



Ultra-spectral efficiency at the core of Great River Energy's new SCADA communications network

Great River Energy
Maple Grove, Minnesota, USA

UBIIX  mimomax

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Requiring a communications network to support their SCADA requirements, Great River Energy in Minnesota chose to deploy radios from Mimomax for their extensive 700MHz Point-to-Multipoint communications project.

CHALLENGE

With a 56,000 square mile service area to cover, Great River Energy was in need of a robust, cost-effective and stable communications solution to support their critical infrastructure. Tree cover and challenging terrain added challenges to the coverage design of the project and the solution needed to be scalable to add an element of future-proofing for network expansion.

SOLUTION

Mimomax engineered a wireless Point to Multipoint communications network based around their world-leading Tornado radio. Utilizing full duplex, Multiple Input Multiple Output (MIMO) communications combined with high order modulation (256 QAM) effectively doubled the data capacity in the two 1MHz channels Great River Energy had leased.

“The level of throughput offered to Great River Energy via our Tornado radios allowed them to effectively utilize the available 700MHz spectrum in ways not possible with traditional radio communications,” said Paul Reid, General Manager for North America, Mimomax .

Incorporating Adaptive Modulation into the Tornado radios allows for every link in the point-to-multipoint

network to be maintained independently, irrespective of any modulation fluctuations in the surrounding links. In addition, the two by two MIMO technology offers the flexibility for customers to carry out activities such as software updates while continuing to run their SCADA monitoring.

With 700MHz being a narrow slice of spectrum sandwiched between Verizon’s LTE system and FirstNet’s proposed public safety broadband network, further challenges were posed in terms of out-of-band interference and the potential for self-interference. The built-in duplexers in the Tornado radios assisted with removing channel perturbations and due to their operation on lower RF power, the Tornado network offered the opportunity for greater levels of frequency re-use.

“Our previous system has used three large channels which did not allow us many options for frequency re-use and, as a result, we have faced a lot of challenges with self-interference. By using 50 kHz channels, we now have a much more robust frequency plan and expect our self-interference to greatly improve or even be eliminated altogether.”

KATHY SHAFT | PE SENIOR TELECOMMUNICATIONS ENGINEER - GREAT RIVER ENERGY



RESULTS - PHASE ONE ROLL-OUT

Still in the early stages of deployment, the project's detailed coverage engineering and propagation modelling carried out prior to deployment had ensured the co-channel protection could be achieved. In addition, the ability to configure radios to operate at bandwidths of 12.5, 25 or 50KHz has offered Great River Energy the ability to choose a mixture of channel bandwidths at any of their base stations, depending on their needs.

While the deployment of the Mimomax network will continue to roll out through 2018, key elements of the project, such as the comprehensive training plan designed and delivered by Mimomax are now complete. Aiming to build an extensive knowledge base in-house at Great River Energy thereby lowering long term operational costs, the training plan focused on topics such as antenna installation, RF configuration and Multipoint Digital Linking.

KEY BENEFITS

- Mitigation of out-of-band and self-interference via channelization and frequency re-use
- Double the data throughput, optimizing investment in spectrum
- Solution equipped for challenging terrain and harsh weather conditions
- Ability to simultaneously monitor SCADA applications and update software

ABOUT GREAT RIVER ENERGY

Location: Maple Grove, Minnesota

Industry: Power & Water Utility

Services: Great River Energy provide wholesale electric service to 28 member cooperatives which distribute electricity to approximately 695,000 member consumers in Minnesota - or about 1.7 million people.



About Ubiik Mimomax

Ubiik Mimomax develops wireless communications solutions for narrowband and private LTE which enhance visibility and control - right to the edge of our customer's networks. Founded in 2007 as Mimomax Wireless, the company was acquired in 2023 by Ubiik, bringing an expanded product range to include LTE and NB-IoT technologies.

Our award-winning narrowband radios utilize Multiple Input, Multiple Output (MIMO) technology combined with full duplex communications and ultra-low latency to provide our customers with communications solutions which optimize data throughput and provide rapid feedback and control of their mission-critical assets. Our small cell pLTE networks bring cost effective connectivity to a range of smart devices for utilities, transport, oil & mining and municipalities.

US Office

4630 East Elwood St, Suite 4

Phoenix, AZ 85040

Phone: 602 441 2448

Email: sales@mimomax.com

mimomax.com

Regional

Western North America: Dennis Sullivan, dennis.sullivan@mimomax.com

Eastern North America: Keith Woodall, keith.woodall@mimomax.com

Australia, New Zealand: Ronald Martinez, ronald.martinez@mimomax.com

International: Paul Reid, paul.reid@mimomax.com