Broader Broadband with WiMAX and WiFi together

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WiFi hotspots has dramatically increased productivity and convenience for providing high-speed Internet access from cable, Digital Subscriber Line (DSL), and other fixed broadband connections within wireless.

Worldwide, more than 223 million homes have WiFi connections, and there are over 127 million WiFi hotspots.1 The integration of WiFi into notebooks has accelerated the adoption of WiFi to the point where it is nearly a default feature in notebooks. Over 97% of laptops ship with WiFi integrated,2 and an increasing number of handhelds and Consumer Electronics (CE) devices are adding WiFi capabilities.

The day is not away when, nearly pervasive WiFi delivers high-speed Wireless Local Area Network (WLAN) connectivity to millions of offices, homes, and public locations, such as hotels, cafés, and airports in Pakistan and will prove itself as metropolitan, suburban, or rural—with multi-megabit per second mobile broadband Internet access.

Though, High level of silicon and platform integration not possible between dissimilar radio technologies, But in the case of WiMAX (IEEE 802.16e) and WiFi (IEEE 802.11) it looks possibile as both of these technologies leverage OFDM and advanced antenna innovations to attain high-broadband data rates and improved signal reception.
WiMAX and WiFi both are open IEEE wireless standards use IP-based technologies to provide connection services to the Internet.

Note: Here WiMAX means the scalable OFDMA air interface as defined in IEEE 802.16e-2005. Commonly referred to as "Mobile WiMAX," IEEE 802.16e-2005 is

ideally suited—and is being deployed—not only for mobile, but also for fixed and portable applications
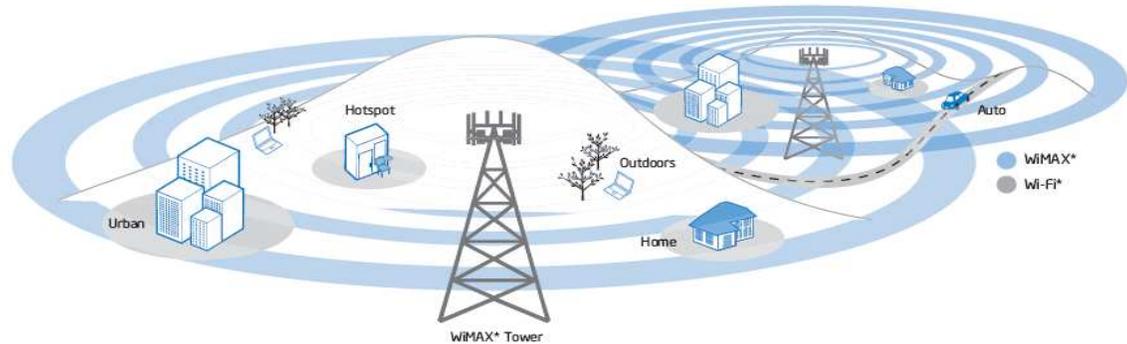
Delivering mixed WiMAX* and Wi-Fi* coverage in a large service area.

Together, WiMAX and WiFi sounds ideal Integration for service providers to deliver convenient, affordable mobile broadband Internet services as WiFi Supports very high-speed WLAN connectivity and WiMAX supports high-speed Wireless WAN (WWAN) connectivity.

WiMAX, based on scalable Orthogonal Frequency Division Multiple Access (OFDMA) technology, is capable of simultaneously supporting fixed, portable, and mobile usage models, and with scalable OFDMA, operators no longer need to choose between fixed or mobile services.

The service providers can leverage these technologies to offer wireless broadband Internet connectivity and compelling new services at affordable prices and in more locations. It also focuses on the synergies between the IEEE 802.11a/g/n Orthogonal Frequency Division Multiplexing (OFDM) and IEEE 802.16e-2005 OFDMA air interfaces.

WiMAX WiFi seamless integration provides compelling benefits to service providers and users:

- Increased common user experience for wireless broadband services, which is a critical enabler in attaining rapid user adoption.

- Coverage issue resolved at its maximum.

- Extensive interoperability and enabling an open and competitive multi-vendor environment So, Limitation of Device Support also solved.

- An all-IP based network infrastructure, enabling cost-effective deployments for

- operators and open Internet services for users.

Service benefits of Wi-Fi and WiMAX synergies

| Key Benefits of WiMAX* andWi-Fi* Combination	Wi-Fi (IEEE 802.11 a/g/n) Characteristics	WiMAX (IEEE 802.16e-2005) Characteristics
"Best-connected" model: users connect to WiMAX or Wi-Fi depending on their location, coverage, and quality of service (QoS) requirements.	Deployed in local coverage areas, such as public hotspots, homes, and businesses.	Deployed in wide coverage areas, including metropolitan areas for mobile broadband wireless, as well as rural or remote areas for last-mile connectivity and portable service.
Service providers can leverage both licensed and license-exempt spectrum; for example, license-exempt for best-effort local area traffic and licensed for wide-area and QoS-sensitive traffic.	Operates in license-exempt spectrum. Current solutions use the 2.4 and 5 GHz bands.	Operates in licensed spectrum. Current solutions use the 2.3, 2.5, and 3.5 GHz bands.
Economical coverage of large areas; for example, Wi-Fi hotspots in cafes, hotels, and airports, and WiMAX for blanket coverage outside of hotspots.	Short range: up to 100 meters for a single access point.	Metropolitan and suburban area mobile coverage of up to several kilometers for a single base station. Longer range (up to several miles) for fixed and lower-density deployments.

