

WiMAX (Worldwide Interoperability for Microwave Access): a Broadband Wireless Product in Emerging Markets

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Abstract

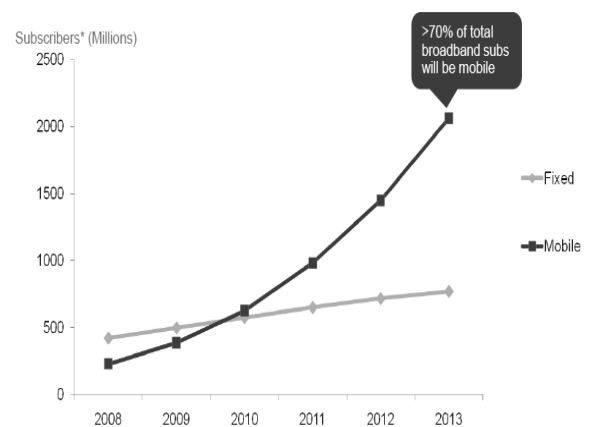
Wireless access networks like WiMAX provide an excellent opportunity for operators to participate in the rapid growth opportunities that exist in emerging markets. Emerging markets are hungry for fixed broadband services; however characteristics of ADSL (Asymmetric Digital Subscriber Line) limit the even distribution of fixed broadband services to encompass urban and rural areas. WiMAX-based access networks will enable local operators to cost-effectively reach millions of new potential customers and provide them with traditional voice and broadband data services. Which are still not possible? Although these markets have all the attributes required for a winning business world, they are not without challenges. But after launching the WiMAX over ADSL in the market, the result are encouraging because with respect to other services the WiMax getting better responses in term of WiMAX's users and operators.

Keywords: WiMax, ADSL, Wireless Network, Fixed Broadband, Emerging Market

1. Fixed- and Mobile-WiMAX?

WiMAX is a standards-based wireless broadband technology [3], also known by the IEEE standard, 802.16, offering high-speed wireless access over long distances. A WiMAX system have a radio tower, similar to a cellular base station, and a WiMAX antenna and receiver at the customer-end, which can be a modem, PC (personal computer) data card or even a mobile handset. Fixed-WiMAX, often referred to as 802.16d standard, was released in 2004. Pre-standard CPEs (Customer Premises Equipment) are available including outdoor, directional antennas as well as indoor modems. The standard is specified to allow nomad city, where users can access the service from various locations covered by the network. However, in the absence of portable devices currently, present deployments offer only fixed wireless access, meaning users can access the service only from their home location, where the CPE is installed. Mobile-WiMAX, referred to by the standard 802.16e, adds mobility to the WiMAX specifications, such that seamless handover and roaming are possible when users move from one cell site area to another. The specifications for 802.16e standard were released in December 2005. PC data cards, mobile handsets and laptops with embedded WiMAX chips are being planned by vendors on this standard. In countries where regulation prohibits full mobility for alternative wireless technologies such as WiMAX, operators can also deploy 802.16e networks for fixed and nomadic access.

We analyzed what can be realistically expected from WiMAX deployments as well as compared its proposition against DSL (digital subscriber line) and 3G (third generation). Wireless Broadband Races to Substitute ADSL[1] For many years, users around the world have relied on fixed Internet connections, from the humble beginnings of dial-up to more generous portions of bandwidth though broadband connectivity. Recently, the emergence of wireless broadband has begun to challenge the landscape of fixed broadband. Though during its infancy stage, wireless broadband was regarded as a complimentary technology to empower mobile broadband, a sector outside the service perimeters of fixed line broadband operators, the scene has now changed to a competing one. Especially in emerging markets, wireless broadband technologies such as WiMAX are now in direct competition with fixed (ADSL) operators, where wireless broadband is positioned for fixed, indoor use that caters for home and small office users. WiMAX holds this advantage as it began as a fixed wireless broadband connectivity (IEEE's 802.16d standard). According to Qualcomm, the year 2010 will see the number of wireless broadband subscribers overtake fixed broadband subscribers as shown in Figure 1 below.



