CERAGON WHITE PAPER

# Rural Broadband

## Why Microwave is a Perfect Fit

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Rural Broadband has recently become one of the most discussed topics in the Telecommunications market. Almost overlooked by the broadband revolution until recently, rural markets are now becoming more attractive thanks to a host of national incentive plans. Perhaps the most publicized of these plans is President Obama's administration-led 7.2B USD Stimulus Fund that pledges to support broadband services for rural communities. Other governments are also pushing forward broadband initiatives, such as Australia's government which for instance declared a 43B AUD (32B USD) fiber to the premise project in April 2009.

Setting up a network in and to rural areas has its challenges. Having to haul traffic over long distances, operators often find it hard to justify network set-up cost when reaching remote communities with low population density. Moreover, these networks sometimes have to bridge over geographical barriers such as mountains, forests, lakes, swamps or deserts - a fact that drives up deployment costs for traditional wired (fiber/copper) solutions.

| Country | Government Incentive for Rural Broadband (in USD) |
|---|---|
| Australia | $ 32 billion |
| USA | $ 7,2 billion |
| European Commission | $ 1.3 billion |
| New Zeeland | $ 850 million |
| UK | $ 400 million* |
| Canada | $ 192 million |
| Germany | $ 190 million |

* European Parliament boost program for British rural broadband infrastructure and renewable energy projects

Source: Intl. press

***Table 1: Government investments in rural broadband initiatives (2008-2009)***

***4 Tips for Planning Your Rural Broadband Network***

*Carriers have to plan their network to make it as cost efficient as possible and to ensure high service quality and a positive ROI. Most Rural Broadband networks stretch over long distances. Distance means that repair crews are not always at hand and that spare parts cannot always be delivered overnight. Here are some of the main issues that service providers need to consider when designing their radio backhaul network :*

1. *Link Protection - the more the network is spread out, the longer it will take for it to recover. Backhaul networks must have built in protection against failures. Traditional 1+1 radio scheme or advanced network topologies such as rings or protected E-LANs services can help design fault tolerant networks and ensure broadband service continuity.*
2. *Classes of availability - Rural Broadband is a broadband service and not all services are created equally nor do they generate the same revenue stream per transported bit. Especially in rural areas, where higher availability means also much higher cost, it is imperative to define multiple classes of availability to reach a competitive return on investment.*
3. *Maintenance - Looking at a map of US, Canada or Australia countryside it is apparent that skilled technicians would need to spend a lot of time on the road in maintenance or upgrading remote rural sites. However, a reliable radio system that can be managed and upgraded from a distance could significantly reduce this expense .*
4. *Warehousing- Deployed over long distances, Rural Broadband networks typically stretch far from the carrier's main warehouse. In order to reduce dependency on on-site warehousing, carriers can implement a license based single unit stocking strategy. Additionally, the use of compact, modular and light weight equipment will make shipment and stocking easier and less expensive.*

Today, however, wireless solutions such as high-capacity point-to-point microwave, help to simplify deployments while driving down set up and maintenance costs. Allowing for quick installation and fast time to market, these solutions are changing the entire Rural Broadband business case. And together with government spending funding plans, they make Rural Broadband an attractive investment for both competitive as well as established carriers.

So why is point-to-point microwave a perfect fit for Rural Broadband? Microwave solutions are instant, reliable and offer low-cost-per-transported bit compared to both copper and fiber alternatives. Microwave is also the preferred backhaul technology by most of the world's mobile operators.

A wireless backhaul link can be set up in a matter of hours and create a broadband connection of up to several hundred Mbps in capacity. In some parts of the world, Rural Broadband has brought about a new breed of carriers – the so called "Pure-Play" service providers. Offering data only services, these new players bypass many technical issues that voice carriers often need to tackle. With no obligation to support legacy services, they can also take advantage of cost-efficient IP/Ethernet transport which is ideal for carrying data traffic. Ethernet microwave solutions are exactly what pure-play broadband service needs as it offers them an opportunity to open up new markets quickly, cost efficiently as is so flexible.

