



Intel® WiMAX Connection 2250 The Path to the Mobile Internet

Establishing Leadership
with Wireless Broadband



Why Wait for WiMAX? It's Already Here.

Secure New Customers and Near-Term Revenue Opportunities with Long-Term Compatibility

Service providers and equipment vendors around the world have begun to deploy WiMAX-based networks, making decisions that will shape the future of their respective businesses. Many service providers are seeing initial success using WiMAX based on the 802.16-2004 standard for fixed and nomadic applications such as last-mile broadband. With the first WiMAX products (based on the 802.16e-2005 standard) becoming available in early 2007, service providers may soon begin to realize the potential of advanced fixed capabilities along with added mobility. With the addition of mobile capabilities, 802.16e-2005 WiMAX networks will be able to deliver broadband Internet access to people on the go. But before they can move beyond the planning stages to operational deployments, service providers must first determine which technologies to use and how they will be deployed.

With the availability of low-cost chips, a clear migration path to mobility and an ecosystem of more than a dozen industry-leading equipment vendors, service providers that act now can shape the future of the mobile Internet.

There is clearly pent-up market demand for wireless broadband. Service providers already offering wireless broadband services based on WiMAX are experiencing steady growth, while enjoying rising Average Revenue Per User (ARPU) for early-stage services. This suggests that wireless operators and service providers have an immediate opportunity to establish wireless broadband networks that fulfill unmet demand while simultaneously laying the foundation for future growth and, potentially, future mobile services. With the availability of low-cost WiMAX chips, a clear migration path to mobility and an ecosystem of more than a dozen industry leading equipment vendors, service providers that act now can shape the future of the mobile Internet.

With the approval of the 802.16-2004 ("d") and 802.16e-2005 ("e") standards, the IEEE has paved the way for the true mobile Internet. Intel has created silicon that delivers a migration path that bridges the gap between these two standards. This silicon-enabled migration path benefits service providers, equipment vendors and ultimately consumers. The 802.16-2004 standard, designed specifically for fixed wireless broadband service, has been finalized for more than a year, with proven silicon, Customer Premises Equipment (CPE) devices and commercial services available today. Equipment based on the 802.16e-2005 standard will be available in early 2007, providing the means for true mobile broadband services.

The silicon called Intel WiMAX Connection 2250 provides a link between fixed and mobile wireless broadband services. CPEs based on this chip enable service providers to establish their services and secure their customer base using today's 802.16-2004 equipment, while providing an upgrade path to 802.16e-2005. With the Intel WiMAX Connection 2250 silicon, service providers can begin offering services today and enable the move to mobile broadband services – via a seamless over-the-air software upgrade – tomorrow.

In addition, forward-looking operators can smoothly transition their networks for future compliance with Intel's next-generation Intel® Centrino® mobile technology, which can make their service available to consumers purchasing mobile devices such as laptops, smart phones and other products.

IEEE WiMAX Standard	Fixed	Mobile
802.16-2004	Yes	No
802.16e-2005	Yes	Yes

The first IEEE-approved WiMAX standard, 802.16-2004 ("d"), offered fixed WiMAX capabilities. The new IEEE-approved WiMAX standard, 802.16e-2005, is a superset of the earlier standard and offers both mobile as well as fixed capabilities.

Intel® WiMAX Connection 2250 – A Solution for Today and Tomorrow

The Intel WiMAX Connection 2250 is a one-of-a-kind solution that integrates an 802.16-2004 OFDM 256 modem with an 802.16e-2005 OFDMA modem. This dual-technology chip provides service providers with a migration path from 802.16-2004 to 802.16e-2005, so that they can take advantage of today's fixed WiMAX, without locking themselves out of tomorrow's advanced fixed and mobile WiMAX.

The Intel WiMAX Connection 2250 is an integrated 802.16-2004 and 802.16e-2005 System-on-a-Chip (SOC) designed for cost-effective, upgradeable WiMAX CPEs. Leading WiMAX system vendors are incorporating this chip into their WiMAX devices to achieve several key goals crucial to the success of any WiMAX service:

- **Cost Effectiveness:** The Intel WiMAX Connection 2250 is a low-cost chip that is optimized for high-volume devices, such as low-cost WiMAX CPEs. Intel is able to deliver such a low-cost solution because CPEs based on the Intel WiMAX Connection 2250 family of products take advantage of economies of scale for both 802.16-2004 and 802.16e-2005 chips. The upgradeability of the Intel WiMAX Connection 2250 allows manufacturers to realize the economic benefits of volume chip manufacturing for both technologies.
- **Easy Upgradeability to Mobile WiMAX:** The Intel WiMAX Connection 2250 was designed specifically to provide a migration path between 802.16-2004 and 802.16e-2005. The chip supports 802.16-2004 and 802.16e-2005 software stacks for flexibility in equipment design, deployment and application. Moreover, CPEs equipped with the Intel WiMAX Connection 2250 can be upgraded from 802.16-2004 to 802.16e-2005 with just an over-the-air software update.
- **Fixed and Mobile Functionality:** The upgradeability of the Intel WiMAX Connection 2250 to the 802.16e-2005 standard gives early-adopters of Intel WiMAX Connection 2250-based 802.16-2004 network deployments the option of upgrading their service offering to take advantage of 802.16e-2005's advances in fixed capabilities as well as added mobile capabilities.
- **Path to Intel® Centrino® Mobile Technologies-Ready Networks:** The Intel WiMAX Connection 2250 is also the starting point for service providers that wish to migrate to mobile networks compatible with Intel Centrino mobile technology devices, such as notebooks. Intel intends to integrate WiMAX into its Intel Centrino mobile technology platforms, and Intel Centrino mobile technology-compatible networks will be able to take advantage of this large WiMAX-ready customer base. Future Intel Centrino mobile technology devices will provide service providers with deep subscriber penetration and a "push model" for distribution that can only be achieved with Intel's market reach.

Laying the Foundation for WiMAX Leadership

Wireless operators that establish their WiMAX networks now will not only get to market before the competition, they will begin generating revenue much more quickly than other greenfield deployments.

