WiMAX Forum® WiMAX™ Technology Forecast (2007-2012)

Introduction

This report summarizes the WiMAX Forum's™ User, Subscriber, Operator & Country Forecasts from 2007-2012. 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, Middle East/Africa. This also includes major country or sub-regional breakouts for the USA, 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.

Our assumptions for the uptake of WiMAX technology, particularly in developing areas, are based on the difficulties inherent in deploying today's available competing technologies. 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 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. Also, growth in fixed and mobile communications has historically followed an S-curve pattern, and therefore S-curve growth has been applied in these forecasts.

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

- WiMAX will have higher growth and penetration rates where penetration of alternative fixed and mobile broadband systems is low.
- The launch date of WiMAX services and their market potential depends on the availability of suitable spectrum in each region.
- WiMAX will have higher growth rates in regions where major operators are already committed to deploying the technology. Emphasis was put on those operators with a large number of existing subscribers to migrate to WiMAX, and what relevant assets (such as base station sites and sales & distribution channels) they have available.
- 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 (e.g. the cost of competing broadband devices) as well as macroeconomic factors such as consumer purchasing power.
- 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

The WiMAX subscription model is similar to that 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 sets out the user numbers by major world region.

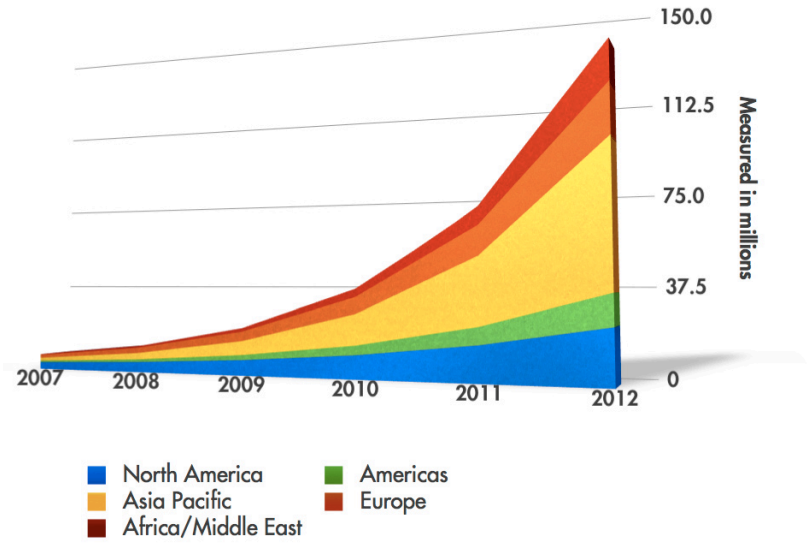

Figure 1: WiMAX Users by Region 2007-2012

Table 1: 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 Customer Premises Equipment (CPE)—will on average service more than one user. This will be most common

* includes pre-certified WiMAX

among business users, but will also prove true in the consumer market. On the other hand, Mobile WiMAX™ device use will be more single-user focused, and portable subscriptions will service single users - especially those with notebooks and tablets. Therefore as mobile and portable subscriptions become an increasing part of the subscriber mix, average number of users per subscription will fall.

In our forecasts, certain Asia-Pacific countries (China, India, Japan, South Korea) have been covered separately, and therefore we use separate multipliers for these rather than an overall regional multiplier. For example, as a result of the combination of different regional patterns for multiple-use and the weighting of the mobile-to-fixed ratios in different regions, our assumptions vary in 2007 from 1.05 in Korea to 1.97 in Developing Asia Pacific countries. By 2012 these have moved towards 1.01 in Korea compared with 1.42 in Developing Asia Pacific countries. Outside of Asia Pacific a regional multiplier is used, as in the Americas (Latin America and the Caribbean), which by 2012 has a multiplier of 1.47.

In developing regions where fixed broadband communications links are currently insufficient and there is the need and drive for rapid rollout of high-speed communications, there will be a greater frequency of multiple-user subscriptions than in economically developed areas. Therefore in countries and regions such as Brazil, China, India, Russia, the Americas, Middle East/Africa, Eastern Europe and Developing Asia Pacific, WiMAX CPE will account for a higher proportion of subscriptions than in North America and Western Europe throughout the forecast period.

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).

User Penetration Levels

Table 2 measures WiMAX user penetration as a percentage of total population in each region.

North America (includes the USA and Canada) had the highest WiMAX user penetration in 2007, and widespread availability will ensure rapid subscriber growth in the region through 2012. Nevertheless, it is estimated that by the end of the forecast period, penetration will approach 6.5%.

Europe has the second highest user penetration in 2007. Growth there is strong, especially in Eastern Europe where cable and fixed broadband Internet is less prevalent. Growth is highest in Asia Pacific, Africa/Middle East and the Americas; however, penetration in these regions will still be modest by 2012 – between 1.25% and 2.34%.

Table 2 shows WiMAX users and population numbers by region in 2007 and 2012.

