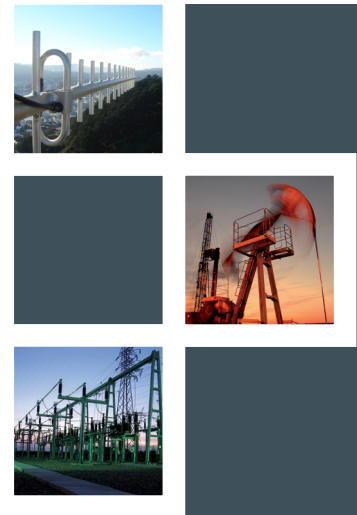# Aprisa SR

SMART, SECURE POINT-TO-MULTIPOINT RADIO
FCC and IC licensed bands

Aprisa SR: smart, secure, point-to-multipoint SCADA communications for oil, gas and utility monitoring and control

- **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 serial, Ethernet and IP 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.

- **Efficient**: the ability to configure detailed radio parameters means that network performance and efficiency can be optimized for the exact network topology, however complex.

- **Flexible**: the Aprisa SR integrates into a range of network topologies, with each unit configurable as a base station, repeater or remote unit.

- **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.

- **Reliable and robust**: the Aprisa SR requires no manual component tuning and maintains its high power output and performance over a wide temperature range.

The Aprisa SR in brief
- FCC and IC licensed bands
- RS-232 and IEEE 802.3 protocols
- Software selectable 12.5 kHz, 25 kHz and 50 kHz channel sizes
- Single or dual frequency
- Gross data rate of 72 kbit/s
- 256, 192 or 128 bit AES encryption
- QPSK modulation
- Selectable error correction of min, max or no FEC
- Advanced forward error correction
- Dual / single antenna port product options
- Transparent to all common SCADA protocols
- Dedicated alarm port
- Protected station option (Master Station)
- –40 to +70 °C operational temperature
- 210 mm (W) x 130 mm (D) x 41.5 mm (H)
- FCC and IC standards compliant
- Fully compatible with Aprisa SR+ in 'SR mode'
- Enhanced traffic management
- Enhanced file transfer and activation of new firmware

Aprisa SR applications
- Offshore rigs and onshore pump jacks
- Transmission pipelines
- Electricity generation plants and turbines
- Power storage and distribution
- Water and waste processing plants

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

RADIO	FREQ BAND	TUNING RANGE	TUNE STEP
FREQUENCY RANGE	220 MHz	215 – 240 MHz	1.25 kHz
	400 MHz	400 – 470 MHz	6.25 kHz
	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 Half duplex remote with SR+ full duplex master station		
FREQUENCY STABILITY	± 1.0 ppm		
FREQUENCY AGING	< 1 ppm / annum		

TRANSMITTER

AVERAGE POWER OUTPUT (Note 1)	0.01 – 5.0 W (+10 to +37 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

RECEIVER		12.5 kHz	25 kHz	50 kHz
SENSITIVITY (BER < 10^{-6})	max coded	–115 dBm	–112 dBm	–109 dBm
ADJACENT CHANNEL SELECTIVITY		> –47 dBm	> –37 dBm	> –37 dBm
	(Note 2)	[> 48 dB]	[> 58 dB]	[> 58 dB]
CO-CHANNEL REJECTION max coded		> –10 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

MODEM			
	12.5 kHz (Note 3)	25 kHz	50 kHz
GROSS DATA RATE	20 kbit/s	32 kbit/s	72 kbit/s
OCCUPIED BANDWIDTH	11.8 kHz	19.8 kHz	43.0 kHz
FORWARD ERROR CORRECTION	Variable Reed Solomon plus convolutional code		

SECURITY

DATA ENCRYPTION	256, 192 or 128 bit AES
DATA AUTHENTICATION	CCM

INTERFACES

ETHERNET	2 port RJ45 10/100Base-T switch
SERIAL	1 port RJ45 RS-232 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	1 x TNC 50 ohm female (2 x TNC for dual antenna port)
LEDs	Status: OK, MODE, AUX, TX, RX Diagnostics: RSSI, traffic port status
TEST BUTTON	Toggles LEDs between diagnostics / status

PRODUCT OPTIONS

DUAL ANTENNA PORT	Separate transmit and receive antenna ports
PROTECTED STATION	Providing hot-swappable / hot-standby redundant hardware switching

POWER

INPUT VOLTAGE	10 – 30 VDC (13.8 V nominal)
RECEIVE	< 7 W
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 90, IC RSS 119
EMC	FCC CFR47 Part 15, EN 301 489 Parts 1 & 4, ICES-003 IEEE 1613 (Note 4)
SAFETY	EN 60950 Class 1 div 2 for hazardous locations
ENVIRONMENTAL	ETS 300 019 Class 3.4 Ingress Protection code IP51

Notes:
1. The Peak Envelope Power (PEP) at maximum set power level is +41 dBm.
2. 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.
3. The gross data rate for the 12.5 kHz channel size in the 896 / 928 MHz bands varies with regulatory compliance.
4. The Aprisa SR has been successfully evaluated against the requirements of IEEE 1613 for class 1 performance criteria.

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.

4RF

For more information please contact
EMAIL sales@4rf.com
URL www.4rf.com

Version 1.6.2