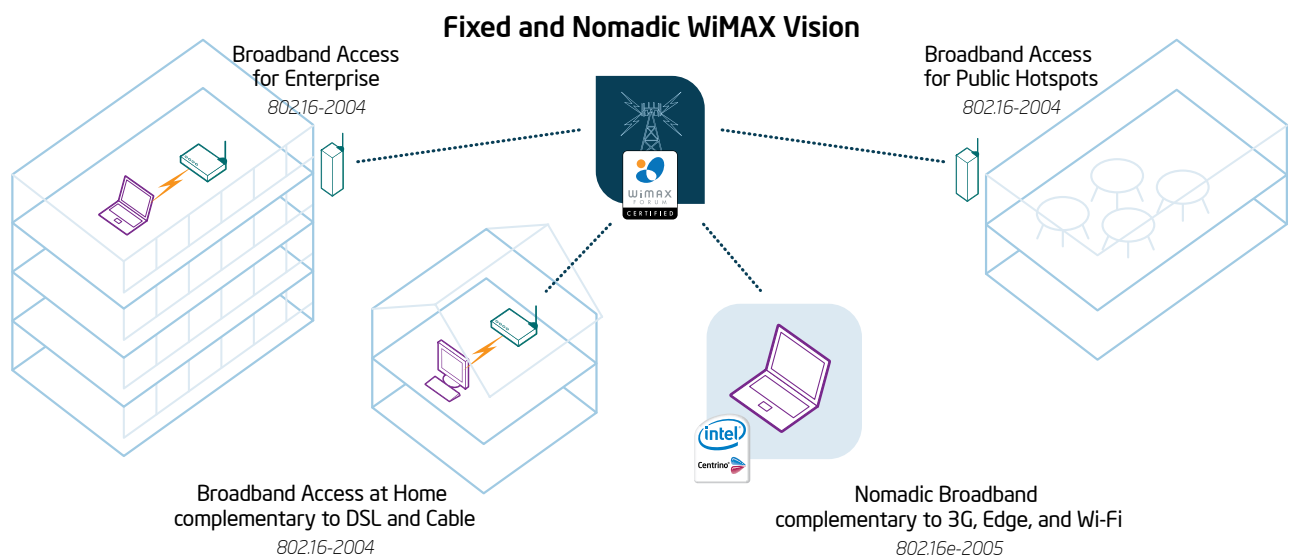
Fixed WiMAX networks based on Intel WiMAX Connection 2250 802.16-2004 client devices are an ideal way for service providers to enter the fixed WiMAX broadband services market now with proven technology. For those service providers that wish to migrate to advanced fixed and mobile WiMAX services, Intel WiMAX Connection 2250 client devices can be upgraded to operate in 802.16e-2005 WiMAX networks using an over-the-air software upgrade. This migration method makes the addition of mobile WiMAX services to a service provider's network virtually seamless, as it allows existing 802.16-2004 devices to be easily upgraded to exist within the new 802.16e-2005-based WiMAX networks. Over-the-air upgrade-ability also eliminates the need for costly "truck rolls" or user intervention in order to upgrade existing 802.16-2004 CPEs to support new 802.16e-2005 devices.

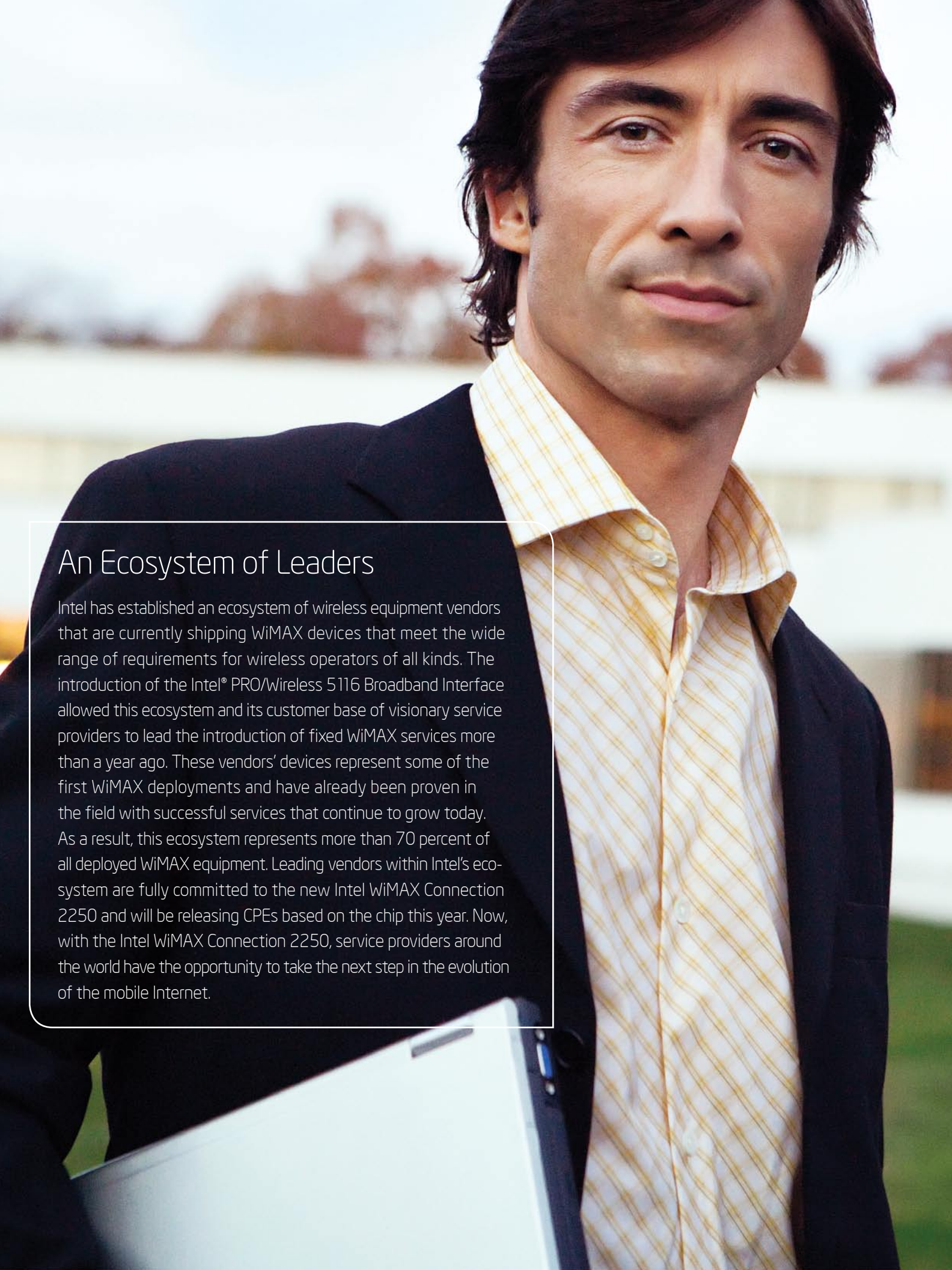
In addition, fixed WiMAX networks based on the Intel WiMAX Connection 2250 give service providers the ability to support Centrino mobile technology as it becomes available. When Intel began embedding Intel Centrino mobile technology Wi-Fi silicon in mobile devices, consumer adoption of Wi-Fi technology increased rapidly because consumers could access Wi-Fi services easily. This same "push model" will dramatically reduce a wireless operator's

cost of acquiring new customers, while increasing subscriber penetration, since it will allow consumers to take advantage of the service with a minimum of intervention on the part of the operator.