Source: Qualcomm
Fig 1: Rapid growth of global wireless broadband subscribers

2. Characteristics of Emerging Markets

The definition of an emerging market [4] is a nation having an economy with a very low current gross domestic product per capita (GDP) with an above-average economic growth potential. The annual GDP per capita for China and India for example is under \$1,000, whereas the United States, Japan, and countries in Western Europe have GDPs per capita ranging from \$24,000 to \$36,000 per year. The above-average growth potential in emerging markets makes these countries attractive for investment but the low current GDP creates one of the major initial challenges. In terms of broadband services the low discretionary income per household has the following impact:

- Lower revenues (ARPU) (average revenue per user) for broadband services.
- Fewer customers can afford to purchase their own customer premise equipment.
- Higher churn and higher percentage of bad debts can result in higher operating expense
- Lower percentage of households own personal computers thus reducing the size of the addressable market for broadband services.

On a more positive note there are a number of favorable attributes in addition to the above-average economic growth that make these markets particularly attractive for communications network investment. These attributes are summarized in the following table

Table 1: Characteristics & Impact

Characteristics of Emerging Markets	Impact on WiMAX Operator
Support of government telecom regulators	<ul style="list-style-type: none"> • Spectrum available at low or no cost • Facilitated licensing process
Very high household (HH) density in metro areas	<ul style="list-style-type: none"> • Lower infrastructure CAPEX (capital expenditure) per HH passed
Limited wire-line competition	<ul style="list-style-type: none"> • Gain higher penetration of addressable market
High pent-up demand	<ul style="list-style-type: none"> • Rapid market adoption rate (1 to 2 years instead of 3 to 5 years)

3. WiMAX Technology Forecast

Wireline technologies are slow and costly to roll out - even in some parts of developed nations. Cellular technology is often too costly to use, does not deliver true broadband speed and does not scale to the capacity of an all-IP media-centric network. Therefore it is assumed that, throughout the forecast period, particularly aggressive WiMAX growth [2] will take place in countries such as Brazil, China, India and Russia; and in regions such as the Americas, Middle East/Africa, Eastern Europe and Developing Asia Pacific.

Initial forecasting assumptions are based on current penetration levels and potential total penetration levels, which take into account current and future economic development potential in each world region.

The WiMAX penetration rates in these forecasts vary significantly by region and are based on the following assumptions:

- After launching of WiMAX services the market potential depends on the availability of suitable spectrum in each region.
- WiMAX penetration will increase as equipment costs—and particularly device costs—decrease, with the rate of penetration in each region depending on the wider broadband market (with compared to other broadband devices) as well as macroeconomic factors such as consumer purchasing power
- WiMAX will have higher growth and penetration rates where penetration of alternative fixed and mobile broadband systems is low.
- WiMAX will have higher growth rates in regions where major operators are already committed to deploying the technology. We are talking to those operators where large number of users migrates to WiMAX.
- WiMAX penetration will increase as service costs decrease, with the exact rate depending on the wider broadband and economic landscape of each region.
- WiMAX penetration rates in each region have been benchmarked against comparable historical penetration rates in the fixed broadband, mobile, and mobile broadband markets. More detail on these penetration rates will be available in future reports. In future forecast revisions our intention is to introduce a dual methodology that includes both a tops-down and a bottom-up approach based on actual deployment data. This will allow for growth assumptions to be tied more closely to the number and growth of national and major regional operators. User Growth Forecasts [8]

The WiMAX subscription model is same as of fixed broadband in that there are multiple business and consumer users connecting per each CPE subscription. The forecasts in Table 1 below take this into account and accordingly show a higher number of users than subscribers. Table 1 set out the user numbers by major world region.

