

## Enabling a Nationwide 4G Network with North America's Largest Microwave Backhaul Deployment

### Case Study

#### BACKGROUND

A 4G pioneer, Clearwire has deployed the first 4G network in the United States and currently covers over 130 million people in 70 markets.

Clearwire's state-of-the-art flat-IP network enables advanced fixed digital voice and high-speed mobile Internet service at speeds several times faster than 3G networks.

With more than 90% of their backhaul powered by packet microwave, Clearwire has achieved dramatic cost and time to market efficiencies over traditional deployments.



#### CHALLENGE

Clearwire recognized early on that 4G would be the first wireless technology to enable a true ubiquitous broadband experience, allowing connectivity for a multitude of new high-bandwidth online services and applications that users rely on more and more in their daily life. The need for people to stay connected at high speed, regardless of location, was clear.

In order to meet this demand, Clearwire set out to pioneer the first nationwide 4G network in the United States – and it planned to do so at a much lower cost yet with much greater capacity than traditional cellular networks.

A key enabler of their strategy was the use of a cost effective backhaul solution that was simple to install and manage. Deploying fiber would have resulted in immense capital costs, while leased lines would have meant large monthly expenses, and in many cases would still fail to deliver the capacity that Clearwire needed. It became apparent that a microwave option was the backhaul solution of choice, offering an optimal combination of capacity, reliability and cost efficiency.

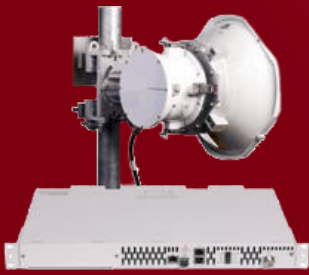
Building a greenfield microwave backhaul network afforded Clearwire the flexibility to select microwave radios that met the following key requirements:

- Packet-based, all-IP solution to ensure greater efficiency and compatibility with next generation applications and services
- High capacity and scalability
- Low latency supporting real-time applications including voice and video over IP
- Rapid deployment
- Carrier-grade reliability utilizing Clearwire's advanced ring architecture

An extensive assessment of microwave vendors led Clearwire to select DragonWave as one of its microwave radio suppliers.

**“It's what I call the elephant in the room that nobody talks about. The backhaul is probably the highest cost of deploying the network... Anyone who wants to roll out a real wireless broadband network nationwide needs a cheaper solution.”**

- Dr. John Saw, Chief Technology Officer at Clearwire



HORIZON DUO

DragonWave Horizon products operate in both licensed and unlicensed radio frequencies between 6 and 38 GHz and deliver the capacity, reliability and latency to support the current and future requirements of 4G networks.



HORIZON QUANTUM

# Solution

## SOLUTION

Clearwire is currently deploying Horizon® Duo microwave systems in its high-capacity backhaul network ring architecture. Clearwire is also currently evaluating DragonWave’s next generation microwave radio and modem products – the Horizon Quantum – for potential deployment in its network. DragonWave’s solution offers the following benefits to Clearwire:

- **High Capacity Packet Architecture** – The simplified all-IP Horizon architecture meets the needs of Clearwire’s WiMAX network and the applications it will support.
- **Automatic, Remote Scalability** – Dragon-Wave’s Flex bandwidth allows capacity to scale automatically based on subscriber growth.
- **Greatly Reduced Operating Costs** – The exclusion of leased lines produces a dramatic reduction in recurring costs for Clearwire.
- **Enabling 4G Applications** – Horizon’s low latency and advanced priority queuing, meets the requirements of future 4G applications.

## SUCCESS STORY

Clearwire is currently operating the world’s largest wireless 4G microwave backhaul network in dozens of markets across the United States. Remarkably, the deployment has cost approximately 50 percent less – both in terms of capital expenditures and time – relative to traditional cellular implementations. This is due primarily to the flat-IP architecture and a backhaul network that is over 90 percent microwave.

Not only has Clearwire shattered existing network cost models, but it has done so with a solution that offers 100 times greater capacity than traditional leased line backhaul networks.

As the service provider expands its network, it will continue to deploy advanced packet microwave backhaul solutions: “...to meet the growing demand for high-speed mobile connectivity, we need increasingly powerful, intelligent and cost-efficient solutions to capitalize on demand for bandwidth intensive and runtime sensitive applications,” said Dr. John Saw, Chief Technology Officer at Clearwire.

“Recurring costs for backhaul facilities are where the savings are. Once the radio equipment is installed and running, the recurring cost is relatively mild, representing annual fees for microwave licenses.”

- Dr. John Saw,  
Chief Technology  
Officer at Clearwire



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