Wireless operators using the Intel WiMAX Connection 2250 also benefit from the low costs made possible by economies of scale. It was designed to be forward-compatible, enabling wireless operators and equipment manufacturers to harness the economies of other CPE silicon that supports both the 802.16-2004 and 802.16e-2005 standards.

Finally, wireless operators that establish their WiMAX networks now will not only get to market before the competition, they will begin generating revenue much more quickly and reach profitability much more easily than other greenfield deployments. With this head start, operators can refine their deployment strategies and optimize their back-end networks. As any operator knows, it takes significant time to fine-tune new networks for optimal performance and customer satisfaction, as issues such as provisioning, billing and OSS can make or break any new service.





An Ecosystem of Leaders

Intel has established an ecosystem of wireless equipment vendors that are currently shipping WiMAX devices that meet the wide range of requirements for wireless operators of all kinds. The introduction of the Intel® PRO/Wireless 5116 Broadband Interface allowed this ecosystem and its customer base of visionary service providers to lead the introduction of fixed WiMAX services more than a year ago. These vendors' devices represent some of the first WiMAX deployments and have already been proven in the field with successful services that continue to grow today. As a result, this ecosystem represents more than 70 percent of all deployed WiMAX equipment. Leading vendors within Intel's ecosystem are fully committed to the new Intel WiMAX Connection 2250 and will be releasing CPEs based on the chip this year. Now, with the Intel WiMAX Connection 2250, service providers around the world have the opportunity to take the next step in the evolution of the mobile Internet.



AIRSPAN Future-Proofing WiMAX

Invest Now and Ensure Your Wireless Broadband Network is Ready

Airspan is a worldwide leader in broadband wireless with over 300 customers in more than 100 countries. As a founding member of the WiMAX Forum, Airspan has led the way in WiMAX, being among the first wave of companies to achieve certification for its base station and customer premises equipment. Airspan is also leading the race to mobile WiMAX. Through a careful choice of advance technologies, the flagship base station HiperMAX* is software upgradeable to mobile WiMAX. The 802.16e-2005 USB device, announced in 2006, will be the first Wave 2-compatible mobile WiMAX device for laptops, and our Outdoor ProST* and Indoor EasyST* WiMAX modems will be software upgradeable to 802.16e-2005 early in 2007.

Network Deployment Can't Wait and Transition to Mobile WiMAX Must be Seamless

At Airspan we believe wireless broadband's time has come, and just like Wi-Fi, WiMAX continues to evolve to greater speeds, better operational ranges and into different form factors. The latest version, mobile WiMAX, also known as IEEE 802.16e -2005, brings with it MIMO, smart antennas and power-saving modes that enable WiMAX to become an embedded radio interface with mobility as a basic tenant. This version of WiMAX enables new uses and applications, and for the first time allows WiMAX to be offered as add-ons or built-ins for laptop computers, PDAs, mobile phones and handheld gaming devices.

We believe that now is the time to start network deployment. With the right technology choices, service providers can invest in fixed and nomadic WiMAX networks today and evolve these networks to mobile capabilities tomorrow. Airspan has built a WiMAX base station platform, known as HiperMAX*, and created customer premise equipment (CPEs) based on the Intel® WiMAX Connection 2250 that allows seamless fixed-to-mobile WiMAX migration and co-existence. This amazing new capability also supports the transition between FDD to TDD spectrum duplexing, necessary to support mobile WiMAX, without the need for expensive and painful hardware upgrades.

The Revolution Begins

Software Defined Radios, or SDRs, have always been at the heart of Airspan's WiMAX strategy. HiperMAX and HiperMAX-Micro are the first and today's only WiMAX SDR platforms that can support fixed WiMAX (256 OFDM), Evolutionary WiMAX (ETG 256 OFDM) and mobile WiMAX (MTG OFDMA) from the same hardware platform, and simultaneously support fixed (256 OFDM) and mobile (OFDMA) applications. We call this capability Dual MAC/PHY.

HiperMAX is a next-generation solution that brings the enhanced economics of ATCA, OBSAI to WiMAX for the first time.

Our SDR blades enable operators to build next-generation networks, which can support fixed and mobile WiMAX simultaneously, and incremental migration to mobile WiMAX as spectrum regulation permits.

HiperMAX is also architected for MIMO and AAS, and will enable the support of up to 4 TRXs per SDR Blade/ WiMAX RF interface.

Enhanced WiMAX CPE — Powered by the Intel® WiMAX Connection 2250, the Essential Element

Airspan has long argued for a software-defined CPE, one that was capable of supporting both fixed WiMAX (256 OFDM) and mobile WiMAX (OFDMA). The Intel WiMAX Connection 2250 is the first WiMAX silicon to have such a capability.

ProST* and EasyST,* Airspan's Intel-based CPEs will migrate to the Intel WiMAX Connection 2250 early in 2007. This will allow Airspan's customers to upgrade to mobile WiMAX using a simple over-the-air software download. This will future-proof Airspan's CPE offering, giving customers the choice of both radio interfaces simultaneously.

HiperMAX's Dual MAC/PHY capability combined with Intel's silicon creates a world of seamless co-existence, where fixed and mobile WiMAX can be supported in the same network. Fixed and mobile WiMAX offer different capabilities for different opportunities and are all offered from one platform from Airspan. Fixed WiMAX is a layer 2 bridging technology, supporting multiple MAC Address per device — with NO support for handover. Mobile WiMAX is a layer 3 IP routing technology, with one MAC and one IP per device, and supports handover, paging and power-saving modes.

By providing both radio interfaces, Airspan customers can pick and choose which WiMAX MAC/PHY is most suitable for their business. With the ability to plan an FDD to TDD evolution, plus seamlessly and simultaneously provide both fixed and mobile MAC/PHYs, the Airspan solution offers the best path for an operator to bring up a wireless broadband network today.

