

**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™?

WiMAX Forum Certified™ equipment allows users to buy equipment with confidence since it ensures multi-vendor interoperability.

This white paper addresses the benefits that WiMAX Forum™ activities lend to the IEEE 802.16 standard from various perspectives: the systems vendor, the service provider and the sub-system/sub-component manufacturer.

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Introduction

In residential areas today, wireline choices for the last mile - also known as the access network or local loop - are predominantly copper telephone wires, coaxial or TV cables. In metropolitan areas, where there is a high concentration of business customers, today's wireline access networks often include high-capacity SONET rings, optical T-3 (45-Mbit/sec), and copper-based T-1 (1.5-Mbit/sec) lines. There are, however, a number of challenges associated with these technologies.

For one, bandwidth constraints in these last mile connections for small and medium enterprise (SME) and residential customers have created bottlenecks.

In addition, wireline options can be costly. Only larger enterprises can afford to pay \$1,000+ per month to lease a 45-Mbit/sec connection. While purchasing T1 lines at \$300 per month can be an option for some medium-sized enterprises, most small businesses and residential customers are still confined to dialup Internet access. Where available, broadband Internet access over DSL and cable modem offers a more affordable solution for data. However, these technologies are difficult and time-consuming to implement. Bandwidth is limited by distance and the quality of existing wiring and voice services have yet to be widely used over these technologies. In rural and underserved markets, these wireline choices are simply not available as an option.

The wireline challenges for the communications infrastructure between a service provider's point of presence (POP) and business or residential locations are now being addressed through the deployment of IEEE 802.16 based networks.

An 802.16-based network allows network providers to set up base stations. These consist of one or more sectors that are linked to edge and core networks using wireless or wireline connections. Unlike proprietary wireless access technologies, each base station can support hundreds of products from different vendors. This allows network planners to develop highly scalable networks.

Where do WiMAX Forum Certified™ products fit?

Today, equipment vendors are focusing initially on developing comprehensive, standards-based transport and access solutions. The long-term goal is the ability to deliver data, video, and voice over a single platform. WiMAX Forum Certified™ products achieve this while offering higher bandwidth, lower costs, and broader service capabilities than many proprietary alternatives.

Visionary companies who feel that proprietary wireless solutions won't support future wireless access networks are spearheading the development of WiMAX Forum Certified products. The

purpose of the WiMAX Forum is to promote deployment of broadband wireless access networks by adopting a global standard and certifying worldwide interoperability of products and technologies manufactured by member companies.

WiMAX Forum Certified is an open certification based on IEEE Standard 802.16d. The WiMAX Forum also plans to certify products that are compliant with the interoperability requirements set forth by The WiMAX Forum Technical Working Group. For network operators, this interoperability provides the flexibility to deploy broadband wireless systems from multiple vendors.

Why select WiMAX Forum Certified products?

Emerging WiMAX Forum Certified products have significant advantages over current proprietary solutions, because they:

- Create a forward looking “future-proof” transport and access network platform for the delivery of “triple play” services (i.e. voice, video and data)
- Are generally Ethernet-based, which is proven to be the most effective infrastructure for data networks
- Have the advantage of worldwide support from the WiMAX Forum as well as the IEEE and ETSI

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 undergo the WiMAX Forum Certified process will reduce costs for all elements in the access network value chain. WiMAX Forum Certified products will deliver wireless broadband access with a range of interoperable components to network operators, equipment and component manufacturers, and ultimately, for subscribers.

This means, for the first time, all parties will enjoy the most effective wireless infrastructure for broadband data services, including fixed (permanent), nomadic (portable) and eventually, mobile (fully transportable signal delivery). It will ensure future-proof transport for data, video and voice applications through a simple global interoperability and certification process.

What does this mean to the bottom line?

In current commercial deployments, broadband wireless networks deliver more bandwidth than traditional copper cables. As such, they 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 or PTP radios) as a proven, service provider class method of connecting long-haul networks. PTP technologies have also been used for access in isolated cases with mixed results. The 'holy grail' for service providers is point-to-multipoint (PMP) technologies, because they can provide broadband services over large geographic areas with greater flexibility and improved economies of scale.

There are a number of factors that have kept the broadband wireless market from benefiting from the economies of scale that other open standards technologies enjoy. Deployments to date, for example, have been limited. This is in part because of the high cost and low functionality of early-generation broadband wireless systems.

A lack of healthy competition and market complexity have also held back standards-based development. Varying frequency regulations from country to country, for example, have led equipment manufacturers to use only proprietary air interface technologies. This in turn has inevitably led to the evolution of multi-vendor networks over time as networks continue to grow.

Much of these can be resolved through the availability of standards-based products – more specifically 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". This feature ensures a migration path from ATM networks to IP networks. With WiMAX Forum Certified products, service providers can be sure that this type of migration can occur in their network, regardless of the vendor products used, because certification will guarantee a known interoperability level between systems.

The economic case for broadband wireless access networks is simple. Wireless is often the most effective medium for transporting data, video, and voice traffic. It offers much higher bandwidth in the access network than existing wireline options (with the exception of fiber). However, running fiber "point-to-point" from every potential customer location to the central office or POP is costly, complex and labor intensive. It involves, among other things, installing electronics at both ends of each fiber connection and then managing all of the fiber connections at the central office.

Broadband wireless access networks built upon WiMAX Forum Certified products, on the other hand, address the shortcomings of fiber solutions by allowing for a PMP topology. This eliminates the cost of installation, as well as the recurring operating cost of active electronic components such as regenerators, amplifiers and lasers within the outside plant. It also reduces the number of network elements needed at the central office.

What's ahead

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

The stage is now set for a paradigm-shift in the communications industry that could well result in a completely new equipment deployment cycle. This new paradigm will be firmly grounded in the wide-based adoption of Ethernet technologies.

A 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 will play an important role, as they will enable a new generation of cooperative and strategic partnerships between service providers, network operators, and equipment manufacturers. Together they will deliver flexible and scalable service packages that will be unrivaled by any other offering in the wireless industry.

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Mr. Suitor is Vice President, Business Development at Redline Communications. He brings to Redline extensive market and technology knowledge of North American service providers and equipment manufacturers. Before joining Redline, Mr. Suitor held various senior level positions in several organizations, most recently with CopperCom's Business Development Group. Earlier, he 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. Mr. Suitor has written numerous contributed articles in a variety industry publications, and is a regular speaker on topics such as WiMAX, ATM, Gigabit Ethernet, Virtual Private Networks and Voice Services.

Attributing company: Redline Communications Inc.

Redline Communications is a technology leader in the development of standards-based broadband wireless access solutions. Its groundbreaking and award winning products feature longer range, more robust performance, and higher capacity than competing products. Redline is a principal member of the WiMAX Forum™, and was first in the world to market an 802.16 compliant product.

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