



WiMAX Forum® “Hot Topics” Q & A
Updated February 2009
www.wimaxforum.org

1. A few vendors have announced plans to no longer pursue Mobile WiMAX technology, most recently Nortel. What does this mean for WiMAX since economies of scale are so vital to its success?

No one is immunized from the global financial crisis. While the WiMAX industry anticipates a slowdown in general, WiMAX Forum still believes that at least 100 more WiMAX operators will launch commercial services in 2009. This number was expected to be higher; however, the market turmoil caused investors to become more cautious. Despite a tightening in investment, companies with sound business models and proven technologies, such as WiMAX, will obtain funding during this challenging time. Meantime, we continue to be encouraged by the fact that the WiMAX industry is growing at a reasonable pace since 2007. WiMAX Forum contributions surrounding the evolution of technology standards and introduction of Mobile WiMAX Certified products are on track, with the active support of the global telecommunications/wireless ecosystem.

2. How is the global recession impacting WiMAX deployments?

Right now, there are more than 455 deployments globally in 135 countries, up from 400 deployments in mid-2008. Even with the global economy shrinking, WiMAX deployments continue to grow rapidly. During the Great Depression people stayed home and listened to the radio for news and entertainment. Today’s mode of receiving worldwide news and entertainment is the Internet and the demand for high speed services will continue to grow even in tough economic times.

WiMAX has already established itself in the 3.5 GHz band with deployments in every region. WiMAX is being deployed in the 2.5 GHz in countries such as the U.S., Japan, Taiwan, Russia and Mexico, and new 2.5 GHz WiMAX spectrum allocations are expected soon. WiMAX has been deployed in the 2.3 GHz in South Korea, Malaysia and Singapore with future deployments anticipated in Vietnam, Thailand, Indonesia, Australia and Canada. Most recently, India approved auctions for 2.3 and 2.5GHz. In the U.K., WiMAX is deployed in the 3.5 GHz band.

3. How will the broadband stimulus plan impact WiMAX deployments in the U.S.?

WiMAX technology provides for fixed, nomadic, and mobile access to broadband which offers speeds comparable to DSL without the landline infrastructure requirements. A number of WiMAX Forum members are based in the U.S., many of which are operators that have long used wireless broadband technology (unlicensed) to deliver voice and data to underserved areas. With additional funding that is proposed, this impacts these operators and

*Other names and brands may be the property of others

could give them the necessary funding to upgrade to WiMAX equipment to deliver the types of high-bandwidth services to achieve the goals of this administration - and to do so today.

Below are the subscriber and user forecasts for the US:

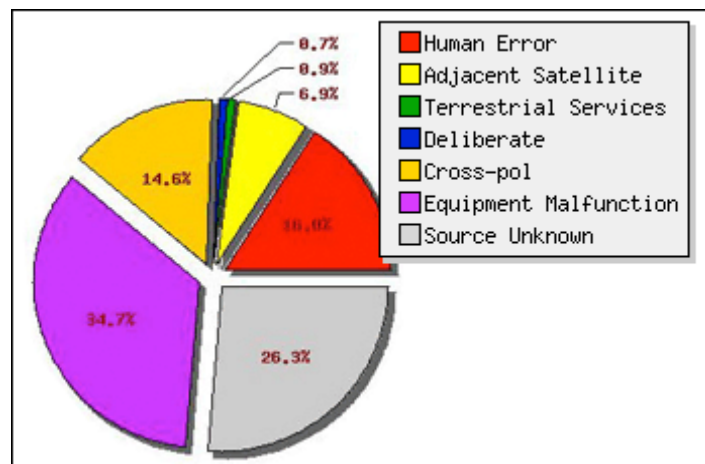
TABLE 1: WiMAX SUBSCRIBERS BY REGION (millions) - Subscriber forecasts							WiMAX Subscriber Penetration	
Region	2007	2008	2009	2010	2011	2012	2007	2012
USA	1.27	2.22	3.87	6.64	11.14	18.08	0.42%	5.64%

TABLE 2 : WiMAX USERS BY REGION (millions) - Subscribers adjusted for multiple users per subscription							WiMAX User Penetration	
Region	2007	2008	2009	2010	2011	2012	2007	2012
USA	2.21	3.48	5.51	8.63	13.53	20.97	0.72%	6.54%

4. What is the current situation with the claims of interference between Broadband Wireless Access systems (including WiMAX) and satellite systems?

Interference can result when any two communications systems are deployed in the same geographical area. Harmful interference is avoided by employing a variety of mechanisms, including frequency coordination between the concerned operators, frequency separation, antenna discrimination, receiver performance requirements (such as filtering), out-of-band power limits and site shielding. Each scenario should be analyzed to determine which mechanisms are appropriate. The WiMAX Forum is working with regulators to develop the appropriate regulatory regimes to avoid harmful interference, while still maximizing use of the limited spectrum resource and accommodating both broadband wireless access systems (BWA) and satellite systems within C-band spectrum—3400-4200 MHz.

Information on actual interference cases is summarized in the diagram below, which was published by the Satellite Users Interference Reduction Group (SUIRG) in its newsletter of late 2008:



*Other names and brands may be the property of others

Based on the data provided by SUIRG, terrestrial services account for only 0.9% of all interference cases. Markedly, the terrestrial services (a co-primary service to satellite) also include fixed radio link systems, which have occupied the C-band under the Fixed Service (FS) allocation for many years. These more traditional fixed point-to-point systems could also contribute to the 0.9% figure, leaving the contribution from BWA at an insignificant level. Further, the WiMAX Forum, vendors and operators are working together with regulators worldwide, as well as experts in other bodies like the Global VSAT Forum, to assure that interference from terrestrial services will not become a significant factor for C-band satellite services.