Device benefits of Wi-Fi and WiMAX synergies

Key Benefits of WiMAX* and Wi-Fi* Combination	Wi-Fi (IEEE 802.11a/g/n) Characteristics	WiMAX (IEEE 802.16e-2005) Characteristics
Integration into devices is expected to reduce device subsidies and lower cost per gross add (CPGA).[6]	OFDM air interface, as defined in IEEE 802.11a/g/n.	Scalable OFDMA air interface, as defined in IEEE 802.16e-2005.
Service providers can leverage both licensed and license-exempt spectrum; for example, license-exempt for best-effort local area traffic and licensed for wide-area and QoS-sensitive traffic.	Embedded in 97 percent of laptops[7] and many handheld and CE devices.	Available in multiple form factors: customer premises equipment, add-on PC cards, and embedded into laptops and handheld devices.
The opportunity for devices to share antenna components reduces the cost of integrating both into devices.	Implementing MIMO in IEEE 802.11n to achieve higher data rates.	Starting in mid 2008, the majority of WiMAX Forum Certified* clients will support both MIMO and beamforming.[8]

WiMAX and Wi-Fi Seamless Roaming (WiMAX and Wi-Fi Inter-Network Operation)

Service providers can take advantage of control-plane and data-plane interfaces to give users with Wi-Fi and WiMAX-enabled laptops or mobile Internet devices (MIDs) the

ability to seamlessly roam between Wi-Fi hotspots and WiMAX networks. Figure 2 shows this architecture. This capability sets the stage for products that provide subscribers with combined mobile services, such as Internet access, VoIP, and entertainment media.
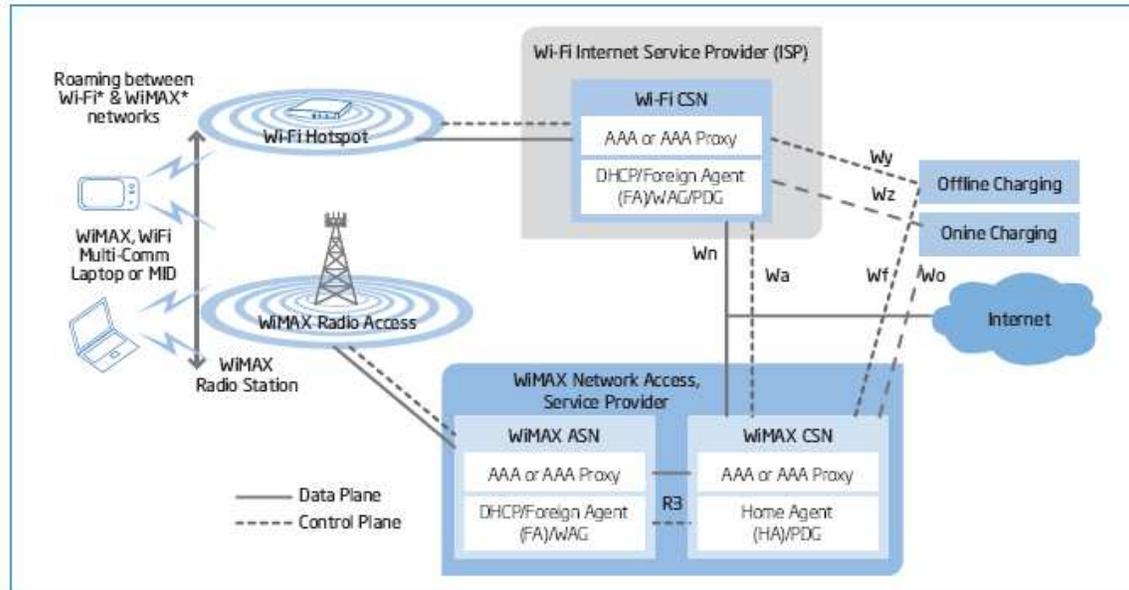
Architecture to provide seamless roaming between WiMAX and Wi-Fi networks.

Conclusion

The integration of WiMAX and Wi-Fi promises convenient and affordable broadband connectivity that brings new deployment models for service providers, as well as new usage models for subscribers. The ability to be connected to the Internet and to have access to real-time information in more places is of high value to business professionals and consumers alike. The advantages of coupling WiMAX and Wi-Fi enable service providers to offer compelling new service offerings with both WiMAX and Wi-Fi capabilities and to take advantage of device cost savings enabled by the synergies between the two technologies. These capabilities and synergies position service providers to be more competitive and profitable as the new face of broadband emerges.WiMAX and WiFi. Provide a common user experience in either access network, Leverage both licensed and license-exempt frequency bands, Optimize the network by routing traffic based on the subscriber's need for mobility, QoS, and bandwidth, Offer appealing and

compelling devices with both WiMAX and WiFi capabilities and take advantage of device cost savings enabled by the synergies between the two technologies.