4RF

4RF Limited

Engineering services overview

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1 Overview

1.1 Introduction

4RF provides technical support, engineering and repair services to support the efficient design, implementation and maintenance of customer wireless networks as well as training services for customer technicians / engineers.

We can manage an entire project including network design, traffic routing, RF planning, core and peripheral equipment selection, implementation, installation, and commissioning.

Alternatively 4RF may only be responsible for a single part of a larger project.

1.2 Definitions

Term	Meaning
'We' or 'Our' or '4RF'	4RF Limited
'You' or 'Customer'	Who 4RF is providing the services to
'Work'	Activity carried out in support of the engineering service provided to the customer
'Urgent'	A classification applied to requests for engineering services or technical support. Applies to significant problems that are causing substantially restricted or partial services to the end customers, or other such occurrence that the customer can reasonably class as being of a critical nature to their network and business operations (that is, revenue affecting)
'Standard'	A classification applied to requests for engineering services or technical support that applies to all requests that do not meet 'urgent' classification
'Obsolete'	A product classification indicating 4RF no longer provides guaranteed support. Items are typically designated obsolete at a period of greater than 7 years after the product has ceased manufacture.
'HW'	The physical components that makes up the 4RF products.
'SW'	The programs and other operating information used by the 4RF products.

2 Engineering services

2.1 HW and SW upgrade

4RF offers a full range of hardware and software maintenance services in order to ensure a timely and cost-effective solution to keep installed nodes in perfect working order with the latest features and functionalities.

2.2 Factory acceptance test (FAT)

A Factory Acceptance Test (better known as a FAT) can be scheduled should a customer require demonstration that the purchased equipment complies to the specified standard(s), and the configurations the equipment is to be used in.

2.3 Installation and commissioning

Customers can benefit from having a 4RF engineer on site to assist with installation and commissioning, especially if the customer has not previously implemented 4RF equipment, or if they do not have in-depth experience in implementing radio links and associated network equipment. Additional benefits can be gained by combining this activity with a training course.

2.4 Network and system engineering

Implementing solutions with the Aprisa's in-built functions, and the wide range of available traffic interfacing protocols means 4RF have knowledge that extends well beyond the design of a 'backbone' point-to-point microwave link.

4RF can design the total solution for the customer including network topology and traffic distribution, as well as the selection of both core and peripheral equipment.

By drawing on extensive experience, 4RF customers can significantly decrease the design and equipment selection phase of their project to achieve lower cost of total ownership, both in terms of equipment selection as well as project design costs.

2.5 Project management

4RF can provide an engineer to assist with the identifying or rectifying system performance or degradation issues as well as the management, planning or coordination of a project.

2.6 Path planning

The 4RF path planning team will work with customers to help assess the viability of the radio links. 4RF are experts at designing links for even the most challenging conditions, such as round obstacles, over water, or across very long distances.

A comprehensive path profile report is provided, containing:

- A plot of each individual path profile, detailing the transmission path as it passes over the terrain, including Fresnel zone criteria and important path data

- A full link budget indicating key transmission system and linking path parameters, including the theoretical availability according to the ITU standard recommendations

- A summary listing of the main components of the link, including antenna type and mounting heights, feeder type and lengths, Aprisa variant, RSSI, fade margin and availability

- Additional information or observations specific to each path, including potential reflection and multi-path analysis, recommendations on alternate antenna and feeder systems and comparisons with customer-specified systems

- Recommendations for alternate radio variants or sites if the analysis identifies that proposed solution could be ineffective

2.7 RF engineering

Accurate RF engineering is key to ensuring reliability expectations are met, and to ensure efficient use of available spectrum, both of which contribute to cost effectiveness and ultimately a better customer ROI (Return on Investment).

4RF engineers have extensive experience in RF planning and transmission systems. With advanced software tools such a 'Pathloss' and extensive experience, 4RF can take much of the uncertainty out of RF planning.

2.8 Regulatory

4RF has products that operate in more than ten different frequency bands, and customers in more than 130 countries.

We have an in-house regulatory team that advises our customers and engages in dialogue with regulators around the world.

3 Repair and Return

While 4RF equipment has a minimal return rate, our systems engineering team ensures that any repairs are handled with minimal delay, to a high standard, with RoHS and WEEE compliance.

Along with a standard warranty period, each product purchase includes a repair and return service with a targeted maximum turnaround time of 30 days.

3.1 Advanced Replacement

4RF offers an advanced replacement service to assist with expediting repairs. This service allows customers to request a replacement for a suspected failed unit in advance of the unit being returned and repaired.

3.2 Extended Warranty

All Aprisa products receive as standard a 15 month warranty from date of shipment.

Extended warranties are available for purchase during the initial (standard) warranty period, either as a stand-alone service option or included in a service level agreement. Extended warranties range from one up to six years.

