



4RF

Introduction to the Aprisa SR family



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The products - Aprisa...

Two product families

Aprisa XE: point-to-point **long distance** microwave links for **demanding applications**.

Aprisa XE



Aprisa SR: **smart, secure, SCADA** point-to-multipoint **radio** for utilities, oil, gas and mining.

Aprisa SR



Aprisa SR+: **high capacity** SCADA point-to-multipoint radio for data-intensive applications.

Aprisa SR+





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Aprisa SR family – Aprisa SR and Aprisa SR+

Aprisa SR family

The Aprisa SR family provides **licensed** narrow band (12.5, 25 kHz) point-to-multipoint **radio** for **SCADA and telemetry** applications.

Some key benefits:

- 360 degree **security** protection, with AES 256 encryption, data authentication, micro-firewall
- **Easy** configuration and management, with laptop-free install and over the air software upgrades
- **Standards-based** with SNMP for integration with network management systems

The Aprisa SR family is **reliable and robust** for real world utility applications. It provides **efficient channel access and traffic management**, optimised for SCADA applications.



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Aprisa SR information and applications

Aprisa SR

A smart, secure, point-to-multipoint SCADA radio designed with an **in-depth, multi-layered approach to security** to provide maximum peace of mind.

An advanced wireless channel access scheme **efficiently manages** the narrowband channel to ensure the **maximum amount of messages** get through the system.



Innovative and advanced functionality is provided in a **very simple way** through the in-built web management system, SuperVisor, complete with **full network element manager**.

And...

Aprisa

By **understanding** the challenges in **migrating from serial to Ethernet/IP**, 4RF delivers migration strategies for utilities to ensure the **migration can happen without disruption to traffic**.

The features that matter:

- 360 degree approach to security
- Over the air rekeying
- OTA firmware upgrades
- Terminal server
- Layer 2 Ethernet filters
- In-built management system with full network view and element manager
- Diagnostics and maintenance made easy

The Aprisa SR is available in UHF and VHF bands, 12.5 kHz and 25 kHz channels, with single and dual antenna ports, and **hot-swappable** redundancy options.



Who has it?



4RF is working with **water and electricity utilities around the world**, with operational networks, install underway or active trials in five continents.

In 2012, nearly **2,000 radios** were provided to Northern Ireland Water in a nationwide network replacement, one of the largest telemetry radio projects in Europe.

Over 120 radios have been installed in Slovenia for the Ministry of Defense. More than 100 radios are being deployed in New Zealand electricity utility WEL Networks.



Applications



The Aprisa SR, with **up to 19.2 kbit/s capacity**, has been designed for everyday applications in **electricity, water and oil and gas** communications.

These include:

- Low voltage distribution automation: automatic reclosers, load break switches, fault indicators, transformers
- AMI / AMR: low density data concentrator backhaul
- Measuring flow, pressure, reservoir and intake levels

And also:

- Controlling well, lift, booster and pump stations
- Measuring casing pressures, temperatures, gas lift and flow valve positions
- Controlling shutdown and segmenting valves
- **And many more applications...**



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...and the Aprisa SR+, just announced

What next?

Today's utilities **want more from their radio networks**, more features, more flexibility, more capacity.

Why? Because of the growing use of Ethernet/IP and **data intensive applications**, automation, security sensors, cameras, government incentives and regulatory concerns.

New products are emerging in the market that start to meet these demands with increased capacity, but **capacity is only a starting point** – there are more considerations.

Other considerations

Capacity is a requirement, more **data means a bigger 'pipe'** is needed. How is the increased capacity being provided? Is **efficient use being made of the increased capacity** and valuable spectrum?

Does the radio provide the **right capacity at SCADA packet sizes**? RF performance is key, but can be overlooked. Does the radio penetrate **dense urban environments**? How does the increase in capacity **impact coverage**?

Security concerns continue to escalate on a weekly basis with more cyber terrorism news. Other considerations include **real world use**, and a solution that is easy and intuitive to use and quick to deploy.

Aprisa SR+

The Aprisa SR+ delivers up to **120 kbit/s in a single 25 kHz channel**, using robust, higher order, adaptive modulation. It is **optimised** for heavy SCADA traffic and Ethernet/IP-based protocols, engineered to **efficiently use** the full capacity available.



The Aprisa SR+ is built on the **strong foundation** that provides the same **RF performance, 360 degree security, ease of use and real world performance** that gives the Aprisa SR its name.



