

Business White Paper
Broadband Wireless Access

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What WiMAX Forum Certified™ will bring to 802.16

Why should you purchase equipment that is WiMAX Forum Certified™? With WiMAX Forum Certified™ equipment you can buy with confidence since multi-vendor interoperability is assured. This white paper addresses the benefits that WiMAX Forum™ activities lend to the IEEE 802.16 standard. The paper examines various perspectives, that of the systems vendor, the service provider and the sub-system, sub-component manufacturer.

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Introduction

IEEE 802.16 based networks address the last mile of the communications infrastructure between a service provider's point of presence (POP), and business or residential customer locations. In residential areas today, the last mile, also known as the access network or local loop, consists predominantly of wireline choices – copper telephone wires or coaxial cable-TV cables. In metropolitan areas, where there is a high concentration of business customers, the wireline access network today often includes high-capacity SONET rings, optical T-3 (45-Mbit/sec), and copper-based T-1 (1.5-Mbit/sec) lines. Generally, these “last mile” connections for small and medium enterprise (SME) and residential customers have been bandwidth constrained creating a “bandwidth bottleneck.”

Where do WiMAX Forum Certified™ products fit?

In an 802.16 based network, a network provider would set up base stations consisting of one or more sectors that are connected to their edge and core networks via wireless or wireline connections as appropriate. Each base station is capable of supporting hundreds of products versus proprietary wireless access technologies creates a strategic option for the network planner focused on developing a network fabric that is capable of scaling over time. Emerging WiMAX Forum Certified™ products have significant advantages over current proprietary solutions:

- They create a forward looking “future-proof” transport and access network platform for the delivery of “triple threat” services (voice, video and data)
- They are generally based upon Ethernet, which has proven to be the most effective infrastructure for data networks over the past decade
- They have the advantage of world-wide support from not only the WiMAX Forum™ but also the IEEE and ETSI

Typically, only larger enterprises can afford to pay the \$1,000+ per month that it costs to lease a 45-Mbit/sec connection. Purchasing T1s at \$300 per month are an option for some medium-sized enterprises, but even today most small businesses and residential customers are left with few choices beyond dialup Internet access. Where available, broadband internet access over DSL and cable modem offers a more affordable solution for data, but these technologies are difficult and time-consuming to provision, bandwidth is limited by distance and the quality of existing wiring, and voice services have yet to be widely implemented over these technologies. Most importantly, in rural and underserved markets, these wireline choices are simply not available as an option.

Visionary companies that feel that proprietary wireless access solutions are inappropriate for the wireless access network of the future have spearheaded the development of WiMAX Forum Certified™ products. The proprietary solutions are wanting because they generally lack video capabilities, deliver insufficient bandwidth, are overly complex, and are more expensive due to a non-integrated supply chain. As the move to Ethernet picks up steam, Ethernet-based broadband wireless access networks will eliminate the need for multiple conversions within the WAN and LAN between ATM and Internet Protocol (IP) network elements.

Equipment vendors are focusing initially on developing comprehensive transport and access solutions, with the long-term objective of realizing a full-service standards-based solution for delivering data, video, and voice over a single platform. While WiMAX Forum Certified(tm) products offer higher bandwidth, lower costs, and broader service capabilities than many proprietary alternatives, the architecture is similar with the benefit of adhering to the IEEE 802.16 standard.

Why select WiMAX Forum Certified™ Products?

The purpose of the WiMAX Forum™ is to promote deployment of broadband wireless access networks by using a global standard (802.16) and certifying interoperability of products and technologies manufactured by member companies.

WiMAX Forum Certified™ products will be based upon a single global standard enabling complete interoperability worldwide. The WiMAX Forum™ will follow the IEEE's tradition of being a clear, comprehensive, and complete standard, designed for very high volume applications. Products that have been through the WiMAX Forum Certified™ process will reduce investment uncertainties for all parties in the access network value chain, from technology providers to service providers to end users. For network operators, equipment and component manufacturers, and ultimately, for subscribers, products that are WiMAX Forum Certified™ will deliver wireless broadband access with a range of interoperable components. For the first time, all parties will experience the most effective wireless infrastructure for broadband data services whether fixed, nomadic or eventually mobile, they will experience future-proof transport for data, video and voice applications, all through a simple global interoperability and certification process that will ensure interoperability.