WiMAX/Wi-Fi Seamless Integration

Regardless of type, all of Airspan's Intel-based CPEs have embedded Wi-Fi Access Points available. This capability enables them to simultaneously offer direct WiMAX and Wi-Fi and connects operators to an addressable market that includes: fixed and nomadic WiMAX, mobile WiMAX and any Wi-Fi devices deployed today and tomorrow. Just add power to Airspan CPEs — enables the rapid and cost-effective deployment of Municipal WiMAX/Wi-Fi networks.

VoiceMAX: Voice over WiMAX Technology

WiMAX's QoS enables Airspan to deliver up to 16 separate SSIDs per CPE; each one has a distinct service, with different CIR, MIR latency and jitter characteristics.

On top of QoS, Airspan's VoiceMAX* gives operators the ability to deliver carrier-grade VoIP through a software suite that provides VoIP admission control and manages network congestion to deliver the best user experience for VoIP calls on WiMAX advanced tiered services are now completely robust across an Airspan HiperMAX network operating both with Fixed, Nomadic and Mobile profiles simultaneously.

Airspan believes the time is now to build your WiMAX network — why wait. Investment protection is a barrier, but with HiperMAX and Intel WiMAX Connection 2250 CPEs, an operator can capture customers immediately, refine operations and bring in mobile WiMAX without concern that a completely new network investment is required.

“Pipex Wireless will initially deploy its network using Fixed WiMAX, but the transition to 802.16e-2005 is very important to us for both radio performance and service offering. Because the timing of the transition is hard to predict, we are deploying Airspan's HiperMAX Base Station Platform and their CPEs based on the Intel WiMAX Connection 2250, enabling us to migrate with a software upgrade. We believe this is the best way to ensure our network is future-proofed.”

– Graham Courier,
Business Development
Director, Pipex Wireless



For more information, please visit
www.airspan.com

Intel WiMAX Connection 2250-based EasyST with WiFi Base





Alvarion: Let the World Leader in WiMAX Make You Mobile

Alvarion's WiMAX solutions, designed around the IEEE 802.16-2004 and 802.16e-2005 standards, are ideal for carriers and other service providers to offer the full range of fixed, nomadic, portable, and mobile services. As a charter board member of the WiMAX Forum*, Alvarion was one of the first to bring a commercial WiMAX system to market in early 2004.

To answer the growing demand for mobile services, Alvarion is offering its 4Motion* mobile solution by leveraging its numerous BreezeMAX* deployments to date and providing an easy, low-cost migration path for existing customers. Carriers benefit from a field-proven WiMAX solution along with the ability to seamlessly transition to mobile applications over time with an "all-in-one" system that supports 802.16-2004, 802.16e-2005, FDD and TDD architecture in one box.

"As the industry begins to coalesce around 802.16e-2005, it's no surprise that Alvarion would again be leading the charge in pushing the technology with an eye towards fundamentally impacting the way people live and work."

- Peter Jarich,
Principal Analyst,
Current Analysis

Build your network with a field proven WiMAX solution

WiMAX Forum Certified*, BreezeMAX is designed for carriers to offer triple-play broadband services to thousands of subscribers from a single base station, thereby optimizing their initial investment followed by a cost-efficient migration path to mobile, or quadruple play services.

Its carrier-class design offers broadband speeds with quality of service (QoS), while its next-generation OFDM technology provides advanced non-line-of-sight (NLOS) functionality. With service recognition and multiple classifiers for generating service profiles, BreezeMAX supports differentiated service level agreements (SLAs) with committed QoS for each profile.

BreezeMAX will undergo certification testing in accordance with the schedule of WiMAX Forum for certifying 802.16e-2005 products.

Go Mobile with BreezeMAX

Carriers deploying now benefit from the vast field experience of BreezeMAX, while maintaining the ability to migrate later to a full mobile solution. Additionally, the product is designed to save OPEX and CAPEX through support of

dual-mode operation in the base station and CPEs in the transition phase and by providing over the air software migration, thereby eliminating the need for CPE replacement.

- **Lower CapEx:** BreezeMAX base stations are designed for dual-mode, simultaneously supporting 802.16-2004/802.16e-2005 and FDD/TDD operations. This allows carriers to support a variety of services and user types over time with full reuse of existing infrastructure, thereby minimizing CapEx.
- **Easy Migration:** Alvarion's solution can be migrated from d to e in a phased, gradual approach ensuring transparent migration for both fixed and nomadic users. And there is no need to replace any of the CPE equipment – it's just a simple software upgrade.
- **Shorter Time to Market:** As BreezeMAX has been commercially deployed for over two years, carriers can get to market quickly after just a short field trial.
- **Efficient RF Planning:** Alvarion performs advanced radio network planning for 802.16e-2005 networks based on the current implementation and according to the customer needs. This results in cost-efficient networks that are up and running in a short timeframe.

Alvarion: Let the world leader in WiMAX make you mobile
www.alvarion.com



- **Carrier-Class NMS:** The AlvariSTAR* network management system means a single network management system regardless of operating mode or services offered at any given time.
- **IMS Support:** BreezeMAX uses standard network interfaces to enable today's core network infrastructure and tomorrow's IMS-based networks.

- Commitment to standards and interoperability – including successful interoperability tests between 4Motion BreezeMAX base stations and various third-party, mobile end-user devices
- Investment protection with clear and seamless migration
- Pay-as-you-grow network scaling

4Motion – Enabling Personal Broadband

4Motion builds on BreezeMAX to enable you to offer personal broadband services. It is designed to include the necessary core network and IP elements as well as end-user devices such as self-install desktop modems, PCMCIA cards, multimode devices, and a comprehensive management platform. In addition, 4Motion supports a wide variety of CPE solutions, based on Intel's WiMAX chips, including outdoor and indoor subscriber units, offering all types of services from voice to data networking.

