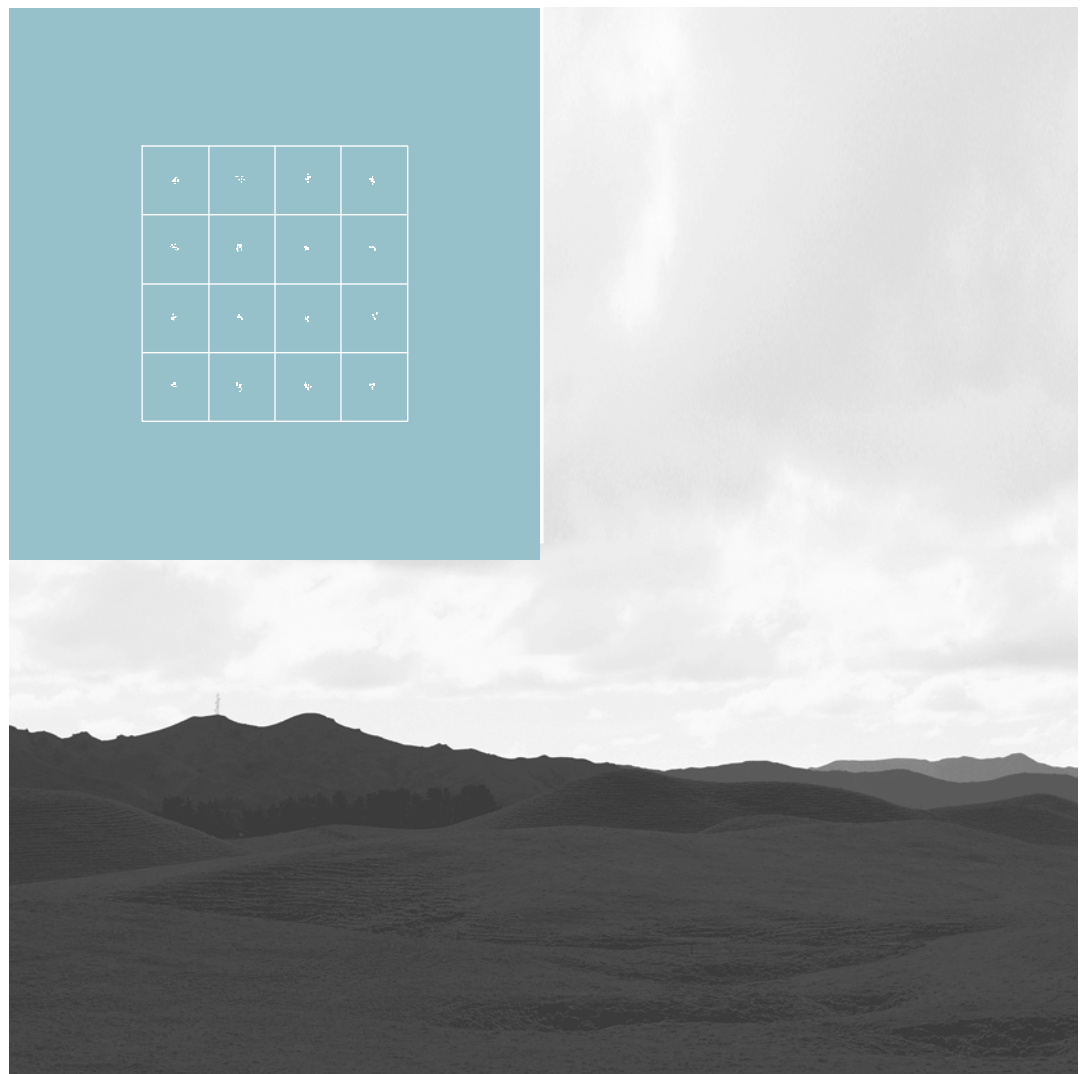


Department of Broadband, Communications and the Digital Economy Broadband Solutions for Remote Areas Submission from 4RF Communications

June 2008

Prepared by:
4RF Communications



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1. Introduction

4RF Communications designs and manufactures innovative long distance point-to-point radio solutions.

Our technology can link distances over 100 kilometres in a single hop and delivers up to 65 Mbit/s per link. This capacity can provide city standard broadband and telecommunications services to communities of approximately 2,500 households. Additional links can be deployed to run in parallel if larger communities need to be serviced.

Used to support both fixed line and mobile networks and ideal for connecting rural and remote areas, we provide a connectivity solution that is often orders of magnitude cheaper than copper or fibre network rollout and offers a technically superior and much more cost-effective alternative to satellite solutions.

Today, 4RF Communications has deployed solutions in over 95 countries and has provided urban standard telecommunications services to rural communities in areas of the world as diverse as the UK, Fiji, Tahiti, Syria and the Maldives. It is an unfortunate reality that many countries which do not share Australia's vast social and economic benefits are nevertheless better served by technology solutions which deliver enhanced broadband and communications to their most isolated and remote communities.

Australians have been denied the ability to use modern sub-3GHz microwave technology that has provided high quality communications to so much of the rest of the world by the monopolistic tactics employed by Telstra in hoarding much of the spectrum under 5GHz and by their control of the key infrastructure such as radio towers.