5. What are the killer applications for WiMAX?

There is no single application today that will be the 'silver bullet' for making mobile broadband take-off with mainstream consumers. However, there are some inventive applications now under development in WiMAX Forum-sponsored applications labs. These new apps provide a glimpse of what is possible today, and signal why WiMAX is at the forefront of enabling the next generation of mobile Internet and communications.

The WiMAX Forum has partnerships with two applications labs today: one in Taiwan's Hsinchu Science Park at the M-Taiwan WiMAX Application Lab (MTWAL), and The MIND Lab and The MAXWell Lab applications labs in the United States at the University of Maryland (UMD). These applications labs allow WiMAX Forum member companies, and university researchers, in the case of UMD, to test their applications on both of these live WiMAX networks.

The U.S. applications labs at the University of Maryland currently are deploying a WiMAX network on both the campus and local transportation systems. This application lab will offer students campus-wide mobile broadband access to important information via WiMAX. From finding your car in the parking lot to instantaneous access to campus security information, including live video feeds from the spot where an emergency call is made, WiMAX will bring information to your fingertips like never before.

6. What is the response to the argument that mobile WiMAX devices and products not yet exist in the market?

Mobile cell phones, Ultra Mobile PC's, Mobile Internet Devices (MIDS), gaming devices and laptops are among the dozens of WiMAX-compliant products showcased at recent industry tradeshows. Currently, more than 35 WiMAX Forum member companies are producing WiMAX base stations, 30 companies are providing PC Cards, USB modems, MIDs, and other personal devices, 25 companies provide chipsets and reference designs, and seven of the top eight global device manufacturers are developing WiMAX products. In regards to existing products, it is important to note that since chipsets that use Wi-Fi are similar to WiMAX chipsets, both can be embedded into one chip. This means that devices utilizing Wi-Fi, including cell phones and laptops, will easily be able to incorporate WiMAX technology on the same chipset at minimal additional cost. Intel's first WiMAX notebook-embedded modem* is estimated to be half the cost of 3G modems and deliver three times the

*Other names and brands may be the property of others

performance. In the future, any device that could potentially benefit from connectivity can become a WiMAX enabled device. This includes digital cameras, digital music players and even your home security system.

7. What is the current WiMAX™ roadmap? When will IEEE 802.16m be ratified and what are the enhancements made in comparison to earlier ratified standards?*

WiMAX technology is the leader in the wireless broadband industry and we expect WiMAX to become a mass market service by 2010. Mobile WiMAX™ is here today and the WiMAX ecosystem is reaching across the world. WiMAX benefits from 23 years time to market (TTM) advantage over any similar technology, during which time performance will be optimized. To date, 455 service providers have deployed in 135 countries. The WiMAX Forum forecasts that by 2011 more than 1,000 products will be Mobile WiMAX Certified™.

IEEE 802.16m air interface is the next major landmark in the WiMAX standard's evolution beyond IEEE 802.16e-2005. WiMAX Forum will adopt IEEE 802.16m once the standard is completed, which is expected to occur in the first half of 2010. The IEEE 802.16 Working Group has defined its expected parameters for IEEE 802.16m, which can be found on its web site. All products based upon IEEE 802.16e-2005 will be forward compatible to the future 802.16m IEEE standard. In addition to its work with the IEEE, WiMAX Forum is committed to contributing to the longer-term work of the International Telecommunications Union, both with enhancements to IMT-2000 and IMT-Advanced. As such, we will be submitting IEEE 802.16m in conjunction with the future WiMAX Forum Mobile System Profiles (including both TDD and FDD schemes) for inclusion in IMT-Advanced.

8. With regard to the much documented LTE vs. WiMAX debate, what are the primary advantages and differences that the WiMAX Forum sees between the technologies and markets?

WiMAX is included in the IMT-2000 family of mobile wireless interface standards and is supported by a broad, open and innovative ecosystem including more than 500 member companies in the WiMAX Forum. This open ecosystem is one of the many strengths of WiMAX – it brings the flexibility of the computing industry model to the mobile world. This includes an open IPR model led by the Open Patent Alliance.

Additionally, WiMAX has already established itself in the 3.5 GHz band with deployments in every region. This is in addition to large 2.5 GHz deployments in major markets such as the US, Japan, and India. As an established technology – WiMAX is here now. There are 455 WiMAX deployments in 135 countries, and there are more major WiMAX spectrum auctions on the horizon.

Conversely, LTE currently has zero deployments. While marketed as an “evolution,” LTE networks are a completely new upgrade. They require new infrastructure and new spectrum. While WiMAX is already in deployment, new spectrum or the re-farming of wide swaths of 2G spectrum will be necessary to free up spectrum to deploy LTE and take advantage of the wider channel bandwidths that are supported. LTE networks will also require new client

*Other names and brands may be the property of others

devices and service providers will need to purchase new radio access network (RAN) equipment in addition to upgrading their core networks to handle additional IP-based traffic. LTE will also take time to roll out, with deployments forecast to reach limited adoption by 2012. In its marketing, LTE claims faster speeds than WiMAX. However this comparison is not correct, as the technologies are similar in performance.