 micro-firewall filtering 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. Support for NMEA GPS receiver option.
- **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 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 variety of supported third party network management systems.

The Aprisa SR+ in brief

- VHF, 220 MHz, and UHF licensed bands
- RS-232 and IEEE 802.3 protocols with multiple port options
- Software selectable 12.5 kHz, 20 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 216 kbit/s in a 50 kHz channel
- 256, 192 or 128 bit AES encryption
- Adaptive Coding and 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 base station and remote station options
- Power optimized option
- Radio GPS coordinates
- –40 to +70 °C operational temperature
- 210 mm (W) x 130 mm (D) x 41.5 mm (H)
- RED compliant
- Seamlessly integrates with Aprisa XE point-to-point radio

Aprisa SR+ applications

- Electricity grid: distribution automation control and protection in MV / HV distribution / transmission
- Smart grid: concentrator communications and GPRS replacement
- Oil & Gas: production metering, lift pump automation
- Renewables: wind farm, tidal, hydro automation
- Water and wastewater: flow, level, pressure modulation automation and pump status

4RF

SYSTEM SPECIFICATION

GENERAL	
NETWORK TOPOLOGY	Point-to-multipoint (PMP), Base, Remote, 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; e.g. Modbus, IEC 60870-5-101/104, DNP3 or similar

RADIO		FREQ BAND	TUNING RANGE	TUNE STEP
FREQUENCY RANGE		135 MHz	135 – 175 MHz	0.625 kHz
	(Note 2)	220 MHz	215 – 240 MHz	0.625 kHz
		320 MHz	320 – 400 MHz	6.25 kHz
		400 MHz	400 – 470 MHz	6.25 kHz
		450 MHz	450 – 520 MHz	6.25 kHz
CHANNEL SIZE		12.5 kHz, 20 kHz, 25 kHz and 50 kHz software selectable		
DUPLEX		Single frequency half-duplex Dual frequency half-duplex Dual frequency full-duplex		
FREQUENCY STABILITY		± 0.5 ppm		
FREQUENCY AGING		< 1 ppm / annum		

TRANSMITTER		
MAX PEAK ENVELOPE POWER (PEP)		10.0 W (+40 dBm)
AVERAGE POWER OUTPUT	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 2) 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
EMISSION DESIGNATOR SUFFIX		QPSK G1D, QAM D1D

RECEIVER			12.5 kHz	20 kHz	25 kHz	50 kHz
SENSITIVITY (BER < 10^{-6})	max coded	64 QAM	–103 dBm	–99 dBm	–99 dBm	–96 dBm
	max coded	16 QAM	–110 dBm	–107 dBm	–107 dBm	–104 dBm
	max coded	QPSK	–115 dBm	–112 dBm	–112 dBm	–109 dBm
	min coded	4-CPFSK	–113 dBm	–110 dBm	–110 dBm	–107 dBm
ADJACENT CHANNEL SELECTIVITY			> –47 dBm	> –37 dBm	> –37 dBm	> –37 dBm
		(Note 1)	[> 48 dB]	[> 58 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 1]				
BLOCKING OR DESENSITISATION		> –17 dBm [> 78 dB Note 1]				
SPURIOUS RESPONSE REJECTION		> –32 dBm [> 63 dB Note 1]				

MODEM		12.5 kHz	20 kHz	25 kHz	50 kHz
GROSS DATA RATE	64 QAM	60 kbit/s	84 kbit/s	120 kbit/s	216 kbit/s
	16 QAM	40 kbit/s	56 kbit/s	80 kbit/s	144 kbit/s
	QPSK	20 kbit/s	28 kbit/s	40 kbit/s	72 kbit/s
	4-CPFSK	9.6 kbit/s	9.6 kbit/s	19.2 kbit/s	38.4 kbit/s
FORWARD ERROR CORRECTION	Variable length concatenated 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, 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 (13.8 VDC or 48 VDC)
GPS RECEIVER	Support for NMEA GPS receiver with radio coordinates

POWER		
INPUT VOLTAGE		10 – 30 VDC (13.8 V nominal)
RECEIVE	All bands except 320 MHz	< 3 W in active receive state
		< 2 W in idle receive state, < 0.5 W in sleep mode
	320 MHz	< 7 W
TRANSMIT	135 and 220 MHz	< 26 W
	400 and 450 MHz	< 28 W
	320 MHz	< 35 W

MECHANICAL	
DIMENSIONS	210 mm (W) x 130 mm (D) x 41.5 mm (H)
WEIGHT	1.25 kg
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 / 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	12.5 kHz	EN 300 113
	25 kHz and 50 kHz	EN 302 561
EMC		EN 301 489-1 and 5
SAFETY		EN 60950 Class 1 division 2 for hazardous locations
ENVIRONMENTAL		ETS 300 019 Class 3.4, IEEE 1613 Class 2 IEC 61850-3, Ingress Protection IP51

Notes:

1. 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.
2. Please consult 4RF for availability.

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.

4RF

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