Go with the Alvarion Advantage

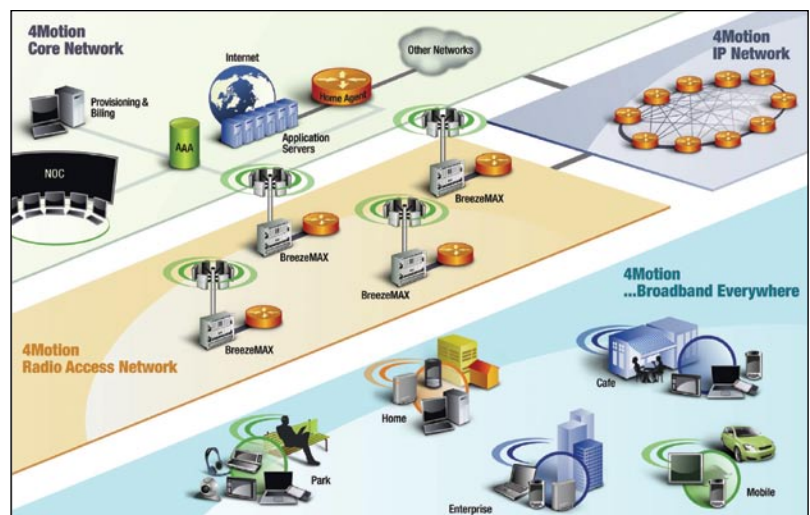
Carriers wanting a “first-to-market” advantage in providing nomadic and portable WiMAX services, while enjoying a jump-start towards pure mobility should go with the Alvarion advantage.

Our unparalleled field experience deploying networks with both large and small carriers worldwide, along with our long-term broadband wireless market and standards leadership make Alvarion the ultimate choice as your partner for deploying mobile broadband services.

Alvarion, 4Motion, BreezeMAX – Go With a Sure Thing

The combination of Alvarion, 4Motion, and BreezeMAX translates into numerous benefits for your move from d to e and the offering of personal broadband services to your customers.

- Over ten years of broadband wireless access (BWA) industry leadership and proven field experience
- Vast field experience from over 180 WiMAX deployments in more than 80 countries worldwide to date – more than any vendor according to Sky Light Research
- WiMAX Forum-Certified BreezeMAX base station and CPE products





Aperto PacketMAX* Architecture Extended to Cover Mobile WiMAX

Operators around the globe are developing business cases and deploying broadband wireless services based on fixed or mobile WiMAX. Some will deploy hybrid networks. PacketMAX* flexible architecture allows each to exploit its full business potential.

Operators can simultaneously host fixed and mobile WiMAX subscribers from a single base station, or can operate the unit as a standalone fixed or mobile base station.

Evolution of the WiMAX Standard

The WiMAX standard supports fixed, nomadic, portable, and mobile broadband wireless access. To meet the requirements of different types of access, two versions of WiMAX have been defined. The first is based on 802.16-2004 standard and optimized for fixed and nomadic access. Carriers and ISPs alike have already rolled out premium voice, as well as Internet and multimedia data services to enterprise, small business and residential customers based on this standard. The second is designed to support portability and mobility, and is based on the 802.16e-2005 amendment to the 802.16-2004 standard. Mobile WiMAX services will be built on the amended standard and some fixed networks will evolve to include mobile WiMAX. Aperto's PacketMAX* architecture accommodates the standards evolution and makes the introduction of mobile WiMAX transparent to the end user. PacketMAX encompasses a wide range of solutions for operators deploying fixed WiMAX today and developing mobile WiMAX adoption strategies.

PacketMAX for Fixed and Mobile WiMAX

Some operators will forego the decision to introduce mobile WiMAX into their networks. They will continue to exploit 802.16-2004 for its ability to operate in the licensed-exempt bands and provide services to outdoor subscriber equipment operating over great distances. However, others are evaluating how best to fit mobile WiMAX into their service plans. While the decision is unique to each operator, PacketMAX's flexible design allows each operator to exploit its full business potential with fixed or mobile WiMAX. These scenarios are examined below.

Leveraging the Mobile WiMAX Standard

Aperto has joined forces with Intel to deliver solutions meeting the needs of WiMAX operators. Aperto's PacketMAX was the first platform certified to operate using the fixed WiMAX standard. PacketMAX includes subscriber units powered by the Intel® PRO/Wireless 5116 Broadband Interface (fixed WiMAX), the Intel® WiMAX Connection 2250 (mobile WiMAX), and the industry's broadest WiMAX base station portfolio.

PacketMAX-Enabled Solutions

Service Plan	Recommended Standard	PacketMAX-Enabled Solution
Fixed WiMAX Services	All 802.16-2004	YES
Fixed and Mobile WiMAX Coexistence	Mixed 802.16-2004 and 802.16e-2005	YES
Fixed WiMAX Migrating to Mobile	802.16-2004 migrating to 802.16e-2005	YES
3G/4G Mobile Services	All 802.16e-2005	YES

PacketMAX Subscriber Units

Aperto offers the following examples of customer premises equipment (CPE) options operating on the fixed and mobile WiMAX standards:

Outdoor Units for Small Offices and Consumers:

PacketMAX 100 series CPE are available in the Intel PRO/Wireless 5116 Broadband Interface and Intel WiMAX Connection 2250 models, and can be employed in both fixed and mobile WiMAX networks, with over-the-air configuration determining the WiMAX standard used.

Outdoor CPE for Large Businesses and Enterprises:

PacketMAX 300 series delivers the functionality, scalability, and performance required by enterprises and business-grade users. Models are available for both fixed and mobile WiMAX standards. PacketMAX 300 CPE are also available in Intel PRO/Wireless 5116 Broadband Interface and Intel WiMAX Connection 2250 varieties.

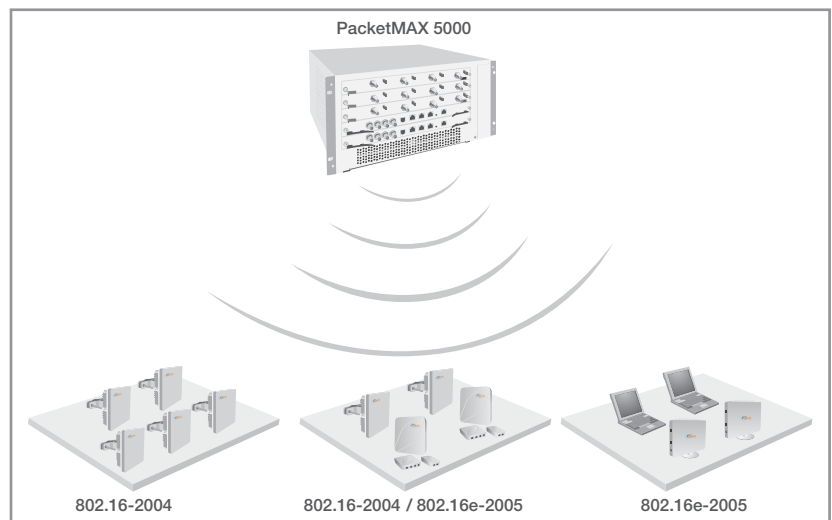
Indoor Gateway for Consumers: PacketMAX 500 leverages the Intel WiMAX Connection 2250 to provide superior link budget and usability for indoor users. PacketMAX 500 also can run the fixed or mobile WiMAX standard based on selectable software load.