4RF's customers in Australia, including mining companies and various electricity companies such as the NSW electricity grid and the Snowy scheme have only been able to deploy our equipment because they hold historic rights to use spectrum under 5GHz. The Australian regulatory environment coupled with Telstra's anti competitive behaviour, at present denies the vast socioeconomic benefits of modern telecommunications services to the disenfranchised rural communities.

Narrow corporate interests such as Telstra's insatiable hunger for state and federal subsidies for uneconomic fibre rollout and their vested interest in pushing inferior satellite technologies as the only alternative have led to a situation whereby the myriad of benefits of a modern telecommunications infrastructure taken for granted in Sydney, Melbourne and Canberra are being denied to Australia's most rural, isolated and economically deprived citizens.

In fact, we are aware of more than 4,500 licences in these bands held by Telstra that are currently being used to provide low capacity analogue microwave links that are completely inadequate to meet the demands of modern telecommunications. Simply upgrading this infrastructure with up to date radio technology could allow Telstra to provide city quality telecommunications services to rural communities that it currently claims can only be achieved with fibre or satellite infrastructure.

Our submission aims to demonstrate ways in which this great communications divide can be bridged and ultimately overcome, and finally deliver those services currently enjoyed in urban and populated centres to the remote Australian community.

2. About 4RF Communications

Based in New Zealand, 4RF Communications is the world's premier supplier of high performance point to point microwave radio systems. Our next generation radios are used around the world by utilities, oil and gas companies, government organisations and fixed and cellular telecom operators to transmit voice and data over distances exceeding 100km in a single hop. This is in stark contrast to conventional microwave systems that are typically unable to transmit over distances greater than 40km. Our systems are generally deployed when it is uneconomic or impractical to use copper, fibre, satellite or higher frequency microwave.

Our blue chip customer base includes important international customers and organisations like:

- The United Nations – for whom we provide communications solutions for peacekeeping missions
- British Telecom – for whom we provide backhaul connectivity to rural communities in the UK
- Royal Dutch Shell – for whom we provide connectivity to drilling platforms
- Électricité de France (EDF) – for whom we provide backhaul for SCADA applications

Our Aprisa XE platform provides a fully integrated, one box solution that allows operators to easily deploy and interconnect with existing network infrastructure. It supports all the standard analogue and digital interface types used to deliver services to customers today as well as offering a simple migration path to the newer IP based services. With this level of flexibility the platform is able to fully support today's access and transport applications as well as providing future proofing for new IP based services in the future.

3. Rural Broadband Access

3.1. Bridging the digital divide

Modern telecommunications is the great enabler of our age. It allows us for the first time to interact with the global community, breaking down the traditional barriers of geographic distance to economic activity and social interaction. To members of our rural communities, the benefits are even starker than those that have already been experienced in cities and urban areas. Not only does connectivity allow participation in the economic activity occurring on a local, regional and global basis leading in a very real sense to higher standards of living, but importantly the petrification of traditionally isolated communities can be arrested by the permeation of the wider social and cultural values of the country and the rest of the world.

The practical benefits of providing city-standard telecommunications infrastructure to rural communities are manifold. Some examples of these are:

- The educative power of the Internet being harnessed by schools to raise teaching standards and increase opportunities for students;
- Health care can be improved by increased access to patient data and exposure to leading edge techniques and research; and
- Income from tourism can be boosted by online advertising and booking systems.

3.2. The problem – Access

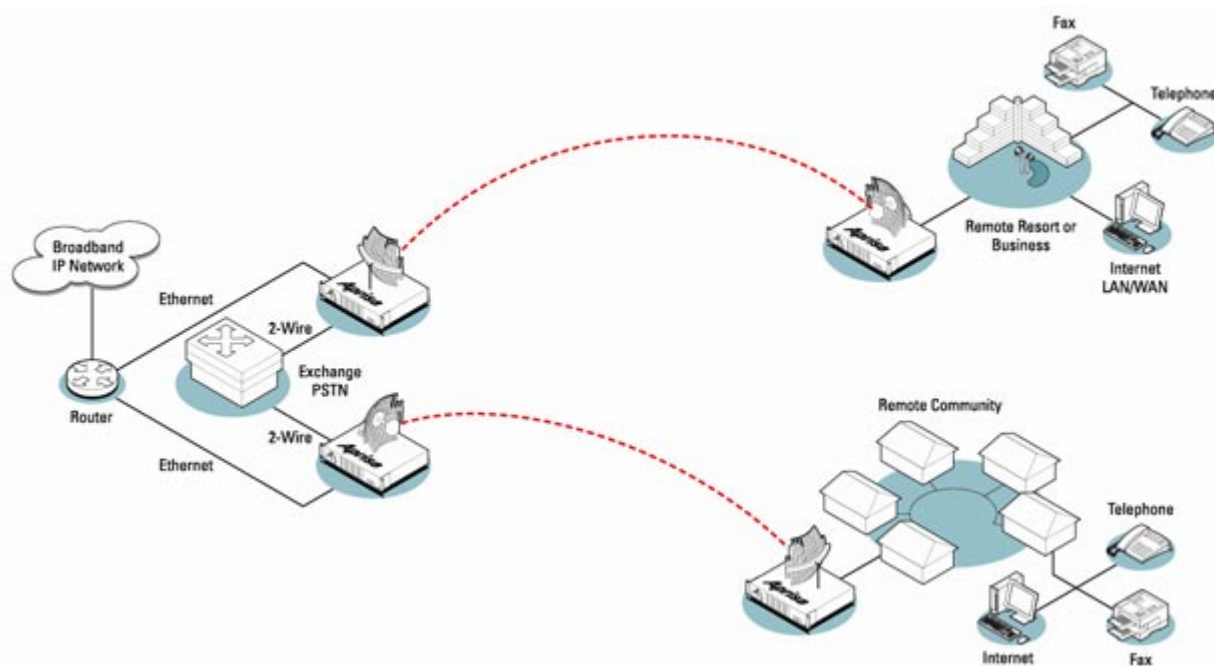
There are many wireless technologies that offer voice, video and internet access for the last mile and many more are being developed. These include GSM cellular and new standards such as Telstra's Next G (3G) and WiMAX. These technologies have increased the potential quality of service in remote communities while significantly reducing the cost of provision. However the central challenge is how these last mile technologies are connected to the core networks of the major telcos. If this can be done cost-effectively then the rural broadband problem can be quickly solved.