3.3 Expedited Repair

Expedited repair may be available upon request. The turnaround time for this service is five days, with an additional fee per unit.

3.4 Guaranteed Replacement Service

4RF offers a Guaranteed Advanced Replacement Service (GARS). To facilitate this service we will maintain a quantity of units ready for immediate shipment.

The type and quantity of units provided under the customer GARS agreement will be defined in an equipment schedule.

Typically the GARS units will be maintained at a 4RF service centre or regional sales office.

4 Service level agreement (SLA)

As standard, all 4RF customers are entitled to a 'Bronze' service level agreement. Service level agreements ensure customers receive additional and preferential service.

Additionally, upgraded SLA's are available to to silver, gold or platinum to benefit from:

- Guaranteed response times

- Reduced service pricing

- On-site emergency support
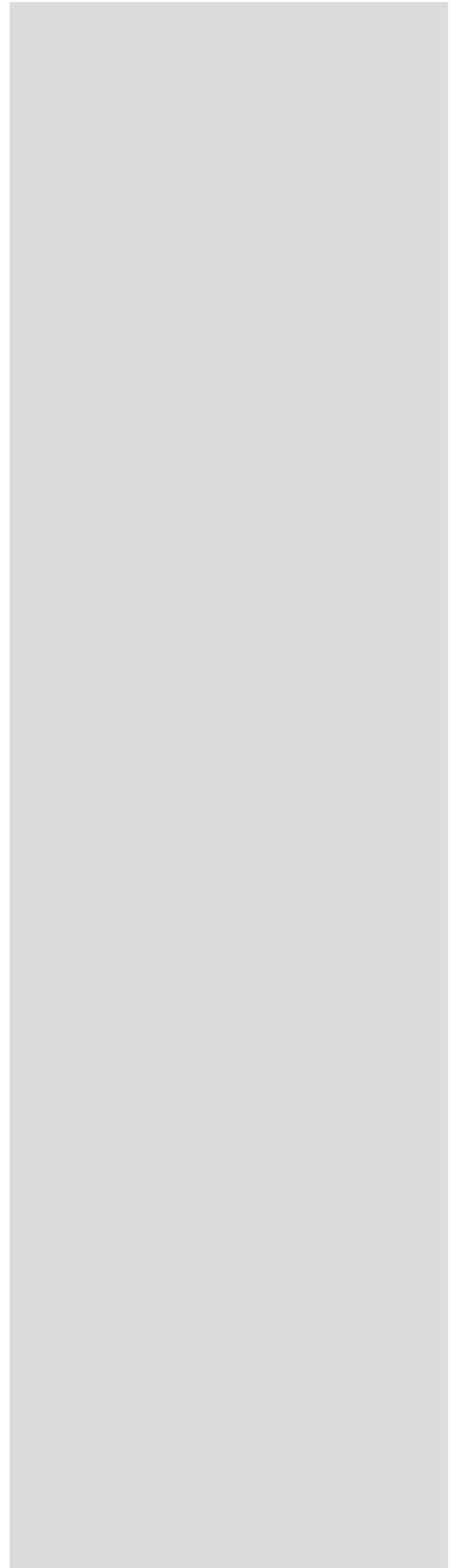
5 Technical support

For 4RF, customer satisfaction is about more than providing high performance, high quality products.

It is about providing the services and support customers need to keep their network running smoothly, from initial network planning and equipment installation through to network monitoring and maintenance.

5.1 E-mail support

The following e-mail address can be used to contact Customer Service for technical support: support@4rf.com.

5.2 Standard telephone support

For technical support during normal New Zealand office hours telephone

+64 4 499 6000 and ask for Customer Service. Normal New Zealand office hours are 9.00 am to 5.00 pm, GMT+1200.

5.3 24/7 telephone support

24/7 telephone support is only provided to customers that have this support option as part of a 4RF SLA.

24/7 Telephone support is provided via dedicated telephone number(s) that will connect to a 4RF service engineer. The service engineer will have access to suitable resources to provide immediate technical support.

6 Training:

The services team provides a variety of training courses to help make the best use of Aprisa products purchased, teaching users how to install, configure and commission Aprisa radio systems.

Standard training courses cover set topics. Alternatively, customised courses can be designed to meet specific network planning, equipment commissioning and maintenance requirements.

These courses are typically held at customer premises and often combined with the installation of your equipment. All customised courses come with the same attention to detail, hand out materials and certificates of attendance as standard 4RF training courses.

All training courses are accompanied with training notes in hard copy and on CD, and successful attendees receive a certificate of completion.

About 4RF Limited

Operating in more than 130 countries, 4RF solutions are deployed by oil and gas companies, international aid organisations, public safety, military and security organisations, transport companies and utilities, broadcasters, enterprises and telecommunications operators. All 4RF products are optimised for performance in harsh climates and difficult terrain, and support legacy analogue, serial data, PDH and IP applications.

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Smart radio for smart networks