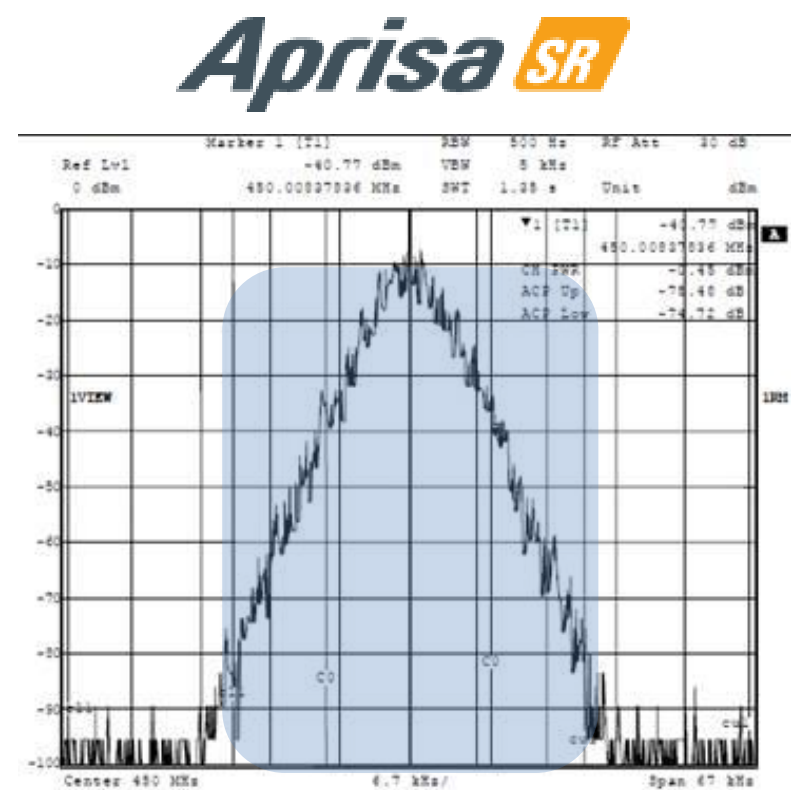
Other enhancements

10W power output and full-duplex operation is provided at base station, repeater and remote station sites. There are four data ports configurable to have 2, 3 or 4 Ethernet ports on a single radio with the remainder as RS-232.

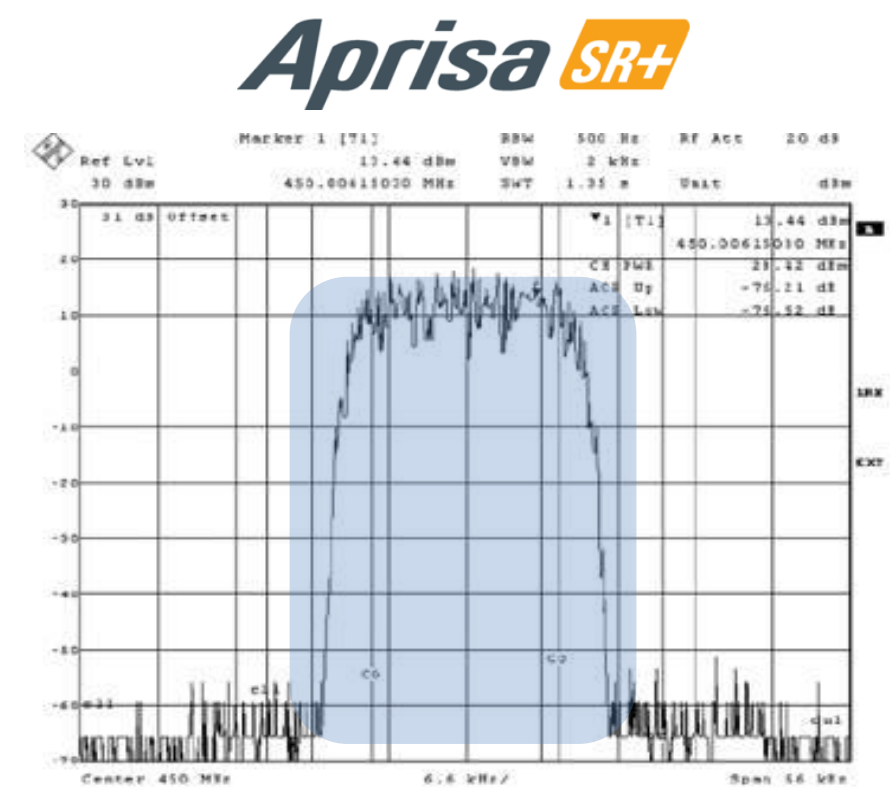
Use of robust modulation techniques provides superior capacity and coverage. 1+1 redundancy is provided by a fully monitored hot-standby (MHSB) hot-swappable protected station with a sliding tray for ease of maintenance.



