

About RuggedMAX™



RuggedMAX™ is a high-performance, long range, secure family of products fully compliant with the WiMAX 802.16e Wave 2 (MIMO) mobile broadband wireless standard. RuggedMAX™ is designed to extend IP networks over large distances to fixed and mobile users.

The product family includes a variety of base stations and subscriber stations with differing output powers, form factors and frequency options for use in licensed or license exempt bands.

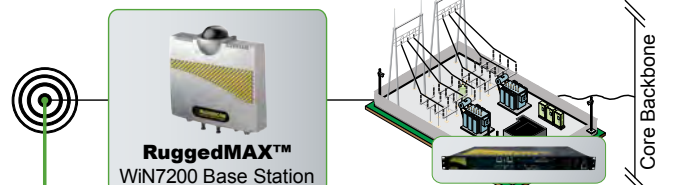
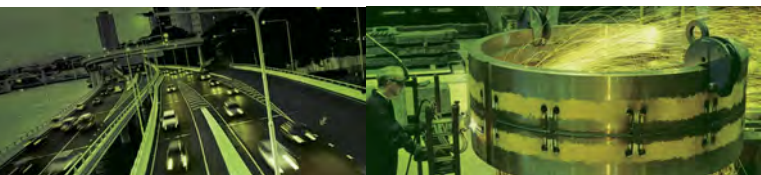
The RuggedMAX™ product family has gone through extensive end to end network interoperability testing to support multiple different ASN gateway platforms and 3rd party subscriber devices in order to give customers flexibility by leveraging the full WiMAX ecosystem. RuggedMAX™ with its all outdoor and ruggedized compact form factor and flexible configuration support is ideal for use in mission critical private networks.

What is RuggedRated™?

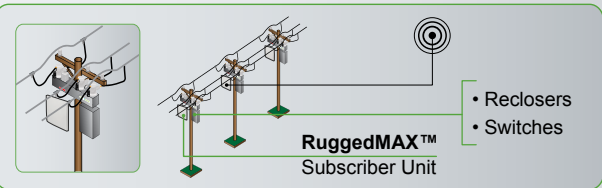


Every networking and communications product that RuggedCom produces is RuggedRated™. The RuggedRated™ certification indicates that the device has been specifically designed to withstand the demands of harsh industrial environments.

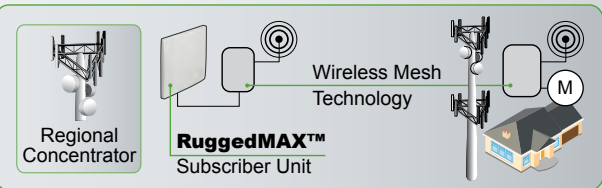
Smart Grid Quad Play



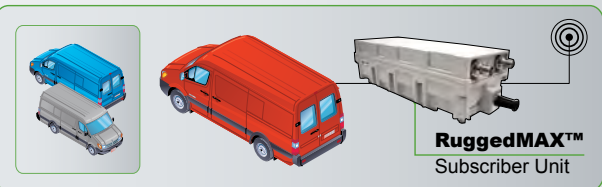
1 Distribution Automation



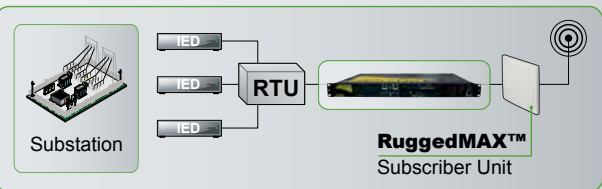
2 AMI Backhaul



3 Mobile Workforce



4 SCADA



Applications



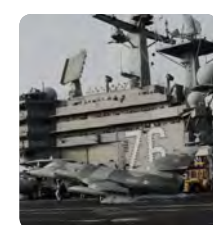
Electric Utilities Applications

- Distribution Automation
- AMI/R backhaul
- SCADA enhancement
- Mobile Workforce



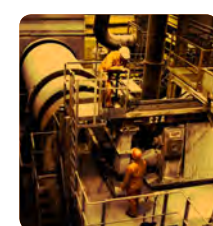
Transportation Applications

- Traffic control
- Monitoring and Control
- Asset tracking
- Mobile video surveillance



Military/Public Safety Applications

- COTS tactical communications systems
- Extend satellite networks



Industrial Applications

- Pipeline surveillance
- Extending the network for field personnel
- Offshore connectivity



RuggedCom Inc.