Whilst the business cases and political imperative to connect major cities and urban conurbations with both fixed line and cellular infrastructure has been well established, providing equivalent levels of service to rural and remote communities has proved to be much more problematic. Private telecoms operators, with their focus on the bottom line and having enjoyed the benefit of state subsidies for fibre deployment are reluctant to proactively tackle the problem of connecting our forgotten rural communities.

3.3. The Solution – Sub-3GHz microwave

In many countries network operators are addressing this problem by deploying next generation sub-3GHz point-to-point digital microwave radio systems to drive their broadband access strategies for remote business enterprises and subscribers in low-density and sub-urban environments connecting schools and hospitals as well as homes. The systems are typically deployed where the speed or costs of deployment of wired, fibre, or satellite communications are not commercially feasible or viable due to distance. Another key factor driving the adoption of sub-3GHz licensed frequency bands is their extremely reliable transmission over long distances and difficult terrain, particularly over deserts, water and over partially obscured paths. In addition, these frequencies are regulated – permitting exclusive frequency assignment guaranteeing carrier-class performance and minimising interference in perpetuity.

Next generation sub-3GHz solutions are particularly cost competitive where local infrastructure does not exist or is expensive to provide. This is principally due to the wind-loading characteristics of sub-3GHz antennae which allow much less robust tower infrastructure – in some cases wooden poles can suffice. Also important is the availability of microwave links that are wholly solar- or wind-powered as provision of power in remote areas can be one of the most important cost factors in a rural rollout. However of most importance to customers is that the very high spectral efficiency of next generation sub-3GHz radios means that city-equivalent broadband can now be supported by this type of equipment for the first time.



As the infrastructure costs are low, sub-3GHz microwave radio solutions enable operators to swiftly build access networks and broaden the reach of broadband for remote townships, sub-urban communities and business enterprises such as resort hotels. It reduces capital costs and realises revenue for transmission services over distance or difficult terrain to remote subscribers and it leverages and provides a profitable answer for rural broadband access opportunities and imperatives

4. Australian Remote Telecommunications Market

4.1. Landscape

Engineering remote and rural backhaul today is challenging, with issues of infrastructure deployment cost and limited spectrum hindering the ever-increasing demands for more capacity and new connectivity. As operators move to address emerging new services and systems for IP based networks in low revenue and low density areas, implementation costs are under pressure as never before. Limiting these new requirements has direct consequences on the economic and social development of Australia.

Whether it is to replace obsolete analogue and digital links or the desire to expand services, many operators face the difficulty of rolling out coverage in rural and often hard-to-reach remote areas. Microwave links, particularly conventional higher frequency systems, are popular metropolitan area backhaul solutions but simply don't have the path length capability needed for rural regions.

In these areas the distance between points requiring service may be tens to hundreds of kilometres or more. These paths challenge microwave backhaul planning and eliminate the choice of higher frequency systems as the required number of intermediate repeater sites would be cost prohibitive.