Modulation



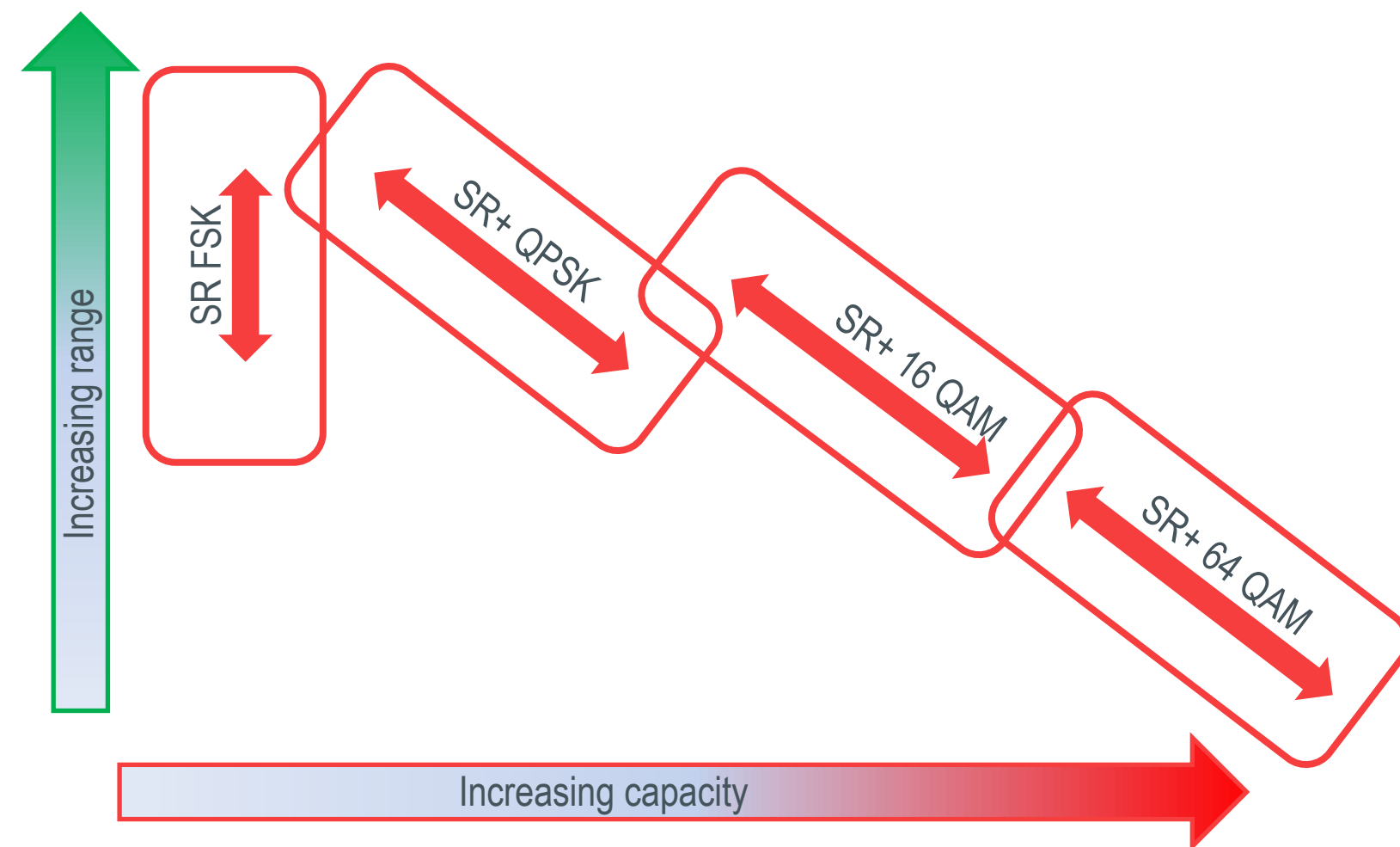
Aprisa SR and other radios use the robust FSK modulation, using little over half of the available spectrum. The Aprisa SR+ with new technology offers QAM modulation, using the full spectrum and delivering up to 5 times more capacity.



