



WiMAX based Broadband Access solutions – an opportunity for rural and remote areas of ASP Region

ITU Regional Seminar on
"Broadband Wireless Access for rural and remote areas for ASP Region"
Shenzhen P. R. China - September 1 ~ 2, 2005

Hendrik Prins

Chairman AWF Broadband Wireless Access Sub Working Group,
WiMAX Forum Asia Pacific Regulatory Coordinator,

Copyright 2004 WiMAX Forum
"WiMAX Forum™" and "WiMAX Forum CERTIFIED™" are
registered trademarks of the WiMAX Forum™.
* All trademarks are the properties of their respective owners.



Broadband – a prerequisite for bridging the digital divide

- The potential of digital technology to assist in fostering socio economic development has been universally recognized.
- The need to bridge the digital divide in rural and remote areas is urgent because here the socio economic disparity is often the greatest, and so the potential benefit of dealing with it obvious.
- Wider proliferation of computers will help, but without a fast low cost connection to the internet the benefit will be drastically curtailed.
- There is no doubt that expanded access to broadband is a key aspect of the digital divide issue.

Copyright 2004 WiMAX Forum
"WiMAX Forum™" and "WiMAX Forum CERTIFIED™" are
registered trademarks of the WiMAX Forum™.
* All trademarks are the properties of their respective owners.



WiMAX based broadband solutions can play a key role

- The proliferation of WiFi has already demonstrated the benefits that can be derived from even a very limited form of high speed, but low cost IP based connectivity.
- The adoption of WiMAX based solutions can greatly expand on this by facilitating widespread high QoS broadband access at relatively low cost in areas where the local copper loop is inadequate or out of reach.
- Rural and remote areas can leverage off the success of WiMAX in developed markets where the conditions are already in place to drive the economies of scale required to bring down the cost of all IP nomadic and mobile access solutions.

Copyright 2004 WiMAX Forum
"WiMAX Forum™" and "WiMAX Forum CERTIFIED™" are registered trademarks of the WiMAX Forum™.
* All trademarks are the properties of their respective owners.



The operators role in delivering broadband to rural and remote areas

- We cannot expect Governments to significantly subsidize the cost of providing broadband access to rural and remote areas – commercially viable solutions must be found for those areas.
- For broadband access, we need to follow the example of what has already been achieved in many rural areas where CDMA has been used to provide a fixed line equivalent voice service, and in this manner achieve significant improvement in teledensity on a commercially viable basis.
- However as the CDMA experience has shown global standards based solutions are a pre-requisite.

Copyright 2004 WiMAX Forum
"WiMAX Forum™" and "WiMAX Forum CERTIFIED™" are registered trademarks of the WiMAX Forum™.
* All trademarks are the properties of their respective owners.



New technologies and global standards – the IMT promise

- The importance of catering for the particular needs of users in rural and remote markets is well recognized in the ITU (Question ITU-R 77-5/8 assigned to WP 8F).
- They are key considerations in the debates taking place in relation to IMT-2000 and systems beyond IMT-2000.
- In particular SG2 of ITU-D dealing with Questions 20 and deliberations related to the WTDC (Resolutions 37 & 43 from Istanbul 2002) are pertinent in this respect.
- In the area of mobile telecommunications, technological change is very rapid and the future is all IP.
- Low cost universal IP broadband access is now also the focus of IMT, particularly in relation to “systems beyond IMT-2000” or so called 4G.

Copyright 2004 WIMAX Forum
“WIMAX Forum™” and “WIMAX Forum CERTIFIED™” are registered trademarks of the WIMAX Forum™.
* All trademarks are the properties of their respective owners.



Linking 4G with the needs of rural and remote users

- The potentially important linkage of 4G technologies with the needs of rural and remote users has been recognized by some administrations who see merit in “leapfrogging” from 2G to 4G, particularly in the context of catering for rural area needs.
- When we consider that as part of systems beyond IMT-2000 “new radio interface(s) are envisaged to handle a wide range of supported data rates according to economic and services demands in multi-user environments” (M.1645 section 4.2.5), it is clear that such a linkage is logical and understandable.
- However the challenge is to find a way for innovative new technologies to be included in the IMT family.