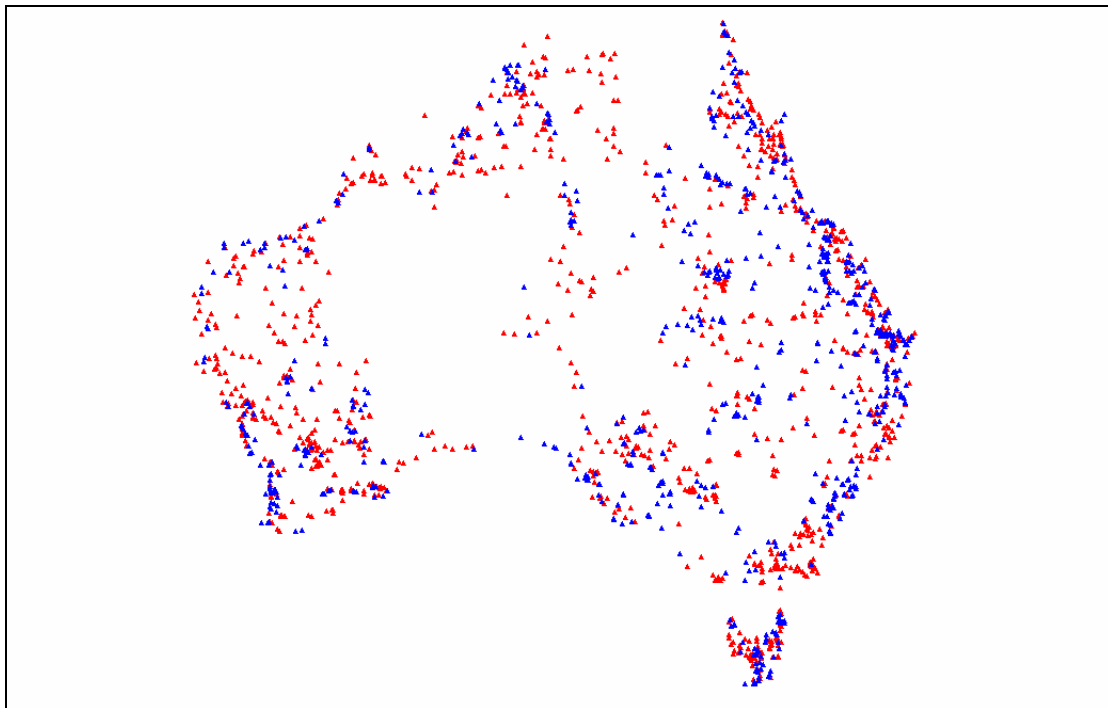
4RF has over the past 7 years concentrated on trying to sell its systems to Telstra for the provision of city-centre quality broadband and telecommunications services to remote rural environments. Although our equipment has been extensively tested and approved by major telcos around the world, it has never been used by Telstra because their policy has been to obtain the maximum subsidies it can to provide optical fibre to medium-sized rural environments, and to force everybody else to use satellite services. Our many customers worldwide have reached the conclusion that remote locations are best served using our specialised point-to-point microwave systems for backhaul. Our equipment interfaces with all existing historic telephone systems and also provides state-of-the-art broadband as well as all modern technology services that can be provided via the telephone network. Thus, telecommunication services in these remote locations become equivalent to the services available in city centres. Our customers have found that using 4RF's long-haul microwave is by far the cheapest solution for small, rural and remote locations. Our case studies support these conclusions. Satellite solutions for broadband are usually significantly inferior to the available land-based solutions, and it is extremely expensive to extend cellular radio coverage to these remote locations unless equipment like ours is used for the backhaul.

We have made no advances to other telecommunications providers in Australia because of the dominance of Telstra, and the complicated political and regulatory environment. Unfortunately the only sensible business decision resulting from our fruitless attempts to market our products has concluded that significant investment in both cash and manpower into Australia is not justified since it has been far easier to achieve sales in other remote markets worldwide. For instance, we have become a major supplier to the dominant telecommunications providers in Scotland (BT), Syria, Iceland, Siberia, the Maldives, Fiji, French Colonial Territories, Sri Lanka, large parts of Africa and many other locations worldwide. Most of these rural environments are similar to Australia but conditions can be far more hazardous and difficult.

4.2. Australian Regulatory Environment

There are six radio bands most suitable for the long distance point to point radio links required to provide rural and remote Australia with modern telephone and Internet access. Each band has various preferred characteristics of distance and capacity capability. Operation of equipment in these bands is controlled by the ACMA through a licensing process engineered on a case by case basis.

Telstra has more than 4,500 licences in these bands. Some 2,000 links serve individual customers (as shown in the map below), with the remaining 2,500 serving typically multiple customers. 4RF equipment can provide city-standard quality services to all of these customers simply by upgrading the out-dated analogue technology links which have been in service for many years.



It is possible for competitors to licence links in these same frequency bands. However the opportunities to properly exploit the spectrum are limited by the following issues:

- Certain ACMA rules pertaining to the recording of information are such that the locations and other technical details of outstations in Telstra's DRCS service are not recorded. The resulting uncertainty in the estimation of interference levels significantly diminishes the opportunity to reuse the spectrum. This severely limits Telstra's competitors from providing service to these locations.

- The ACMA has an embargo in place that prevents further assignments on approximately half the channels in the current 1.5GHz band plan. Established in 1996 this embargo made provision for a future Digital Sound Broadcasting (DSB) service that, twelve years later, has yet to be established. This also represents a massively anti-competitive gift to Telstra by limiting point to point competition in this most useful band.
- Similarly there is an ACMA embargo on a small but still useful amount of spectrum at 1.8GHz reserved for wireless local access (WAS).
- WAS systems have been allowed to be established without suitable engineering criteria established for co-ordination with point to point services resulting in inefficient use of spectrum through conservatism engineering.
- There is an impediment to the take-up of channels in the 2GHz bands over the potential interference from so-called Aeronautical Mobile Telemetry (AMT) service operated by Australian Defence Forces (ADF). ACMA can give no guidance on the likelihood of these AMT services actually being in operation.

In summary, 4RF as an equipment supplier and any competing operators in the rural telecommunications market are effectively prohibited from offering services to currently under-served or unserved locations in Australia by application of regulatory rules which, while appropriate for urban environments where interference can be a serious issue, are not suitable in a rural context.

4.3. Telstra's obstructionism

4RF has attempted to engage with Telstra on some 16 occasions from October 2001 until January 2008 at various levels, from the CEO on down, without success. We sought the corporation's interest in our technological capability and have, on more than one occasion, offered a system trial at our cost.