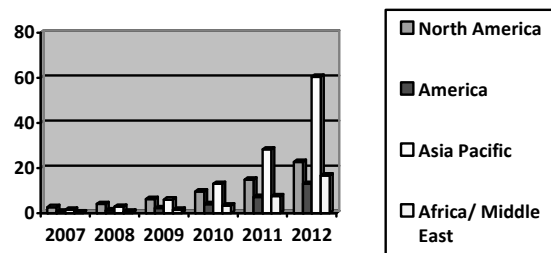


Fig 2: WiMAX Users by Region 2007-2012

Table 2: WiMAX Users by Region (millions) 2007-2012

Users = subscribers adjusted to reflect multiple users per subscription

Region	2007	2008	2009	2010	2011	2012
North America	2.61	4.03	6.25	9.59	14.79	22.62
Americas	0.66	1.18	2.14	3.92	7.17	12.97
Asia Pacific	1.39	2.84	5.99	12.96	28.17	60.45
Europe	1.35	2.34	4.07	7.08	12.23	21.01
Africa/Middle East	0.30	0.65	1.46	3.32	7.50	16.60
TOTAL	6.32	11.04	19.91	36.88	69.87	133.66

Fixed WiMAX device subscriptions—for example by outdoor or indoor CPE—will on average service more than one user. By 2012 the Asia Pacific region will lead the market in total actual users, with North America in second place followed by Europe, Africa/Middle East and the Americas. User numbers in India will overtake those in the USA in 2012, and it is estimated that by then China will have almost as many users as the whole of the Americas region (Latin America & the Caribbean).

4. WiMAX: Country Growth & Operator

The numbers of WiMAX operators and countries shown in Figure 3 are those in which WiMAX service has commenced. Those currently in deployment but not yet implemented in their account for the forecasts, with other operators and status which will adopt WiMAX technology in future.

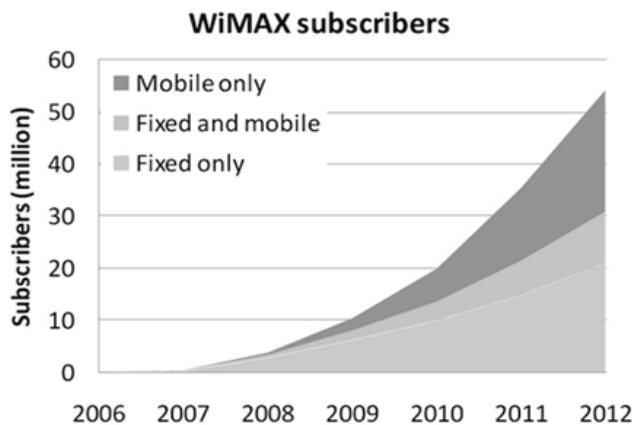


Fig 3: WiMAX Subscribers 2006-2012

The end of 2007 showed a total of 181 WiMAX operators globally. This number is expected to rise to 538 operators by 2012. The number of countries with WiMAX is anticipated to rise from 94 (out of a total 234 countries) at the end of 2007[5] to 201 in 2012.

Europe is anticipated to have the largest number of operators, followed by Asia Pacific, Africa/Middle East, Americas and North America. However, Africa/Middle East is expected to have the highest number of WiMAX operator countries, followed by Europe, Americas, Asia Pacific and North America.