Copyright 2004 WIMAX Forum
“WIMAX Forum™” and “WIMAX Forum CERTIFIED™” are registered trademarks of the WIMAX Forum™.
* All trademarks are the properties of their respective owners.



4G via the evolution of IMT-2000

- If 4G standardization is tied exclusively to an evolutionary approach based on M.1645 peak data rate targets, it could be well into the future (post 2012) before 4G standardization is completed, and new non-evolutionary techniques are incorporated into 4G standards.
- Such an approach may not be in the interests of rural and remote users who need low cost standards based IP access solutions **now**, and whose needs are **not focused on very high data rates**.
- The requirement is for **modest** data rates, the ability for the network to support **many** users and above all **low cost**.
- This is an issue that needs to be addressed as a matter of urgency in the ITU.

Copyright 2004 WiMAX Forum
"WiMAX Forum™" and "WiMAX Forum CERTIFIED™" are
registered trademarks of the WiMAX Forum™.
* All trademarks are the properties of their respective owners.



The potential benefit of a new approaches based on innovative new IP based solution

- The WiFi experience has demonstrated the positive impact that can result from the adoption of what some may term a "disruptive" technology.
- For the majority of users, particularly in rural areas, mobile communications comprising **voice and both way paging** (SMS), will continue to be the **mainstay** that satisfies their basic communication needs.
- In other words 2G is here to stay for a very long time!
- Unless 3G can offer a very low cost nomadic IP access solution that also offers a viable business for the operator, it may have **limited** application for rural and remote areas as a **broadband access solution**.
- In this context it makes sense to focus on approaches that are not just confined to "evolution"!

Copyright 2004 WiMAX Forum
"WiMAX Forum™" and "WiMAX Forum CERTIFIED™" are
registered trademarks of the WiMAX Forum™.
* All trademarks are the properties of their respective owners.



Frequency bands for rural and remote BWA some “re-farming” options

- For rural and remote areas the lower frequency bands offer the best chance to keep costs down.
- The move to digital television broadcasting as well as the migration of mobile voice to 3G opens opportunity for re-farming bands below 1 GHz in some countries – particularly rural areas.
- In the Asia Pacific Region, the band 2300 to 2400 MHz is also potentially available in many countries by re-farming.
- Bands around 3.5 GHz are already used for FWA in many places, or not intensively used, and so they are prime candidates for nomadic BWA.
- A re-location of some existing services together with a relaxation of license conditions in this band would pave the way for new BWA technologies with economy of scale advantages to be introduced.

Copyright 2004 WiMAX Forum
“WiMAX Forum™” and “WiMAX Forum CERTIFIED™” are
registered trademarks of the WiMAX Forum™.
* All trademarks are the properties of their respective owners.



Frequency bands for rural BWA with IMT-2000 implications

- Pyramid Research predicts that by 2009 only 300 million out of a total of 2.7 billion mobile subscribers (11%) will be using 3G. It is obvious that these will be predominantly in the advanced metropolitan markets.
- This suggests that in many places the 2500 to 2690 MHz band often held in reserve for 3G expansion could be opened for BWA, particularly outside the metropolitan areas.
- It is also widely acknowledged that IMT-2000 offers significant spectrum efficiency improvements for delivery of basic voice and data - this may stimulate migration of those services from 2G to the core 2GHz IMT-2000 identified band creating further opportunity to re-farm lower bands for BWA.

Copyright 2004 WiMAX Forum
“WiMAX Forum™” and “WiMAX Forum CERTIFIED™” are
registered trademarks of the WiMAX Forum™.
* All trademarks are the properties of their respective owners.