Every issue raised by Telstra has been addressed, ranging from equipment performance through to detailed cost trade-offs. It is hard to escape the conclusion that Telstra is too bureaucratic or simply self absorbed to discuss alternative rural communications technology in a way that would benefit customers or help achieve the political priorities which have been part of the public policy debate in this country for some time.

This is in direct contrast to the impression given by Telstra as depicted in the Telstra Country Wide (TCW) Advisory Board Annual Reports. These reports give full contact details for TCW Area General Managers with an implied invitation for direct engagement. It was our experience that approaches made to the eight managers most directly concerned with rural and remote customers elicited two 'brush off' style responses and deafening silence from the others.

Telstra currently operates at least 4,500 legacy analogue microwave links in Australia that provide extremely poor quality services to rural communities and which are unsuited to the demands of the modern connected world. Telstra's intransigence in considering cost effective and swiftly deployable upgraded solutions like 4RF's is particularly difficult to understand given the clear and obvious benefits that such a program would bring.

Our experience over 7 years of trying to interest Telstra in upgrading the service to these customers has led us to conclude that there is no interest. Telstra appears to only be motivated to upgrade service to remote communities as a means of suppressing potential competitor activity.

4.4. Solutions

At one time Australia was acknowledged around the world as the leader in rural telecommunications. Telstra's Rural Remote Area Program involved the expenditure of some A\$530M between 1984 and 1992 to provide 45,000 phones in rural and remote Australia. This cost of A\$11,700 per telephone involved some significant expansion of the DCARS network. If this equipment was merely upgraded using modern technology, then these remote customers would be able to enjoy the same level of service and connectivity as their urban counterparts.

In order that provision of frequencies in rural and remote environments can proceed, and where there is little risk of interference, 4RF believes that the rules can be significantly simplified to enable swift connection to disenfranchised customers by:

- Requiring all Telstra's DRCS outstations to be properly recorded in the ACMA's licensing database;
- Lifting the embargos on spectrum in the 1.5 and 1.8GHz bands, in favour of point to point links in rural and remote Australia; and
- Devising, in conjunction with the ADF, a means to provide guidance on AMT services to operators wishing to establish point to point links in rural and remote Australia.

4.5. Pilot Trial

As we have already stated, 4RF equipment in a single link can cover distances in excess of 100 kilometres. Indeed, our equipment has often been used to cover greater distances. For example we have recently completed a roll-out in Equatorial Guinea where a 241km link has been established in a single hop between the mainland and the Presidential island, providing high-quality, highly secure services.

Several or multiple hops can of course be used to cover greater distances, and at intermediate points our equipment has been specially designed to be solar-powered. Conventional microwave technology using higher frequencies is rarely able to provide single hops in excess of 40 kilometres, and requires far more extensive infrastructure in the form of expensive and heavy aerials, and robust metal towers to support them.

To provide both ends of a link using 4RF equipment, including all the necessary interfaces for existing telecommunications services and broadband etc, would cost in the vicinity of A\$25,000 for the capital cost of the equipment. We can of course provide a full turnkey solution if required and do so in many countries worldwide.

Should we be asked to demonstrate our technology and equipment in a pilot trial site or multiple sites, 4RF would obviously provide a detailed costing for any appropriate locations which are identified. This could be rolled out in approximately 8 weeks which includes all manufacturing and installation.

5. Summary

The far-sighted policies of the Australian Government in the 1980s and 1990s subsidised the provision of basic voice telephony services to rural and remote users. This involved in excess of 4,500 sub-5GHz microwave links to isolated farmsteads and small remote communities. When these subsidies ceased, so did the provision and upgrade of these services. If next generation digital microwave equipment of the type provided by our company was used to upgrade the legacy analogue equipment still in service, there would be no great digital divide of the type that now exists. Rural and remote customers would enjoy services equivalent to the cities and major centres, with fast broadband access and all access to other next generation equipment.

In our submission, we have tried to demonstrate how the regulatory environment can eliminate Telstra's de-facto monopoly on the use of the necessary microwave spectrum to enable suppliers other than Telstra to service these customers. However, the problem still remains that Telstra will claim they own the existing infrastructure, and may make it difficult for competitors to access infrastructure such as microwave towers and last-mile distribution networks.

Obviously if the Government wishes to ensure that customers in these locations have the option to buy modern technology services, then clearly a form of subsidy will be required. However, unless these disenfranchised rural and remote customers are given the right to have their existing networks upgraded using modern microwave equipment, they will continue to be held to ransom by Telstra's self-interested policies, whatever they may be. It is clear in our experience that Telstra have little regard for the needs of these customers, despite paying lip service to the concept of Universal Service Obligations.

It is unfortunate that in only a little over two decades Australia has gone from one of the world's leading providers of telecommunications services to remote and rural communities, to offering services that would shame many third-world countries.

6. Appendices

6.1. Case Studies

6.1.1. Existing Australian Customers

The following table lists all end users using the Aprisa product in Australia along with the market segment and number of systems sold.