In current commercial deployments, broadband wireless networks deliver more bandwidth than traditional copper cables and exhibit a clear economical advantage over wireline alternatives in the last mile. Historically, many operators worldwide have used broadband wireless technologies, namely point-to-point radios, as a proven, service provider-class method of connecting long-haul networks. And while point-to-point technologies have also been used for

access in isolated cases (and with mixed results), point-to-multipoint technologies have long been recognized as the 'holy grail' for service providers because of their ability to provide broadband services over large geographic areas with greater flexibility and improved economies of scale. The industry has suffered from limited deployments, however, due to the high cost and low functionality of early-generation of broadband wireless systems.

In addition, a lack of healthy competition caused by various factors has contributed to the industry malaise. In addition, with frequency regulations varying from country to country, equipment manufacturers have used only proprietary air interface technologies. These and other factors have precluded the broadband wireless market from benefiting from the economies of scale that other technologies enjoy from open standards.

WiMAX Forum Certified™ is an open certification based on IEEE Standard 802.16d. The WiMAX Forum™ also plans to certify that products are compliant with the interoperability requirements set forth by The WiMAX Forum™ Technical Working Group. For network operators, this interoperability yields the operator more options, the flexibility of deploying broadband wireless systems from multiple vendors, and the knowledge that all products deployed, if certified, will interoperate seamlessly.

Further, the evolution of a service provider's network over time-especially the multi-vendor network that might result from standards-based products being available-is also a key concern that is solved by selecting WiMAX Forum Certified™ products. For example, one of the building blocks of the IEEE 802.16 standard is the concept of a "variable burst length," a feature adopted to ensure a migration path from ATM networks to IP networks. With WiMAX Forum Certified™ products, service providers can be sure that this type of evolution can occur in their network even when it is made up of products from multiple vendor as certified interoperability will guarantee a known interoperability level between systems.

What does this mean to the bottom line?

The economic case for broadband wireless access networks is simple: wireless in many cases is the most effective medium for transporting data, video, and voice traffic and offers much higher bandwidth in the access network than existing wireline options with the exception of fiber. The cost of running fiber "point-to-point" from every potential customer location to the central office or POP, installing electronics at both ends of each fiber, and managing all of the fiber connections at the central office is prohibitive. Broadband Wireless Access networks built upon WiMAX Forum Certified™ products address the shortcomings of fiber solutions by using a point-to-multipoint topology instead of point-to-point in the access network, eliminating the cost of installation and the reoccurring operating cost due to the use of active electronic components such as

regenerators, amplifiers, and lasers within the outside plant, and reducing the number of network elements needed at the central office.

What's Ahead

IEEE 802.16 products are in the early phases of commercial development with initial trial deployments anticipated during the second half of 2004. Standardization efforts have been underway for almost five years and momentum is building for multi-vendor interoperability.

The stage is set for a paradigm-shift in the communications industry that could well result in a completely new equipment deployment cycle, firmly grounded in the wide-based adoption of Ethernet technologies. This Broadband Wireless Access network architecture promises to become a significant means of delivering bundled voice, data, and video services over a single network. WiMAX Forum Certified™ products are an enabler for a new generation of cooperative and strategic partnerships, bringing together service providers, network operators, and equipment manufacturers to deliver service packages unrivaled by any other past offering in the wireless industry.

Attributing Company: Redline Communications

Redline Communications is a leading provider of standards based broadband fixed wireless equipment, helping companies reduce costs, extend and enhance networks and increase customer satisfaction. Redline is a leader in using OFDM technology to provide robust high-speed wireless connectivity. Redline's AN-30 and AN-50 are recognized for their unique capabilities in providing backhaul links and high-speed access links to urban and rural service providers. Redline has also introduced the AN-100, the world's first IEEE 802.16a standards based solution. Redline has more than 5,000 systems installed by customers in over 40 countries in industries as diverse as carriers, school boards, manufacturing, Internet providers, transportation, government, and health care facilities. Redline is a principal member of the WiMAX Forum(tm), and is committed to developing WiMAX Forum Certified(tm) products. www.redlinecommunications.com

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Mr. Suitor has held many senior level positions in several organizations most recently within CopperCom's Business Development Group. Earlier, Mr. Suitor built a solid track record at the executive level in a variety of roles with organizations such as CTI Datacom, Tekelec, DCI Digital Communication Inc. and Wandel & Goltermann. He brings to Redline extensive market and technology knowledge relating to North American service providers and equipment manufacturers. Mr. Suitor has written numerous contributed articles in several industry publications and is a regular speaker on topics such as ATM, Gigabit Ethernet, Virtual Private Networks and Voice Services.