One example of a Rural Broadband carrier that is already making good

use of wireless backhaul solutions is Stelera Wireless, a pure-play service provider based in Oklahoma City, USA. Stelera Wireless is facing the same challenge to connect rural populations so that they would not stay behind. Stelera uses HSPA (high-speed packet access), a technology typically associated with 3.5G mobile, to provide internet access services to rural communities in North America. End users may use a wireless modem or a wireless dongle connected directly to their laptop to pick up the signal and go online. Stelera offers data-rates of up to 7 Mbps downlink and 2 Mbps uplink – comparable to, and sometimes exceeding DSL. Stelera's network has almost no wires and is based mostly on cost efficient high-capacity microwave systems.

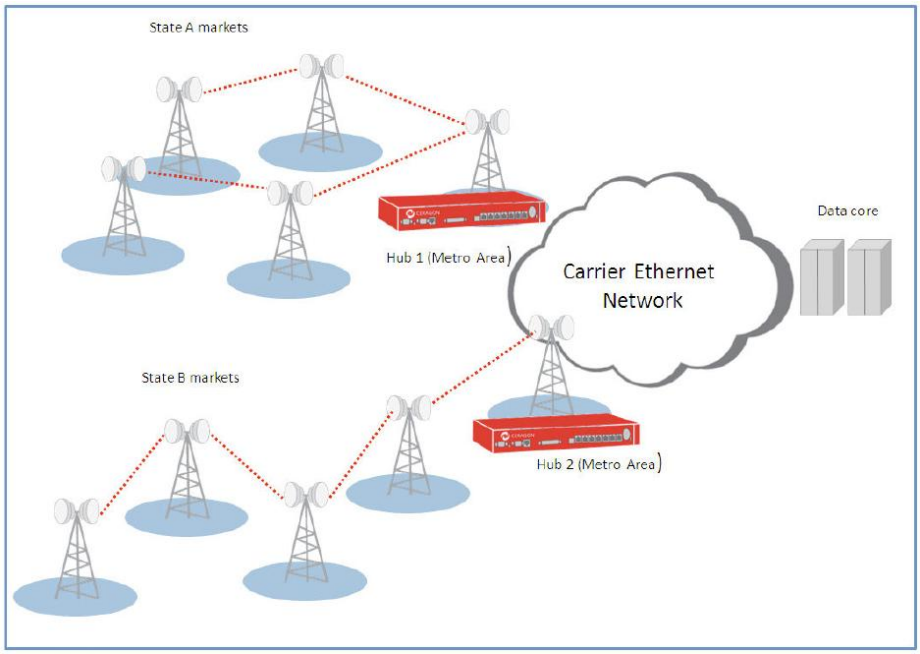


***Figure 1: National wireless rural broadband network -example***

Rural Broadband is the next step in the communication revolution that began in the 1990's with the advent of the internet and the mobile phone. In fact, it combines the two bringing users the benefits of the world-wide-web over wireless technology. For broadband service providers this means a cost-effective expansion of their networks to new markets not yet connected to the Information revolution. For the communities in rural regions all over the world, it means, new forms of enterprise, new types of skills, new sources of wealth and new forms of social interaction or in one word: Opportunity •

**ABOUT CERAGON**

**Ceragon Networks Ltd. (NASDAQ: CRNT) is the premier wireless backhaul specialist.**

**Ceragon's high capacity wireless backhaul solutions enable cellular operators and other wireless service providers to deliver 2G/3G and LTE/4G voice and data services that enable smart-phone applications such as Internet browsing, music and video.**

**With unmatched technology and cost innovation, Ceragon's advanced point-to-point microwave systems allow wireless service providers to evolve their networks from circuit-switched and hybrid concepts to all IP networks.**

**Ceragon solutions are designed to support all wireless access technologies, delivering more capacity over longer distances under any given deployment scenario.**

**Ceragon's solutions are deployed by more than 230 service providers of all sizes, and hundreds of private networks in more than 130 countries.**

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