

# IBM Secure 802.16 WiMAX Wireless Metropolitan Area Networking Solution

Enabling high speed data connectivity, VoIP and web based applications to disparate buildings and remote locations where installation of fiber optic cabling is too costly or not feasible



## An alternative to cable, DSL and T1/E1 - transforming the world of wireless broadband and eliminating recurring costs

*The integration of the IEEE 802.16 standard enables the dissemination of information to hard to reach areas in real-time. It can provide Government agencies with the instantaneous ability to securely augment and enable new high speed data capacity in hard to reach areas and where it is needed most. Extending precious Wide Area Satellite pipes to lower levels, it provides aggregation of data via Wireless Metropolitan Area Networking and enables more efficient use of satellite resources.*

### Highlights

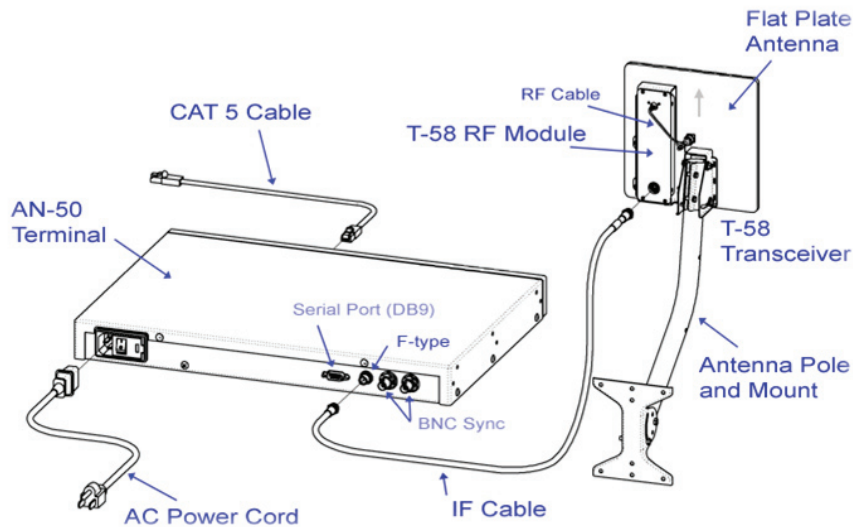
- Point to multipoint capabilities allowing for one-to-many connections, providing all buildings with high speed data infrastructure and connection into the network with secure access
- Compliant with the new DoD instruction 8100.2 and coupled with an IBM security solution that is NSA / NIST Common Criteria and FIPS-140-2 certified, our wireless solution becomes compliant with DoD instruction 8500.1 and NIST Special Publication 800-37
- Eliminates recurring fees for T1 /T3 and satellite time costs
- Long range capability up to 75 Miles line of sight (LOS) and up to 15 miles non line of sight (NLOS)

### Performance Improvements

In many cases, NLOS links can be made by taking advantage of reflections off of nearby buildings, or by diffraction over the tops of trees. In fact, many wireless links can be made even when the direct route is completely blocked by buildings or trees, i.e. entirely dependent upon reflections. This solution allows up to 75 miles LOS and up to 15 miles NLOS capability, with high speed data capability of 72Mbps over the air and 54Mbps actual information rate capability. It offers a very small network and outdoor unit footprint with a modem that is only 1 rack unit high and antennas that are 1 foot by 1 foot square.

### Use of the Orthogonal Frequency Division Multiplexing (OFDM) waveform enables the 802.16 products to “close the RF Link” when obstructions are in the way

Fresnel zone encroachment is a special case of multi-path interference. When the fresnel zone is encroached by trees, buildings or the ground, reflections are caused which can become destructive multi-path interference. Since the OFDM is more tolerant of fresnel zone encroachment, reliable links will operate that otherwise could not be used, or antennas can be located in more convenient and less costly locations. For example, an antenna could be



**Offers a very small network and outdoor unit footprint with a modem that is only 1 rack unit high and antennas that are 1 foot by 1 foot square.**

located lower on a tower, saving significant cable and antenna installation and support costs. With OFDM, the base-band signal or information is carried over multiple carriers. If one or two carriers are degraded by selective fading, the impact is minimal since the information is spread across the remaining carriers.

### **ODFM Advantages:**

- Line of sight, optical line of sight and non line of sight capabilities
- High tolerance against multi-path
- High spectral efficiency
- Payload rate up to 54 Mbps
- Inherently resistant to interference
- The most robust technology for back haul

### **IBM 802.16 WiMAX solution features and benefits:**

- High speed wireless bridge for point-to-point applications
- Designed to improve throughput up to ten fold across the network
- Operation in unlicensed 5.8 GHz band (5.725-5.825 GHz)
  - or operates in the 5.4 or 3.5GHz licensed frequency spectrum
- Rates: 72 Mbps coded (over the air) or

54 Mbps peak burst at MAC level or 44-48 Mbps average rate at Ethernet port

- 9 Channels (5 non overlapping)
- SNMP management
- Dynamic Adaptive Modulation:
  - BPSK, QPSK, 16 QAM and 64 QAM
  - Burst by burst
  - Upstream and downstream
- Compliant with the new DoD instruction 81002 and coupled with an IBM security solution that is NSA / NIST Common Criteria and FIPS-140-2 certified, our wireless solution becomes compliant with DoD instruction 8500.1 and NIST Special Publication 800-37
- Long range capability up to 75 Miles line of sight and up to 15 miles non line of sight
- Extremely low latency (3-5 msec) ideal for time sensitive applications like VoIP and video
- Patented acknowledge repeat (ARQ) error correction
- Achieve PER/BER=1E-6/1E-9
- Confine delay to maximum one re-transmission
- Avoids signal correction occurring at TCP level, which involves significantly more overhead
- Orthogonal Frequency Division Multiplexing (OFDM)

### **For more information**

To learn more about IBM Business Consulting Services and IBM Secure 802.16 WiMAX Wireless Metropolitan Area Networking Solution, e-mail us at SecPrivW@us.ibm.com or call 1-877-217-1034, Keyword: **Security, Privacy & Wireless**

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Bethesda, MD.  
U.S.A.

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