End User	Market Segment	State	Systems
Apache Energy	Oil and Gas	WA	3
Australia St Johns Ambulance	Public Safety		2
Australian Military	Defence	QLD	22
BHP Billiton	Mining		2
Chevron	Oil and Gas		2
Country Energy	Electric Utilities	NSW	1
Ergon Energy	Electric Utilities	QLD	1
Fortescue Metals Group	Mining	WA	12
MCS Digital	Trunked Mobile Radio	VIC	1
Queensland Railways	Rail	QLD	4
Rio Tinto	Mining	WA	3
Tasmanian Government	Public Safety	TAS	27
Santos	Oil and Gas	SA	12
Snowy Hydro	Electric Utilities	NSW	1
TransGrid	Electric Utilities	NSW	1
Union Switch	Transport - Rail	Various	4
NSW Fire Department	Public Safety	NSW	4
Western Power	Electric Utilities	WA	5

Some examples of Australian users of 4RF equipment are:

St Johns Ambulance, Australia

Connecting mobile radio base stations to enable mobile communications with the ambulance service.

Australian Military

Being used by the Australian Army at the Townsville camp training grounds to provide backhaul of information relating to troop activity and movements in the training field.

Fortescue Metals Group

Providing mobile radio backhaul between fixed base stations along approximately 200 kilometres of rail line between the Pilbara mine and Port Hedland, ensuring that trains are in constant communication with their control centre.

Tasmanian Government (Radio Network Project)

Providing fixed base station backhaul for mobile radio services being used by the Tasmanian Police and Hydro Tasmania. The system allows both groups to share available capacity for their individual requirements while enjoying economies of scale by standardising technology and removing the requirement for establishment of individual networks.

Western Power

Providing dual services of voice and teleprotection/SCADA over the same network. This allows linesmen to carry out service work in remote field locations while maintaining critical communications over a privately owned network. The same network is also allowing teleprotection monitoring and SCADA backhaul of substation activity.

6.1.2. International Customers

4RF Communications has deployed solutions in more than 150 networks and over 95 countries. These are only some of the examples:

British Telecom

We have supplied 26 systems to provide telephone services in difficult to reach locations. One example is a recent application to link the area around Port Askaig in Scotland with the local British Telecom Exchange. These services meet Universal Service Obligations in out-lying areas, as a microwave solution is the only option to broadband-enable rural exchanges. Our equipment meets specific terrain challenges such as distance, water and mountains and provides carrier-class performance and evolution to an all IP, next generation network.

Syrian Telecommunications

We have supplied 60 systems that are being used to provide telephone services to remote locations. This has allowed STE to increase their subscriber base as well as increase capacity to existing subscribers by replacing out of date equipment. UHF frequencies are used to deliver conventional telephone services and Broadband services to remote subscribers often over difficult desert terrain.

South African Police

The South African Police have been extending the coverage of their mobile communications network requiring the use of 10 4RF systems to carry out backhaul from fixed base stations. This allows the police to carry out operations in more remote locations while maintaining critical communications to both their headquarters and other mobile police units.

Telecom Fiji

4RF provides internet, voice, and data services to more than 37 islands in the Fiji chain. We have provided 48 systems allowing connectivity to resorts with tourists needing access to the internet and modern telephone services. Much of the linking is over water with line of sight limitations and up to 75 kilometres.

OPT Tahiti

French Polynesia's national communications provider has deployed 38 4RF systems to extend GSM coverage through the islands of the Marquesas archipelago where cellular coverage is vital for economic development and tourism.

United Nations

The UN operates peacekeeping missions and local headquarters in many countries worldwide. 4RF systems operate in 21 of these countries and are used for providing telephone and internet services in very remote locations. We have supplied more than 1,000 systems to these missions providing fast, secure communications in areas of conflict and/or natural disasters. Phone, fax and broadband Internet

are vital to speed the rebuilding process and 4RF offers a fully integrated solution which is simple to deploy and minimises support requirements.

Dhiraagu, Maldives

The leading telecommunications company in the Republic of Maldives operates 132 4RF systems. Many of these systems are making use of free spectrum at 600 MHz providing cellular backhaul and broadband services into islands & resorts using high availability links over water paths.

Sri Lanka Telecom

As the primary Sri Lankan telecommunications service provider, SLT required a modern system capable of providing voice, data, and internet services throughout Sri Lanka. They have utilised 152 4RF systems to provide these services.

Mila, Iceland

Mila is a telecommunications company operating in 11 locations around Iceland. They have installed 12 4RF systems in the first phase of their rollout.

Motorola – Equatorial Guinea

4RF has deployed a 241 km link from the mainland to the presidential island in the 1.4 GHz band. This provides backhaul for Government, Military and Police voice networks, and has included additional capacity available for broadband if required at a later date.

6.1.3. Testimonials

A number of Australian and International testimonials and references can be provided on request.

6.2. Summary of presentation to African Regulators – May 2008



4RF

Communications

connecting further - connecting faster

Sub 3 GHz Radio Solutions for Rural Communications

*Commonwealth ITU Group – WTSA 2008 Preparatory Meeting
Accra, Ghana – May 2008*



Communications infrastructure for rural and remote subscribers and operators in Africa needs to address a wide range of requirements.

