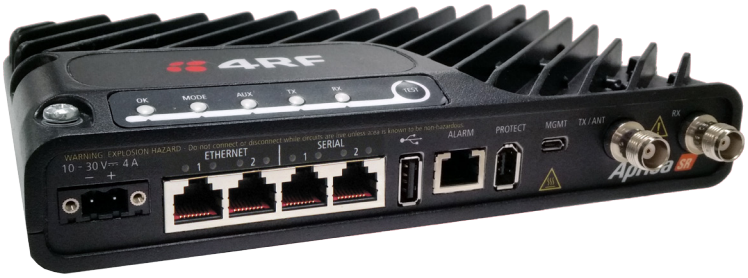
FCC / IC licensed bands
VHF, 220 MHz, UHF, 900 MHz

Datasheet

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 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 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.
- **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.
- **Flexible:** the Aprisa SR integrates into a range of network topologies, with each unit configurable as a base station, repeater or remote unit. Support for NMEA GPS receiver option.
- **Link efficiency:** 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. Automatic Transmit Power Control maintains the minimum transmit power required for effective communications enhancing both frequency reuse and power savings. Advanced payload and Ethernet / IP / TCP / UDP header compression.
- **Reliable and robust:** the Aprisa SR 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 variety of supported third party network management systems.

The Aprisa SR in brief

- Frequency bands of 135 – 175, 215 – 240, 400 – 520, 896 – 902 and 928 – 960 MHz
- RS-232 and IEEE 802.3 protocols
- Software selectable 12.5 kHz, 15 kHz, 25 kHz, 30 kHz, 50 kHz, and 100 kHz [note 2] channel sizes (frequency band dependent)
- Data rates of up to 144 kbit/s
- QPSK modulation with adaptive coding
- Selectable error correction of min, max or no FEC
- AES-CCM to NIST SP 800-38C
- Ethernet and IP / TCP / UDP header compression (ROHC) and payload compression
- Software selectable dual / single antenna port operation
- Transparent to all common SCADA protocols
- Dedicated alarm port and optional GPS for radio coordinates
- Power optimized option
- 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
- MEMS accelerometer motion sensing anti-tamper option
- Fully compatible with Aprisa SR+ in 'SR mode'
- Substation hardened to IEEE 1613 class 2 and IEC 61850-3
- 30 kV ESD antenna protection
- Class 1, Division 2 for hazardous protection
- –40 to +158 °F operational temperature
- 8.27" (W) x 5.12" (D) x 1.63" (H)
- FCC and IC standards compliant

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), Master, 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 all common SCADA protocols such as 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
	220 MHz	215 – 240 MHz	0.625 kHz
	400 MHz	400 – 470 MHz	1.25 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, 50, 100 kHz software selectable		
DUPLEX	Single frequency half-duplex Dual frequency half-duplex Half duplex remote with SR+ full duplex master station		
FREQUENCY STABILITY	± 0.5 ppm		
FREQUENCY AGING	< 1 ppm / annum		

TRANSMITTER	
MAX PEAK ENVELOPE POWER (PEP)	10.0 W (+40 dBm)
AVERAGE POWER OUTPUT	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		12.5 kHz	25 kHz	50 kHz	100 kHz
SENSITIVITY (BER < 10^{-6}) max coded	QPSK	–115 dBm	–112 dBm	–109 dBm	–106 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	> –10 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	25 kHz	50 kHz	100 kHz
GROSS DATA RATE	QPSK	20 kbit/s	32 kbit/s	72 kbit/s	144 kbit/s
OCCUPIED BANDWIDTH		11.8 kHz	19.8 kHz	43.0 kHz	88.0 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 auto-neg MDI/MDIX
SERIAL	1 or 2 ports 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	
DATA PORT CONFIGURATION	2 x Ethernet ports + 2 serial ports 2 x Ethernet ports + 1 serial port
POWER OPTIMIZED	Providing optimized power and sleep mode
GPS RECEIVER	Support for NMEA GPS receiver with radio coordinates

POWER		
INPUT VOLTAGE		10 – 30 VDC
RECEIVE	All bands	< 3 W (217 mA at 13.8 VDC) in active receive state < 2 W (145 mA at 13.8 VDC) in idle receive state < 0.5 W (36 mA at 13.8 VDC) in sleep mode
TRANSMIT	135 and 220 MHz	< 26 W (1884 mA at 13.8 VDC)
	400, 450, 896, 928 MHz	< 28 W (2028 mA at 13.8 VDC)

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	SSH and HTTP/S web servers with full control / diagnostics Partial diagnostics via LEDs and test button Software upgrade from PC or USB flash drive
REMOTE ELEMENT	SSH and HTTP/S 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, 25 kHz, 50 kHz	FCC CFR47 Part 90, IC RSS 119
	100 kHz	FCC CFR47 Part 24, IC RSS 119
EMC		FCC CFR47 Part 15, EN 301 489-5, ICES-003
SAFETY		UL / EN 60950 Class 1 div 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. The gross data rate for the 12.5 kHz channel size in the 896 / 928 MHz bands varies with regulatory compliance.

ABOUT 4RF

Operating in more than 150 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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