Table 2: WiMAX† Users and Population (millions) by Region

	2007		2012	
Region	WiMAX Users	Population	WiMAX Users	Population
North America	2.61	339	22.62	355
Americas	0.66	573	12.97	608
Asia Pacific	1.39	3708	60.45	3879
Europe	1.35	889	21.01	897
Africa/Middle East	0.3	1186	16.6	1324
TOTAL	6.32	6696	133.66	7063

WiMAX penetration figures for both years have been calculated and are shown in Figure 2:

† includes pre-certified WiMAX

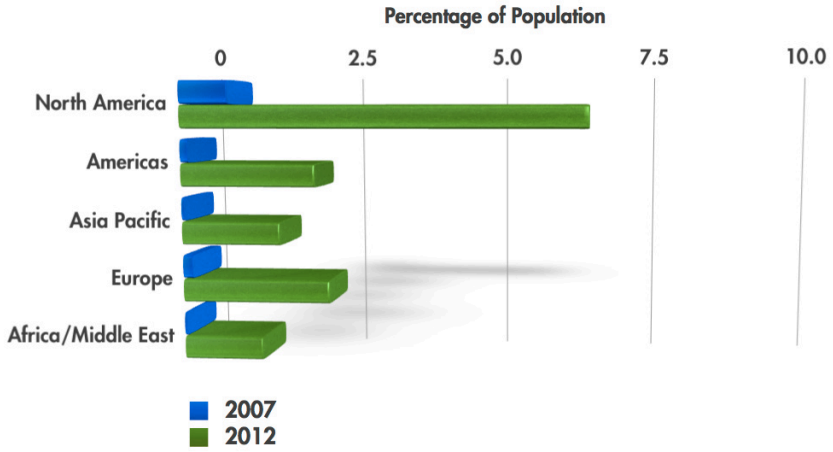

Figure 2: WiMAX User Penetration by Region 2007 & 2012

By comparison, W-CDMA penetration at the end of 2007 reached 0.67% of the population in Middle East/Africa region, 2.18% in Asia Pacific, 2.68% in North America and 9.68% in Europe.

Total fixed broadband penetration, while much higher than W-CDMA penetration on a worldwide basis, was less than 2% of the population in Africa, 3.5% in Asia Pacific and the Americas, 21% in Western Europe and 23% in North America.

We believe these comparisons demonstrate the realism of the present forecasts. Clearly, there will be plenty of opportunities for further user growth in the future. As WiMAX rolls out more widely, competition for subscribers should ensure lowered service and equipment pricing, and operators will be motivated by the market to provide packages that will attract users and further increase penetration levels.

WiMAX Operator and Country Growth

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 operational are taken into account in the forecasts, along with the other operators and countries anticipated to adopt WiMAX technology in the future.

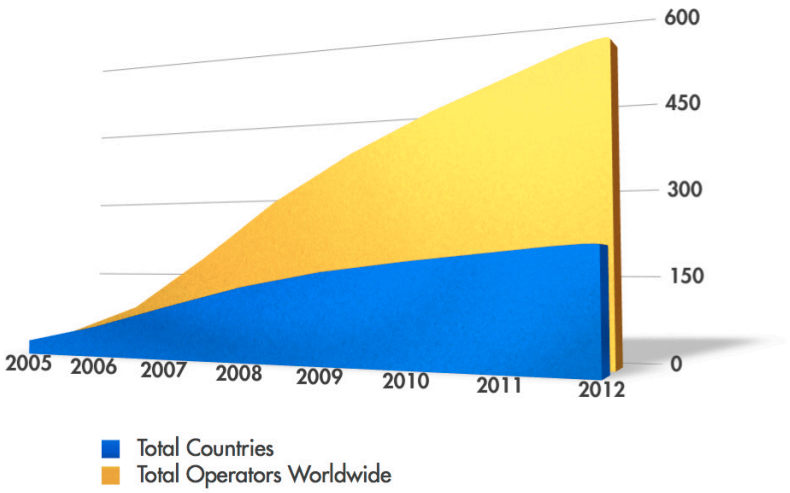

Figure 3: WiMAX Operators & Countries 2007-2012

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 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.

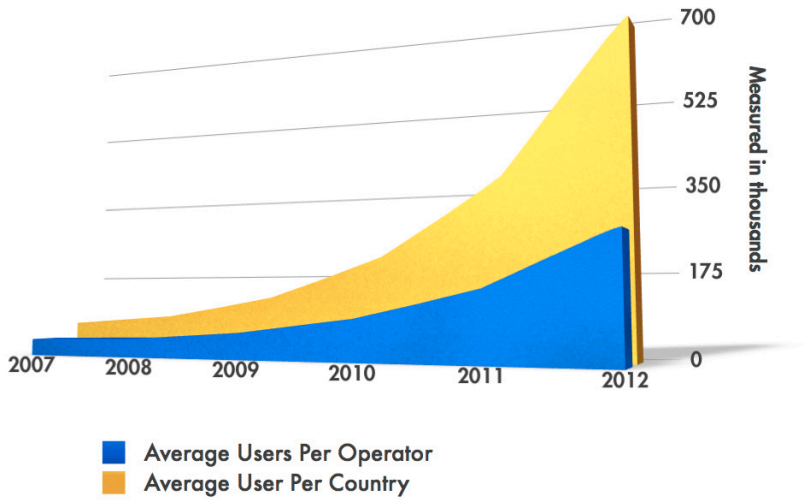

Figure 4: Average WiMAX Users by Operator & Country 2007-2012

Evolution of the Forecast

This forecast is an ongoing project of the WiMAX Forum that will continue to be used to educate the market as the WiMAX ecosystem expands. Future iterations of this report will be more robust, with more details on numbers and methodology. As WiMAX continues to flourish on the worldwide market, future reports will in particular focus on operator and country growth.