PacketMAX Base Stations: PacketMAX 5000, the first base station certified to meet the fixed WiMAX standard, now accommodates 802.16e-2005 networks with a wireless controller module ("e" blade). Operators can simultaneously host fixed and mobile subscribers from a single base station, or can operate the unit as a standalone fixed or mobile base station. Key advantages include:

- Add mobile WiMAX capability by simply installing a module
- Utilize existing radios, antennas, MAC schedulers, and other equipment (TDD optimized)
- Support both WiMAX standards within a single base station and common management platform
- Migrate to an all mobile WiMAX network or operate a "mixed" network
- Support all features of mobile WiMAX Wave 2 certification
- Upgrade to OBSAI for MIMO, 2X/2X diversity, and STC with new radios
- Choose from single-sector, multi-sector, or all-outdoor pico base station models

WiMAX Starts with Aperto

Aperto Networks, a founding board member of the WiMAX Forum, develops the world's most advanced carrier-class WiMAX base stations and subscriber units. They enable carriers to profitably offer broadband services through IP-rich point-to-point and point-to-multipoint wireless networks that are easy to deploy and provide unsurpassed subscriber density, quality of service, and reliability. PacketMAX architecture is now extended to include mobile WiMAX-compliant base station and subscriber components as well as roaming and mobility functions.



PacketMAX 5000 can serve both fixed and mobile WiMAX subscribers simultaneously.

Enter the WiMAX Era with Aperto PacketMAX — for more information about Aperto PacketMAX, go to www.apertonet.com

Worldwide WiMAX Now

Cost-Effective and Scalable WiMAX Deployments with Proxim Tsunami* MP.16

With over 25 years of wireless experience, Proxim Wireless, a global manufacturer of end-end broadband wireless solutions, enables worldwide WiMAX now! You can depend on the Tsunami* MP.16, Proxim's fourth-generation point-to-multipoint WiMAX system, to respond to the tremendous demand for services based on WiMAX.

"Tsunami product line was singled out for its scalable approach to system deployment... which breaks down the barrier to deploying WiMAX systems and enables a wider range of service providers (from rural areas service providers to metropolitan service providers) to use this technology."

**- Frost and Sullivan,
in awarding 2006
Product Innovation Award**

WiMAX has a great potential to change the game in the broadband access market, especially in underserved communities. It offers a powerful alternative to DSL and cable modem services. Although the presence of two versions of WiMAX (fixed and mobile) creates a challenge for everyone in the industry, most industry observers agree that fixed WiMAX is the present technology of choice for a majority of service providers. It is today's market and is especially relevant in emerging economies.

Does your target market require support for wireless VPNs, disaster recovery, wireless backhaul, streaming media or nomadic roaming? If so, today's fixed WiMAX solution, like Proxim Tsunami MP.16, is your optimal choice. You can deploy it now and offer services based on a proven product. To ensure that you can evolve your network as the WiMAX technology evolves, Proxim offers an easy migration path to enable mobile services in the future. Why wait for certified mobile WiMAX products that are not expected to be generally available until late 2007 and interoperable until 2008? Also, cost of 802.16e-2005 equipment will be higher for the next few years, until economies of scale kick in and WiMAX Forum Certified* 802.16e-2005 products with full mobility support will not be deployed for large-scale service before 2008.

Tsunami MP.16 3500 is a Safe Investment

Make a safe bet today. You can be assured of quicker time to market and an easy migration path to 802.16e-2005 with Tsunami MP.16. Service providers can deploy the fixed WiMAX product now and offer services that are in highest demand, e.g., broadband wireless access. Your network can be upgraded in the future to enable applications such as vehicular data sharing and support of mobile phones. Proxim is committed to an easy migration strategy, from fixed (OFDM) WiMAX to mobile (OFDMA) WiMAX, leveraging the Intel® WiMAX Connection 2250.

Tsunami MP.16 3500 in Your Network

The feature-rich Tsunami MP.16 3500 has been specifically developed for the last-mile access market. It also serves very well as a hotspot or cellular backhaul solution. Last-mile residential wireless access requires a pico-cell architecture, especially if service to customer-installable indoor equipment (indoor CPE) is provided. Both urban and suburban deployments need more base stations for optimal capacity and spectrum efficiency. This makes Tsunami MP.16 the ideal product for residential last-mile access, since it combines a best value, low footprint base station design with ease of installation. Proxim also offers high throughput point-to-point links to provide easy backhaul connectivity with a pico-cell architecture.

**To learn more about Proxim's WiMAX solutions, please visit
www.proxim.com/products**

The Tsunami MP.16 enables cost-effective, scalable approach to system deployment, making it attractive to a wide range of service providers. Housed in a ruggedized enclosure with an external antenna connector, the SS can be deployed in extreme climates. With an output power of up to 28 dBm (BS), the system supports 3.5 MHz and 7 MHz channels. The product has an attractive Return on Investment due to its key features – a TDD system optimal for asynchronous traffic patterns – preferred by service providers, scalability, ease of installation and deployment leading to low TCO, and support-ready for emerging applications like triple play at a competitive price.

Highly Scalable System

Proxim Wireless delivers a more scalable approach to system deployment, beginning with entry-level single-sector base stations and growing into six-sector macro base stations with GPS synchronization.

Fast Installation and Lower Maintenance Cost

Several features have been built in to enable fast installation and minimize maintenance, e.g., a single UV-shielded CAT5 cable carrying power and data, eliminating guess work in locating the remote antennas with audible tone and real-time signal strength measurements and support for both local and remote management, removing the need for expensive on-site support.

Advanced Security

Tsunami has extensive security features including client authentication with X.509 certificates, advanced encryption to protect over-the-air transmission and easy integration with existing RADIUS systems for subscriber provisioning.

Migration from Fixed to Mobile WiMAX

Proxim understands that service providers need optimal deployment choices for today's network (fixed) and a clear and easy migration path for the future (mobile).

Proxim intends to offer software upgradeability (from 802.16-2004 to 802.16e-2005) for CPEs and base stations. This would also enable gradual migration to a 802.16e-2005 network requiring high-speed mobile roaming, based on network planning.

Furthermore, Proxim's patented technique allows synchronization of fixed and mobile transmissions using the same frequency in the same sector, providing a zero cost upgrade to 802.16e-2005. A single management solution that supports both versions is beneficial. Enter Proxim-Vision*, Proxim's centralized network management system (NMS) capable of managing end-to-end wireless network.