Making the best use of all possible global standards based technologies and solutions

- Some creative standardization and regulatory approaches should be considered in dealing with the telecommunications needs of rural users.
- The potential of evolutions of IMT-2000 systems to offer appropriate and timely access solutions in many markets is not denied, but given the wide diversity of needs and markets this is not the only way.
- Lack of appropriate responses in the ITU to this issue will slow the adoption of new technology to the detriment of users and operators.
- A more constructive approach would be to embrace innovative solutions and manage their introduction.

Copyright 2004 WiMAX Forum
"WiMAX Forum™" and "WiMAX Forum CERTIFIED™" are registered trademarks of the WiMAX Forum™.
* All trademarks are the properties of their respective owners.



Industry stakeholders need to convince Government and regulators to take action!

- The WiMAX Forum has adopted a position that it is the combination of
 1. a comprehensive suite of ITU-R recognized standards, the identification of globally harmonized bands for nomadic and mobile BWA services, together with
 2. flexible domestic regulations that allow operators to choose the most appropriate technology for their needs,that can serve as a sound foundation to foster the growth of BWA globally – including rural and remote areas.
- Prescriptive policies related to which technologies can or cannot be deployed, in which manner, and in which frequency bands can stifle innovation and inhibit the deployment of most efficient and cost effective technologies.
- Scope should be provided to enable innovative technologies to be deployed by operators for the benefit of users everywhere.

Copyright 2004 WiMAX Forum
"WiMAX Forum™" and "WiMAX Forum CERTIFIED™" are registered trademarks of the WiMAX Forum™.
* All trademarks are the properties of their respective owners.



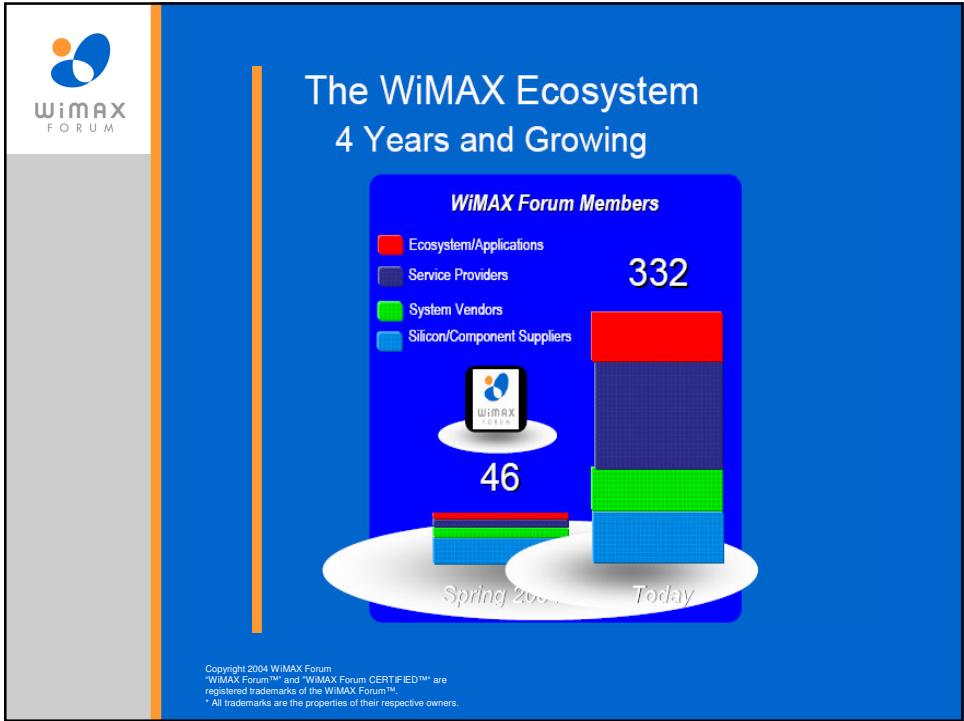
Making broadband access in rural and remote regions a reality

- The WiMAX Forum has a large amount of expertise available that it can share with industry and regulators to ensure wireless broadband will be a success in each country.
- We are ready to work with you and your Government to make it a success everywhere in the Asia Pacific Region.
- Together we can help to bridge the digital divide.