300 Applewood Crescent, Unit 1, Concord, Ontario, Canada L4K 5C7

Tel: +1 (905) 856-5288

Fax: +1 (905) 482-2156

Toll Free: 1 (888) 264-0006

RuggedInfo@RuggedCom.com

www.RuggedCom.com

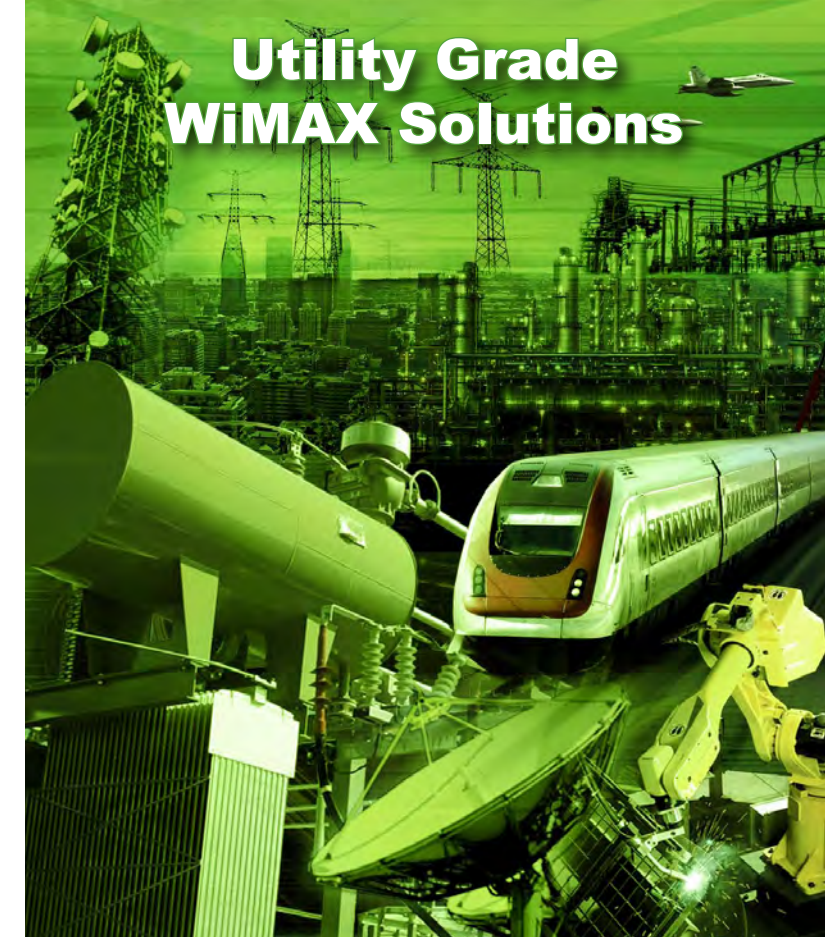
5-Year Warranty Applicable to design or manufacturing related product defects.

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Patent Pending
All Specifications in this document are subject to change without notice.



Utility Grade WiMAX Solutions



Base Stations

Subscriber Units

Complete Network Solution

Key Differentiators



RuggedMAX™ WiN7000

High Power Base Station

- Ruggedized all outdoor form factor designed for substation environment
- High output power of 2x 36dBm
- Greater than 40 Mb/s total aggregate throughput
- Available in 1.X, 2.X, 3.X GHz frequency bands
- Supports standard ASN gateway for full mobility or lightweight architecture
- Daisy Chain architecture supports multi-sector sites
- Optimize link performance in NLOS conditions through STC/MRC and MIMO radio technologies
- Optional direct fiber optic interface
- Automatic Transmit Power Control (ATPC) to allow for optimal network deployment and interference avoidance



RuggedMAX™ WiN7200

Outdoor Power Base Station

- Ruggedized all outdoor form factor designed to live in substation environment
- Available in 2.X, 3.X GHz frequency bands
- Supports standard ASN gateway for full mobility or lightweight architecture
- Certified for FCC 3.65 GHz band use
- High Output power with low power consumption – 2x +27dBm and less than 30 W
- Power over Ethernet single cable design
- Small form factor, simple to install on poles, walls or rooftops
- Supporting greater than 40 Mb/s throughput
- Flexible configurations (pt-pt, reach extender, point to multipoint)

Common Features:

- Mobile-WiMAX compliance based on IEEE 802.16e standard and WiMAX Forum Wave2 (MIMO) certification
- Numerous applications and services - guaranteed voice, video and data services based on advanced QoS levels and a variety of classification / prioritization Schemes
- Ecosystem compatibility with any RuggedMAX™ product or 802.16e standard compliant WiMAX network equipment
- Adaptive modulation to optimize throughput and facilitate performance robustness
- Powered by OFDMA technology for superior range, throughput and spectral usage



RuggedMAX™ WiN5100

Vehicular Subscriber Unit

- 2 antenna connectors for roof top antenna connection
- Superior range and coverage
- Powered directly through 12 V or 24 V



RuggedMAX™ WiN5200

Outdoor Subscriber Unit

- High Gain Integrated Antenna
- Rugged case protects against harsh outdoor conditions
- Power over Ethernet



RuggedMAX™ WiN5500

Indoor Subscriber Unit

- Support of worldwide WiMAX deployments in the 2.5GHz, 3.5GHz and 3.65GHz band
- Voice over IP - high quality telephony over the IP network
- Up to 26dBm output power



RuggedMAX™ WiN5800

USB

- Quadruple play solution for Data, Video, Voice and Mobility to personal computer
- Plug-and-play installation and operation
- USB2.0 Interface

Common Features:

- Mobile-WiMAX compliance based on IEEE 802.16e standard and WiMAX Forum Wave 2 Profiles
- Multiservice support including, voice, SCADA, mission critical control data, video and many more...
- Excellent performance in NLOS conditions - overcoming multi-path and deep fading, providing extended range and easy installation
- Automatic Transmit Power Control (ATPC) allowing for optimal network deployment, tight frequency reuse, and interference avoidance
- Numerous applications and services - guaranteed voice, video and data services based on advanced QoS levels and a variety of classification/prioritization schemes
- Low cost of ownership through simple installation and demand-based build-out, enabling operators to rapidly penetrate new market segments with minimal CAPEX

RuggedNMS™

Element Manager System

RuggedNMS™ is a fully-featured enterprise grade network management software platform designed specifically for the rugged communications industry. RuggedNMS™ provides a comprehensive platform for monitoring, configuring, and maintaining mission-critical IP-based communications networks, such as those found in substation automation and “Smart Grids” for electric utilities, intelligent transportation systems, and advanced control and automation for industrial processes.



Fault Management:

Alarms and events real-time reporting, alarm sorting and filtering, alarm status management, event logging, historical event queries, and security information



Configuration Management:

Device discovery hierarchical location and management, unit configuration and software upgrade, logical and geographical topology views and inventory management.



Performance Monitoring:

Monitoring of traffic load, wireless link performance parameters and quality of service performance statistics to identify problems and bottlenecks, maximize traffic capacity and optimize resource allocation.



Security Management:

User management, user groups, functional permissions and passwords for multi-level authorization and access protection.

Core Service Network Elements

RuggedCom® offers the RuggedMAX™ solution, a complete end-to-end WiMAX solution joining all network elements in the Access and Core Network.

- ASN Gateway
- DHCP Server
- AAA Server

Technology:

Long Range: Transmit and receive diversity for improved reach and Non-Line of Sight Performance

High Bandwidth: RuggedMAX™ has two built-in radios operating on the same frequency simultaneously (MIMO) to increase bandwidth and effective spectral efficiency

Lowest Frequency Use: Leverages OFDMA and built in GPS to enable users to deploy an entire network on a single frequency channel, minimizing potential interference

Usage models: Designed to support long range connections to fixed, portable and mobile end points, supporting vehicular speed seamless mobility.

Quality of Service: RuggedMAX™ gives the user the ability to separate traffic types over the air, and guarantee latency, minimum bandwidth and jitter according to application needs.

Product:

Rugged Form factor: RuggedMAX™ is an all outdoor ruggedized form factor enabling flexible deployment options. RuggedCom products are designed for use in harsh environments such as those found in electrical power substations, oil refineries, military applications, roadside traffic control cabinets and metals and minerals processing.

Lightweight Network Architecture: Commercial WiMAX equipment requires an entire network infrastructure to be in place including a specialized mobile router called an ASN gateway, which acts as a central point for all network traffic. This infrastructure can be very costly and complex to implement. RuggedCom® has developed a mode which does not require this heavy infrastructure but maintains the interoperability and technology advances of WiMAX.

Secure: RuggedMAX™ has many built-in features to ensure NERC CIP compliance such as two factor mutual authentication, AES encryption and message integrity protection using CMAC.