Proxim is thus lowering the barrier for service providers servicing rural as well as metropolitan markets, to deploy WiMAX today. We offer all components of an end-end WiMAX based broadband access network – indoor/outdoor mesh, WiMAX point-to-multipoint and high-throughput PtP for wireless backhaul, along with a centralized NMS. Experience increased ARPU by reaping the benefits of WiMAX-based services now!



Applications Table

Business and Residential Last-Mile Access	Competitive broadband service access alternative to DSL or cable modems for residences and businesses
Security and Surveillance	Wireless solutions for bandwidth intensive and high-definition IP surveillance cameras located at key city and transportation infrastructure such as airports, bridges and trains
Broadband Service Access	Broadband service access for businesses and residences in developing countries and regions where DSL/cable infrastructure is not an option
Metropolitan (Muni) Area Networks	Secure and reliable backhaul of Wi-Fi Mesh cells

Redline — Leading the WiMAX Revolution

RedMAX* WiMAX Forum Certified* solutions play a critical role in building today's advanced wireless broadband networks and will deliver tomorrow's innovative services and applications.

"Redline's product architecture roadmap ensures the development of WiMAX solutions for high-performance broadband access that deliver the benefits of WiMAX Forum Certification today, and will rapidly evolve to support portable devices such as laptops and PDAs, which are expected to be among the largest markets for WiMAX services."

– Caroline Gabriel
Rethink Research

WiMAX Market Overview

Network operators delivering WiMAX services and applications need a clear deployment strategy that allows them to start generating revenue from fixed and portable WiMAX solutions today and to evolve with the WiMAX ecosystem as products based on new standards become available. The adoption of WiMAX technologies is being driven by end-user demand for advanced applications including voice, video and data communications. WiMAX equipment manufacturers like Redline understand the need for a seamless solution for operators to deliver on the end-user demands today and to introduce more advanced services over time.

Operators also need to ensure the WiMAX technology they choose is flexible, and reliable, integrates with their core network and is easily manageable, and delivers superior performance all at the lowest possible total cost per user.

Redline RedMAX* Solutions

Redline's RedMAX* products are among the world's first and most widely deployed complete WiMAX Forum Certified* systems.

RedMAX solutions deliver the performance operators need to enable the delivery of revenue-generating wireless broadband services.

Redline's WiMAX-certified RedMAX subscriber units and base stations are today delivering the benefits of third-generation implementations of 802.16e-2005 technologies (OFDM PHY and QoS enabled MAC) and core products to major carriers and other network operators around the world.

Redline's carrier-focused RedPATH* product architecture roadmap ensures that operators that choose RedMAX have the industry's most comprehensive products to establish immediate revenue today and a clear strategy to deliver the personal, mobile broadband experience of tomorrow.

Network operators considering large-scale wireless roll-outs are concerned with OPEX costs. Accordingly, Redline has developed an indoor self-installable WiMAX CPE. The RedMAX SU-I is a low-cost, software upgradeable and plug-and-play CPE designed with dual-mode capabilities, that supports both WiMAX standards and allows for seamless network evolution through software upgradeability.

RedMAX — Proven Solutions that Work

With WiMAX-certified systems deployed globally, Redline's proven products are trusted by more major operators than any other solution available today.

Leveraging the innovative Intel® WiMAX Connection 2250, RedMAX delivers the ultimate performance, reliability and flexibility for today's challenging wireless broadband networks.

RedMAX Delivers:

- Low latency for superior VoIP and data services
- Carrier-class high availability networks
- Broadband connectivity to the enterprise and residence
- High-bandwidth music, video and other multi-media services
- Mobile video conferencing

RedMAX is here today. It gives operators the tools to generate revenue now – and an innovative product development strategy that will help deliver the personal, mobile broadband experience of tomorrow.

RedPATH Architecture Roadmap

RedPATH is Redline's strategic architecture roadmap that guides RedMAX product development.

RedPATH gives network operators the ability to roll out the world's most advanced WiMAX-certified networks available today and the confidence they can evolve with Redline to enhance their services and increase their market share.

The ability to deliver fixed, portable and mobile service offerings offers a significant revenue opportunity for operators serving both developed and underserved markets. With RedPATH, operators benefit from "best-of-breed" solutions and have the network evolution strategy needed to deploy, expand and enhance their networks and offerings from fixed and nomadic services to portability and full mobility over time.

RedPATH Benefits for Operators:

- Establish immediate revenue
- Seize opportunities to increase market share
- Protect existing network investments
- Build "best-in-class" networks
- Grow networks to introduce new, high-margin offerings
- Maximize spectral efficiency and throughput capacity
- Avoid vendor-lock through standards-driven interoperability
- Integrate advanced technology seamlessly
- Simplify network monitoring and management
- Deploy software-upgradeable solutions
- Evolve networks in step with the WiMAX ecosystem

RedMAX — Evolving with RedPATH

As the WiMAX ecosystem grows and evolves, it is expected to bring a wide range of end-user devices that support advanced applications. These devices will range from fixed modems for high-bandwidth enterprise use to small mobile devices that deliver music, video and other communications to individual users. To ensure the seamless operation of these devices with their networks, operators need to deploy flexible, open architecture WiMAX networks.

In order to address this diversity of devices, Redline is building dual-mode base stations that will accommodate both "d" and "e" standards as well as upgrade capabilities to include MIMO and other advanced antenna systems. In addition to this, Redline will introduce a macro-cell base station architecture housed in a microTCA chassis that will support either or both standards in several different configurations.

Redline will be integrating VoIP capabilities to allow for seamless standards-driven voice activation. The toll-quality voice service will leverage the built-in QoS mechanisms of WiMAX to give operators the ability to offer attractive service bundles to end users and significantly increase average revenue per user (ARPU).

Leveraging its RedMAX universal design architecture and working with industry-leading ecosystem partners on the development of a Radio Control Server (RCS) and ASN gateway, Redline products will support any full mobility application. This will give network operators the same interoperability on the core side that they have demanded on the access side, avoiding many of the vendor-lock situations common in the 3G world. Redline's ASN gateway strategy will be a key building block for operators to begin offering portable and mobile services.

Underlying RedPATH is Redline's RedMAX Management Suite (RMS). RMS is a sophisticated element management system that maximizes network operational efficiency and protects an operator's integration investment by seamlessly bridging standards-certified "d" and "e" networks.