- *Bridging the digital and knowledge divide*
- *E-Government, Telemedicine, Distance Learning*
- *Improving services into regional areas for economic growth*
- *Capacity development*
- *Information sharing between industry and government*
- *Meeting universal service obligations and improving the “social balance sheet”*



Technology choices must facilitate delivery of these requirements

Technology options

- *Wired infrastructure*
 - *Highest bandwidth at highest capital cost*
 - *Infrastructure Security*
 - *Copper cables are stolen and Kevlar covered fiber*
- *Satellite infrastructure*
 - *Lowest bandwidth with high operational costs*
 - *Loss of control and lower reliability*
 - *High latency and susceptibility to climatic conditions*
 - *Foreign ownership, revenues are lost to foreign operators*
- *Wireless infrastructure*
 - *Wide range of options*
 - *Access and transport options at better per subscriber cost*
 - *Quick to deploy*
 - *Sub 3 GHz wireless is the best option for rural communications*

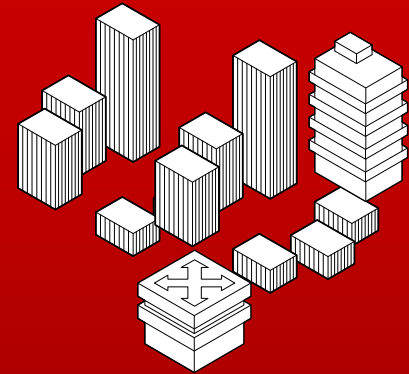
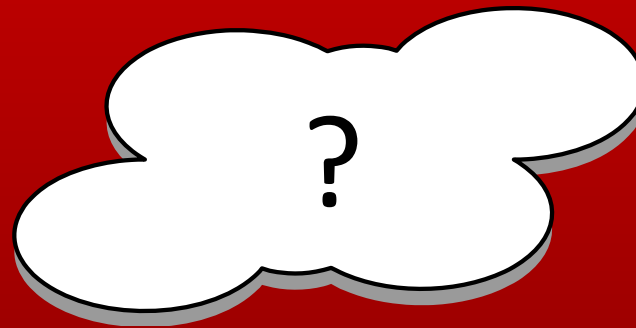
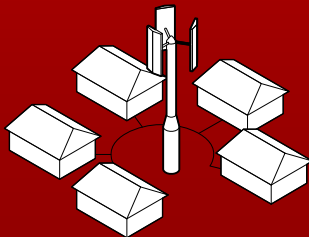


Many wireless technologies exist that offer voice, video and internet access for the last mile and many more are being developed.



Last mile wireless technologies offer better economics at higher subscriber densities. Covering areas where subscriber densities are lower will require more infrastructure.

But how do you get to the last mile.



Sub 3 GHz Microwave backhaul MUST be a key part of the equation.

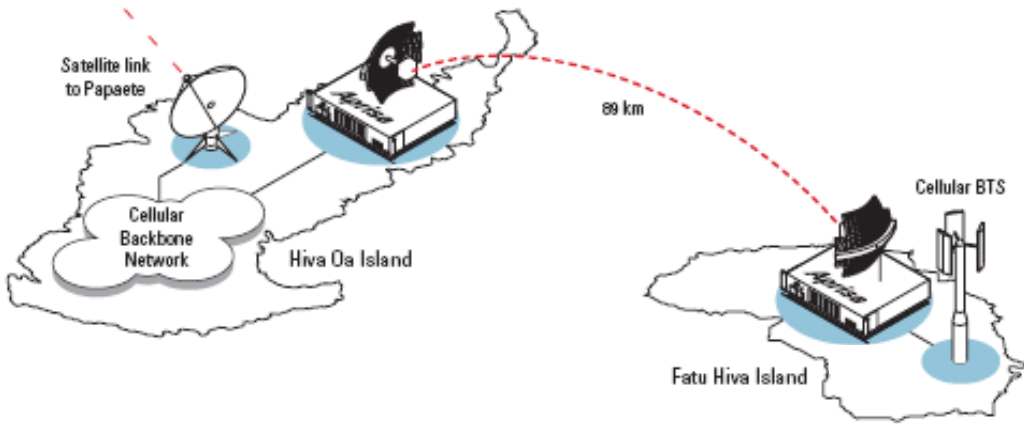
Sub 3GHz, point to point, licensed frequency bands....



- *Are an excellent option for backhaul to remote areas*
 - *Propagation characteristics lend themselves well to long distance linking*
 - *Much more tolerant to environmental and atmospheric conditions*
 - *Capitalize on diffraction characteristics over knife edge obstacles*
 - *Less susceptible to rain fade and harmattan*
 - *Lower free space loss and higher system gains*
 - *Extremely low latency*
 - *Simpler technology to deploy*

OPT - Tahiti

Office des Posts et Telecommunications



- *89 Km link across a difficult water path*
- *Primary application was cellular backhaul for small community*
- *Link provided 1Mbit/s of capacity*
 - *Cellular base station required 10 time slots*
 - *Additional capacity can be put towards broadband link and pay phone*
- *OPT added additional subscribers to its network*
- *4RF chosen as preferred supplier for thin route linking*



- *Meeting Universal Service Obligations in outer lying areas*
- *Microwave solution only option to broadband-enable rural exchanges*
- *Terrain challenges — distance, water, mountains*
- *Carrier-class performance required*
- *Evolution to an all IP, next generation network*



- *Fast, secure communications in areas of conflict and/or natural disasters*
- *Provides life-lines to the outside world*
- *Phone, fax and broadband Internet to speed the rebuilding process*
- *Fully integrated solution*
- *Simplified installation and minimal support equipment*