Copyright 2004 WiMAX Forum
"WiMAX Forum™" and "WiMAX Forum CERTIFIED™" are
registered trademarks of the WiMAX Forum™.
* All trademarks are the properties of their respective owners.



W i M A X
F O R U M



	IEEE 802.16* Standard Basics	
	802.16-2004	802.16e
Approved by IEEE S.A.	June 2004, a.k.a. 802.16d	Estimate Q3'05
Spectrum	< 11 GHz Licensed & Unlicensed	<6 GHz practical Licensed (& Unlicensed)
Subscribers	Fixed & Nomadic	Nomadic, Mobile
Channel Conditions	Non Line of Sight	
Modulation	OFDM 256 / OFDMA 2k	Scalable OFDMA (128 – 2k)
Peak Bit Rate	Up to 75 Mbps in 20 MHz* 4-18 Mbps in 5 MHz	Up to 15 Mbps in 5 MHz
Channel Bandwidth	Flexible channel bandwidths between 1.25 and 20 MHz	
Range at 2.5 GHz (typical cell)	2 to 10 km semi-rural 2 to 5 km urban/suburban Max range 35 km at 700 MHz	Nomadic/Mobile Urban/Suburban/Semi-rural 1 – 5 km (indoor) 2 – 7 km (outdoor)
	<small>Copyright 2004 WiMAX Forum "WiMAX Forum™" and "WiMAX Forum CERTIFIED™" are registered trademarks of the WiMAX Forum™. * All trademarks are the properties of their respective owners.</small>	* No compensation for MAC overhead (raw bit rate out of PHY.) Highest QAM (64) assumed.



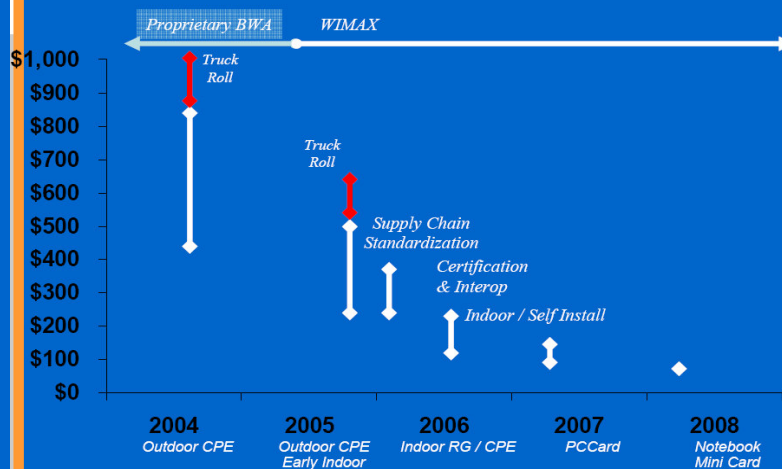
Reaching mass market economies of scale and prices – two aspects

- Software defined radio techniques can significantly reduce the cost of network infrastructure and provide maximum flexibility.
- Software only changes to take advantage of improvements in technology, incorporate new evolutions of the standard, change frequencies, and add new features as the market requirements change.
- However a primary prerequisite will be delivering a low cost user friendly terminal solution.
- At the client end the integration of the user access terminal into all manner of portable consumer computing and telecommunications hardware terminal devices holds the key.

Copyright 2004 WiMAX Forum
"WiMAX Forum™" and "WiMAX Forum CERTIFIED™" are registered trademarks of the WiMAX Forum™.
* All trademarks are the properties of their respective owners.



WiMAX CPE ASP Curve Drops



Copyright 2004 WiMAX Forum
"WiMAX Forum™" and "WiMAX Forum CERTIFIED™" are registered trademarks of the WiMAX Forum™.
* All trademarks are the properties of their respective owners.