Find out more about how RedMAX and RedPATH can help you by visiting www.redlinecommunications.com/redpath

Leap Gracefully from D to E

With minimal risk, cost, and downtime

SR Telecom offers carriers the unique benefits that come with 25 years of experience supporting top-tier operators. We provide all the components of a seamless upgrade: an efficient broadcast software download capability, an NMS suite that manages and simplifies the process, and technical services to prepare and execute a trouble-free migration.

When you make the leap from “d” to “e,” rely on SR Telecom to manage the transition cost-effectively and trouble-free.

A Glimpse into the Near Future

It is 2:55 a.m. on a day in the not-so-distant future. 18 months ago, you began your WiMAX rollout, using SR Telecom's **symmetryMX*** WiMAX 802.16-2004 solution to cover your urban centers and suburban areas. In a little under a year, you deployed a stable “d” network that currently provides tens of thousands of subscribers with fixed and nomadic services for high-speed IP applications. Your brand is well known, and you're well on your way to break-even. Now, you're poised for explosive growth with WiMAX “e” mobile services, and you are eager to capture the promised mobile market.

SR Telecom technicians helped you plan your migration, and they've been in constant communication to support your engineering team. You received your SR Telecom software update a few days ago, and upgraded a handful of Subscriber Stations (SSs), which worked seamlessly.

It is now 3:00 a.m. on that same day. From your Network Operations Centre, your technical team begins the upgrade. Using **symmetry* NMS** they upload the 802.16e-2005 software update to all your base stations. At 3:05 a.m., using **symmetry's** powerful broadcast software download feature, a NOC technician starts installing the new 802.16e-2005 software on the thousands of SSs. Fifteen minutes later, at 3:20 a.m., **symmetry NMS** has converted the entire network to WiMAX 802.16e-2005.

Six customers were online. They noticed the Internet went down for a little while, and that now it is back up. As they continue their online sessions, these night owls receive a message from their WiMAX-enabled laptops: “Found new mobile network.”

You have successfully made the leap from D to E.

What Carriers Need Today

Today's reality is that there is a large and growing demand for wireless broadband services. Only those carriers who move the fastest are likely to take a dominant place in that market. However, early deployment of technology carries risks. That's why the Intel® WiMAX Connection 2250 is the perfect platform – it allows operators to immediately roll out stable WiMAX “d” networks that are supplied by experienced vendors, like SR Telecom, and then upgrade to the future WiMAX “e” standard when the time is right.

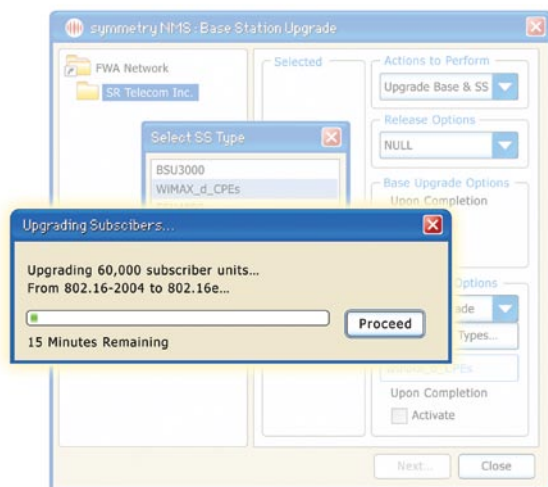




Photo courtesy of ISH Kabel, Deutschland. Unauthorized use not permitted.

How to Make the Leap

A successful leap from “d” to “e” requires an assured, trouble-free, upgrade that is efficient, inexpensive, and low-risk... exactly what SR Telecom has been providing to customers for 25 years.

As a specialist vendor who is focused on top-tier carriers, SR Telecom has supported operators with numerous network upgrades. Upgradeability and future-proofness are built deep into our systems. For example, SR Telecom has supplied carriers with nearly 1,000 ABS4000 base stations* that support our pre-WiMAX **symmetryONE*** airlink; our WiMAX Forum-Certified **symmetryMX*** 802.16-2004 airlink, as well as our forthcoming **symmetryMXe*** 802.16e-2005 airlink.

Broadcast Software Download

In addition, we built a Broadcast Software Download capability into **symmetryMX** from day one. This feature, which is not addressed by the 802.16-2004 standard, allows operators to download new software to thousands of WiMAX SSs over-the-air and simultaneously.

Comprehensive NMS

The **symmetryMX** platform is backed up by another key component: **symmetry NMS** is a comprehensive suite of NMS tools designed to scale to millions of subscribers, and offering real-time and historical monitoring, server redundancy, and broadcast software upgrades to 60,000 SSs at a time.

Together, the **symmetry** hardware platform and the **symmetry NMS** ensure all the key components of a successful upgrade are in place: fast downloads – thousands of SSs can be upgraded in a few minutes; integrity checking of the new software; and fallback to the previous software load if any issues are detected.

Technical Support Services

The final piece of the puzzle is technical services. Accustomed to the stringent requirements of top-tier carriers, SR Telecom provides services that make upgrades easier and more secure. For instance, SR Telecom customizes upgrade procedures and offers remote or on-site support.

Your Partner for D to E

With all the pieces in place – stations and airlink designed for upgrades, the most capable NMS system to manage the process, all backed up by committed technical service – SR Telecom is your ideal partner for the leap from “d” to “e.”

Most importantly, carriers can count on the fact that SR Telecom has done it all before. So, we understand the challenges involved in upgrading a massive network, and can help you manage your transition and avoid unplanned downtime.

Another Glimpse into the Future

It is 11:25 a.m. in the not-so-distant future. People have been hearing about the new mobile services that are now available in their city. As the dominant provider of broadband services, your sales department has been receiving orders for these new services all morning.

Learn more about the **symmetry** suite at
www.srtelecom.com

Why wait for WiMAX?
It's already here.

Find out more at
www.intel.com/go/wimax



The Future of WiMAX

Intel believes broadband wireless technologies will help bring the next billion users to the Internet by providing new broadband wireless services in established markets and by enabling broadband services in previously underserved and emerging markets. More than 40 service providers have deployed commercial fixed WiMAX networks using Intel-based CPE equipment. In addition, Intel is actively engaged with many of the more than 240 service providers worldwide that are preparing for both fixed and mobile WiMAX trials and deployments.

Intel and the WiMAX ecosystem have made great progress. Intel continues to work with a growing community of developers, laying the path to Intel® Centrino® mobile technology integration and mass-market adoption for fixed and mobile WiMAX.

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