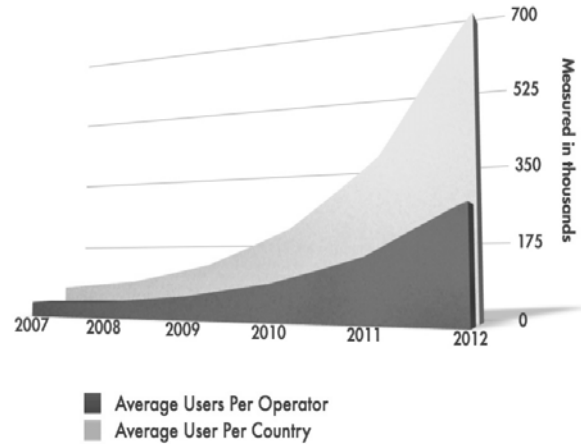


Fig 4: Average WiMAX Users by Operator & Country 2007-2012

Competing technologies

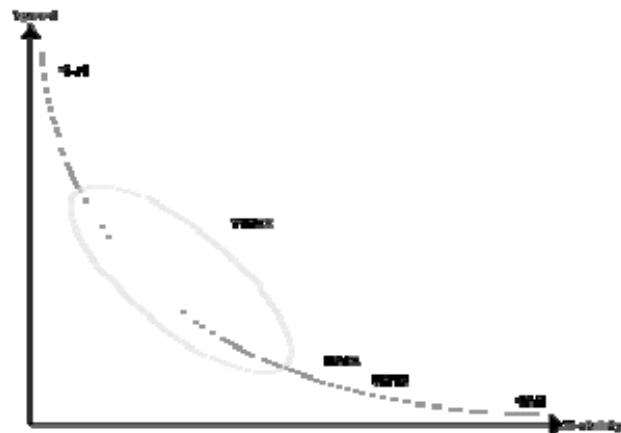


Fig 5: Speed vs. Mobility of wireless systems

Wi-Fi, HSPA (high speed downlink packet access), UMTS (universal mobile telecommunication system), and GSM (global system for mobile communication) within the marketplace, WiMAX's main competition comes from existing, widely deployed wireless systems such as UMTS, CDMA2000 (code division multiple access), existing Wi-Fi and mesh networking.

In the future, competition [7] will be from the evolution of the major cellular standards to so-called 4G, high-

bandwidth, low-latency, all-IP networks with voice services built on top. The worldwide move to 4G for GSM/UMTS is the 3GPP (third generation partnership project) Long Term Evolution effort. However, it has been noted that the likely performance difference between WiMAX as it stands today and LTE (long term evolution) [6] when it is eventually commercially available in 2–3 years time, will be negligible.

LTE is expected to be ratified at the end of 2010, with commercial implementations becoming viable within the next two years. End of 2009 TeliaSonera started commercial deployment in Oslo and Stockholm, In Denmark the 3 big telecoms are upgrading their network, and will make LTE available during 2010.

In some areas of the world, the wide availability of UMTS and a general desire for standardization has meant spectrum has not been allocated for WiMAX: in July 2005, the EU-wide frequency allocation for WiMAX was blocked.

5. Conclusion

The purpose of this forecast is to provide the WiMAX Forum prediction of the ecosystem's worldwide growth over the next five years. The forecast covers WiMAX deployments globally and is broken down by major regions – North America, Asia-Pacific, Europe, and Middle East/Africa. This also includes major country or sub-regional breakouts for the USA (united state of America), Canada, Japan, China, Korea, India, the Rest of Asia-Pacific Developed, the Rest of Asia-Pacific Developing, Western Europe, Eastern Europe, Africa and the Middle East.

Assumptions

Worldwide access to Broadband Internet is vital for economic growth and development. All governments must work to ensure that their nations are able to realize the benefits associated with a strong communications infrastructure. Therefore this report assumes that many countries will adopt WiMAX as a wireless Broadband Internet technology to facilitate rapid economic development. It is also assumed that the move to WiMAX, a technology that is ready for deployment now, will be preferable to waiting for alternative technologies that may not be available for three or more years.

We can assume the growth of WiMAX technology, because we have seen the results the other related technologies by rapid growth, WiMAX user growth, the worldwide WiMAX operator growth, average WiMAX user by operator and country 2007 to 2012 and finally other competing technology of Fig 1, Fig 2, Fig 3, Fig 4 and Fig 5 respectively .

So, we can conclude that WiMAX's operator and product has a vital role for country and their operators' growth to cost-effective reach million of traditional voice and broadband data services.

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