Range vs. Capacity

In QPSK mode the Aprisa SR+ **doubles the capacity** of the Aprisa SR and other radios with the **SAME range**.

Network design decisions are based on overall network coverage (or points of presence) and capacity.



Applications

The Aprisa SR+, with **up to 120 kbit/s capacity** and four build-configurable ports, has been designed for **data-intensive applications** throughout the electricity grid and renewable energy.

These include:

- 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

And also:

- Co-generation and community energy storage monitoring and control in distributed storage and generation
- Fibre substitution in substation and feeder automation upgrades
- **And many more applications throughout utility, oil gas and industrial automation...**

Aprisa SR+ recap

- 120 kbit/s in a 25 kHz channel
- 10W power output
- Full duplex base, repeater and remote stations
- Superior RF performance
- Optimised for SCADA traffic
- Security based design
- Adaptive modulation
- 4RF reliability and robustness





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Aprisa SR family - **smart**

Aprisa SR family



The Aprisa SR and Aprisa SR+ both use the same “smarts” to provide their world-leading performance, reliability and ease of use: **real world radio.**



What is so smart?

What is **smart**?

- Security
- Future-proof
- RF performance
- Flexibility
- Licensed spectrum

SMART on the outside, SMART on the inside



What else is **smart**?

- You're in control
- Efficiency
- Easy to manage
- SNMP support
- Reliability

1. Security

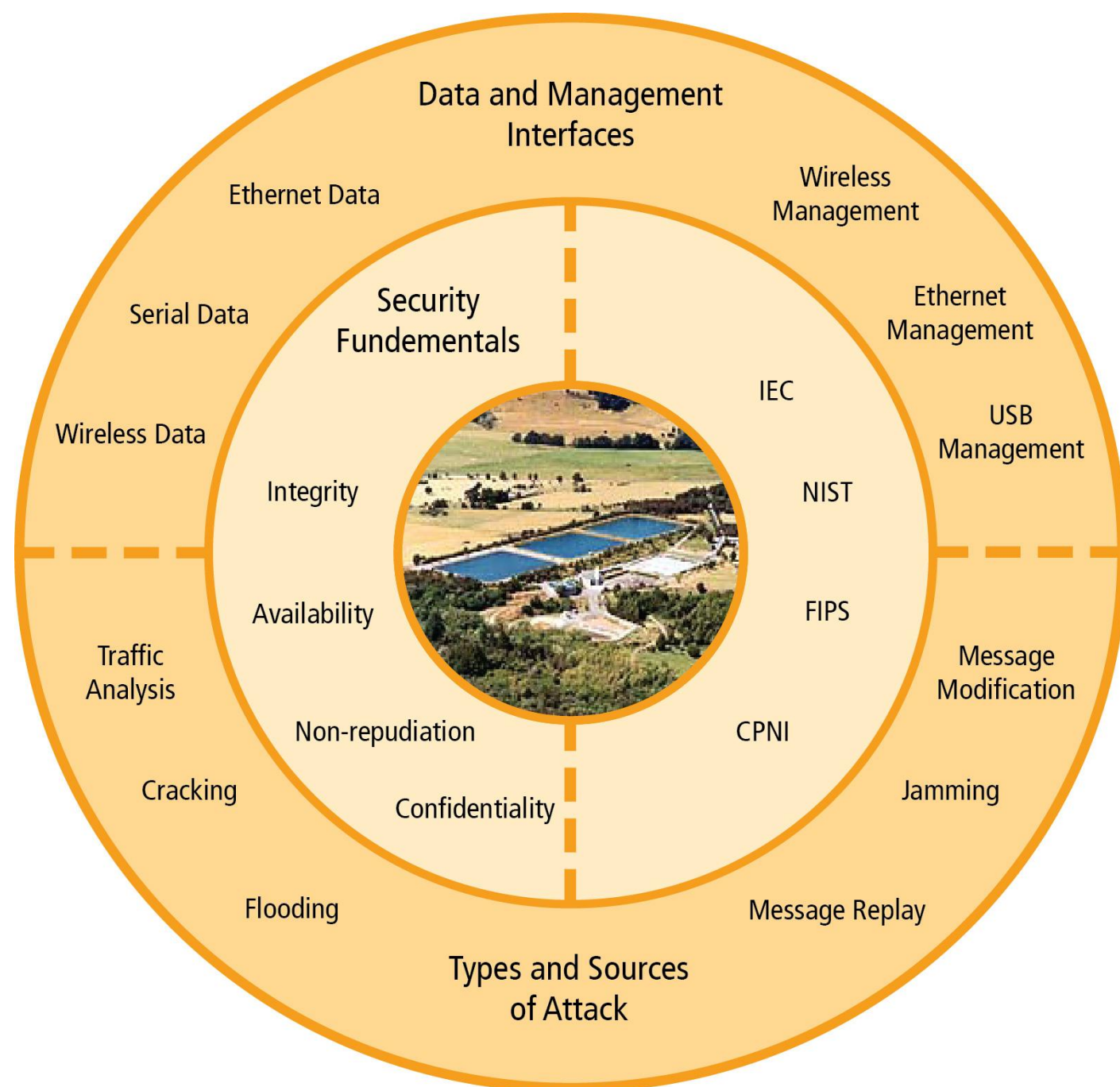
Security is **by design**, not a bolt on afterthought. The Aprisa SR family offers **much, much more** than encryption in today's cyber terrorism world.