Other customers

- *Syrian Telecommunications Establishment*
 - *UHF frequencies used to deliver PSTN and Broadband services to remote subscribers*
 - *Difficult desert terrain*
- *Dhiraagu – Maldives*
 - *Making use of free spectrum at 600 MHz*
 - *Providing cellular backhaul and broadband services into islands & resorts*
 - *High availability links over water paths*
- *Motorola – Equatorial Guinea*
 - *241 km link from main land to presidential island in the 1.4 GHz band*
 - *Provides backhaul for Government, Military and Police voice networks*
 - *Additional capacity available for broadband if required*

4RF in Africa

Angola

Burundi

Central African Republic

DRC

Cote d'Ivoire

Equatorial Guinea

Kenya

Liberia

Libya

Mauritius

Mozambique

Namibia

Nigeria

Sierra Leone

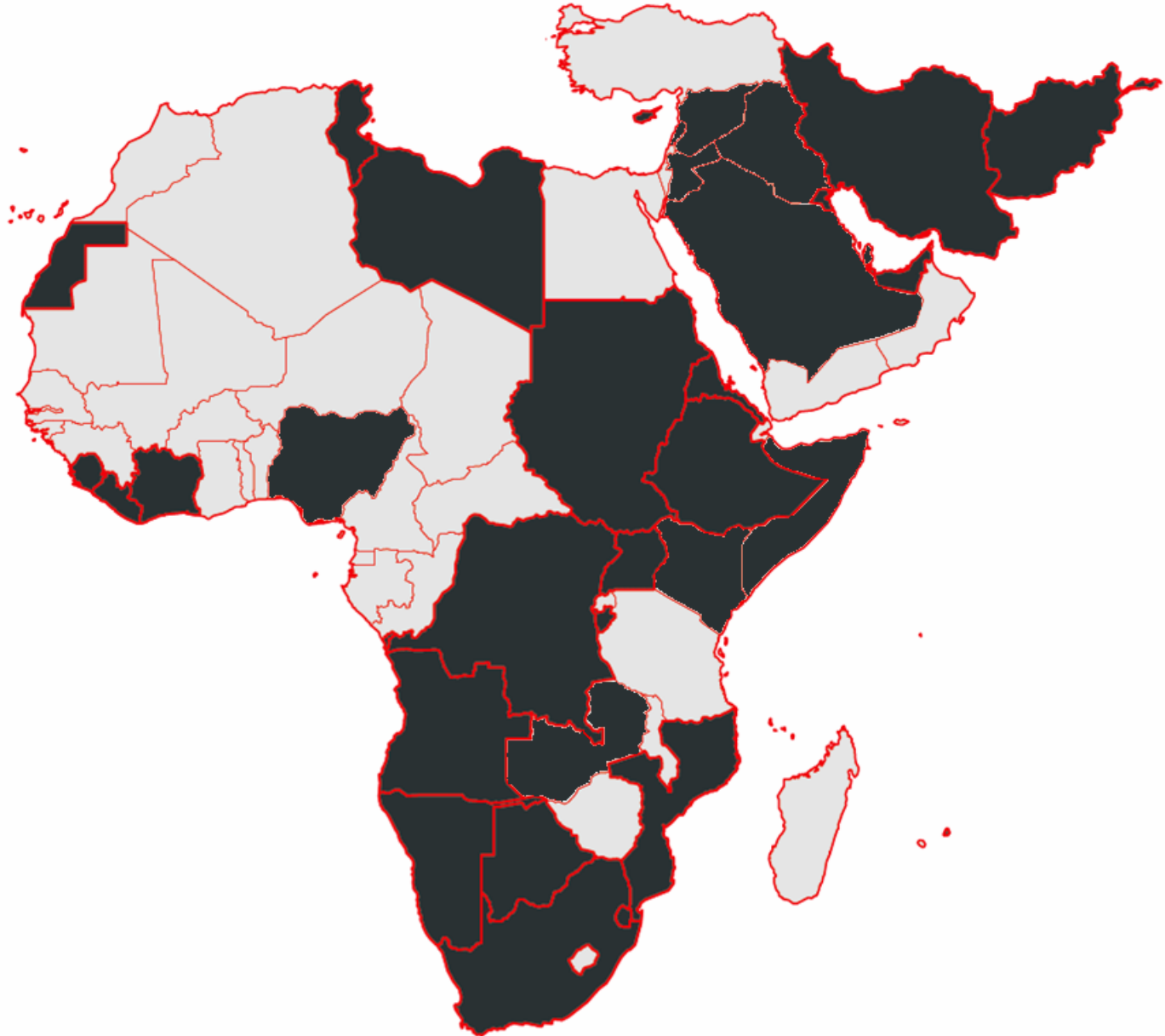
Somalia

South Africa

Sudan

Tunisia

Zambia



- *Wireless solutions make economic sense in Africa*
 - *Best technologies for rural communications initiatives*
- *Microwave backhaul into rural areas must be part of the equation*
- *Locally owned and operated networks*
- *Sub 3 GHz bands are the best option for distance linking*
 - *Minimise infrastructure requirements*
 - *Better propagation characteristics*
- *Sub 3 GHz spectrum needs to be made available for backhaul*
- *4RF has focused on the distance linking niche*
 - *Premium product offering more capacity across longer distances*
- *Solid experience in the region*