Combined are key security **fundamentals**, sources and types of **attack**, types of **interfaces** and **standards** and recommendations.

To name a few **features**:

- AES 256 encryption as standard
- CCM authentication
- Proprietary wireless protocol
- Encrypted USB software upgrades
- Address filtering
- HTTPS secured management interface connection

More on security



4RF implements a **360 degree** approach to security:

- Over the air protection
- Protected management interfaces
- Secure USB software upgrades
- Micro-firewalling Ethernet interface
- Using government standards and best practice

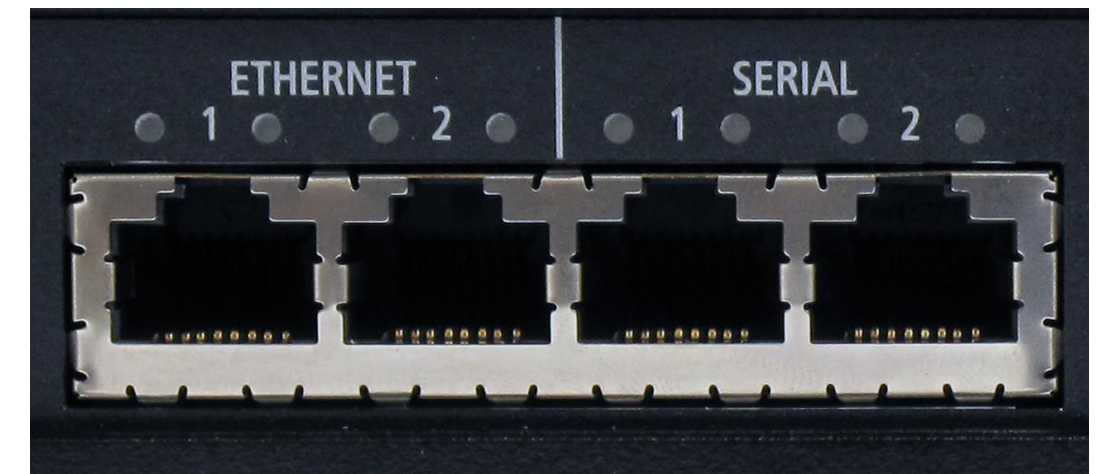
This approach creates a **security perimeter** around the Aprisa SR / Aprisa SR+ and the design environment of the product.

2. Future-proof

The Aprisa SR provides one **serial** RS-232 port and two **Ethernet** ports to support both today and tomorrow's traffic requirements, as the world **moves to Ethernet/IP**.



The Aprisa SR+ provides **four data ports**, build-configurable to have 2, 3 or 4 Ethernet ports on a single radio with the remainder as RS-232; **ultimate flexibility** for migration and connected devices.



3. RF performance



The Aprisa SR family provides unbeatable **real world** RF performance in the real world. It quite simply **makes connections** that other radios cannot.

The dual antenna port configuration supports separate transmit and receive connections to support external duplexers or filters.

This means that the Aprisa SR family can be deployed even in **congested areas** where there is radio equipment already installed.

4. Flexibility

Each unit can be configured as a base station, a remote station or a repeater, **minimising spares** and enabling easy network reconfiguration.



Redundancy options include a standard protected base station and a data driven protected base station, both with automatic switchover capability.

5. Licensed spectrum

It is your critical infrastructure – **licensed spectrum** is essential to maintain quality of service. 4RF does not design any equipment that uses unlicensed bands: no compromise.

The Aprisa SR uses licensed spectrum in the **VHF and UHF licensed bands**, and is certified for use in ETSI, FCC and IC regions.

If you have specific questions about your country homologation and certification, please let us know.

The initial release of the Aprisa SR+ will be certified for use in ETSI regions, in the UHF licensed band. Further variants will follow.

6. You're in control

It's **your network**: why let someone else operate it? With the Aprisa SR and Aprisa SR+ you own and can **flexibly** design your own communications network.

What are the **benefits**?

- Cost-effective deployment
- Redeploy units as needed
- Complete financial control
- No dependence on third parties
- Licensed spectrum means guaranteed quality of service

You have **ultimate control** over every element of your network. No more dependence on third party operators. And 4RF makes it **easy**, too.



7. Efficiency

The Aprisa SR family has been designed to make the **best possible use** of the typically available 12.5 kHz and 25 kHz radio channels.

The radio is designed specifically to manage the **small data packets** needed in SCADA / telemetry networks.

To name a few **features**:

- Superior RF design
- Managed, efficient channel access scheme
- Low noise receiver
- Data interleaving and compression

8. Easy to manage

With the intuitive, built in SuperVisor software, radios are easily **configured and managed**: locally, remotely over the air or via **SNMP**.

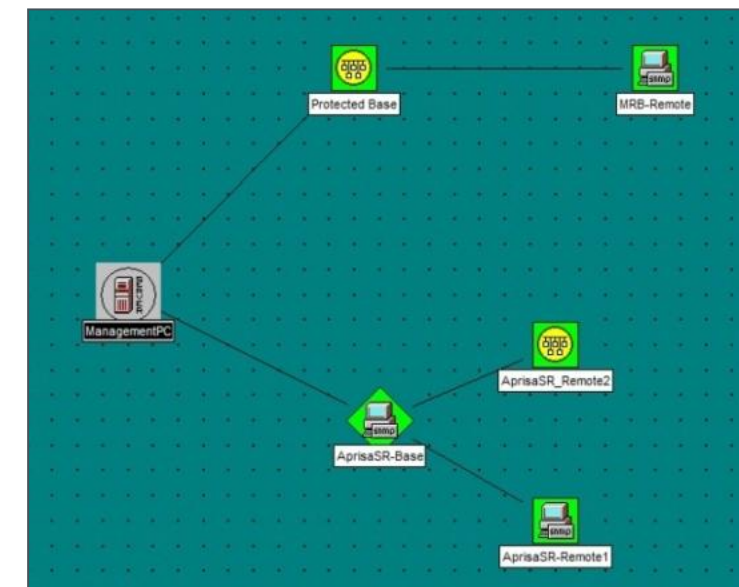
IP Addr	Mode	OK
172.25.0.39	Remote	
172.25.0.32	Remote	
172.25.0.40	Remote	
172.25.0.38	Remote	
172.25.0.37	Remote	

A web browser can then be used to view and configure all radio settings and parameters. HTTPS means that this session is **secure**.

9. SNMP support

SNMP means that you can also use your preferred **third party network management** software such as SNMPc from Castle Rock Computing.

You can visualise, monitor and pro-actively manage your network of Aprisa SR radios alongside other equipment in your SCADA / telemetry network.



10. Reliability

Reliability means many things, and 4RF combines them all. **Longevity**: attention to detail and **quality** means the radios last as long as needed.

Robustness means a rugged enclosure and **immunity** to temperature extremes. They simply keep on working, wherever you put them.

All components used in the manufacture of the Aprisa SR family are fully rated to operate over the **-40°C to +70°C** temperature range.

Recap of 'smarts'

What is **smart**?

- Security
- Future-proof
- RF performance
- Flexibility
- Licensed spectrum

SMART on the outside, SMART on the inside



What else is **smart**?

- You're in control
- Efficiency
- Easy to manage
- SNMP support
- Reliability

The Aprisa SR family
provides you with maximum:

Flexibility

Choice

Control

Performance

How do **you** monitor and control
your critical infrastructure?



INTRODUCING THE NEW ADDITION TO
THE APRISA FAMILY, THE **APRISA SR+**



HOWEVER YOU DO IT, WITH THE
APRISA SR AND THE **APRISA SR+**,
THE CHOICE IS YOURS



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Thank you for your time.
Questions?