Version August 09, 2004

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REGULATORY POSITION AND GOALS OF THE WIMAX FORUM

Introduction

The WiMAX Forum* is an industry-led, non-profit corporation formed to help promote and certify the interoperability of broadband wireless products compliant with the IEEE 802.16* and ETSI HiperMAN* standards. The Forum's goal is to accelerate global deployments of and grow the market for standards-based, interoperable, broadband wireless access (BWA) solutions. The economies of scale realizable throughout the value chain will result in cost points and performance levels unachievable by proprietary approaches. Computing history has shown that innovation occurs far more rapidly once a standards-based industry structure is in place, with consumers being the primary beneficiary. Reductions in equipment costs and consistent approaches to network design also vastly improve the business model for service providers.

WiMAX Forum Certified* equipment is designed and configurable for a range of broadband wireless access deployment scenarios. These scenarios include the possibility for longer ranges (up to 50km) in low density, line-of-sight (LOS) outdoor conditions to shorter range non-LOS deployments in cluttered urban environments. Services can be fixed, portable or mobile, or some combination thereof. Over this range of conditions the common feature is the capability to reliably deliver broadband connectivity to the business & home users.

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There is considerable demand for flexible, quickly deployable wireless broadband access. For this reason, 802.16 was designed from the ground up to support multiple service levels – for example, guaranteed T1 or E1-level services for business, and best effort DSL-speed service for home consumers. Quality of Service also designed into the standard to allow for services that require low latency, such as voice and video.

With the flexibility that wireless broadband access affords, a service provider can offer premium "on demand" high-speed connectivity for events such as trade shows, with hundreds or even thousands of 802.11 hot spot users. These Wi-Fi hot spots would use 802.16 solutions as their backhaul to the core network. Such "on demand" connectivity could also benefit businesses, such as construction sites, that have nomadic broadband connectivity needs.

Most importantly, the impact of this technology – assuming favorable regulatory conditions -- will be very significant in developing nations where service providers haven't deployed wired infrastructure or where there isn't sufficient quality wiring to support a growing computer-literate population. Especially for low population density areas (rural and remote) and associated "green field" deployments, wireless broadband access may be far easier, faster and cheaper to deploy than new wired infrastructure.

The Importance of Global Harmonization

One of the key hurdles to overcome in order to accelerate worldwide broadband wireless access (BWA) is cost. Although the total cost of deployment includes myriad factors (licenses, rooftop or tower space, backhaul expenses), the cost of the actual equipment is a major component, and is the focus of service providers and manufacturers involved in the WiMAX Forum. Global harmonization, or the uniform allocation of

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spectrum worldwide, is crucial to lowering equipment costs because radios are a major cost component in developing WiMAX Forum Certified* systems. To maximize radio performance and minimize costs, radios must be optimized for each of the major spectrum bands identified as suitable for WiMAX deployments. The fewer radios needed to serve the worldwide BWA market, the greater the economies of scale that can be achieved in manufacturing, resulting in lower equipment cost.

The WiMAX Forum also advocates that governments remain technology neutral in allocating spectrum. Spectrum bands should be allocated in a manner that allows license holders to deploy the most appropriate services and technologies for their market, as long as those solutions adhere to the regulatory requirements to support compatibility of services and deployments, and behave in a safe, fair and consistent manner. With the increasingly rapid rate of technology advancement, approaches that specify which technology may be used in a particular allocation risk becoming quickly outdated or obsolete. The WiMAX Forum is committed to work with policy makers to ensure economically beneficial and efficient use of spectrum.

Initial Bands of Focus

In the next three years – through the 2006 timeframe -- the WiMAX Forum believes a reasonable level of global harmonization for BWA can be achieved in the following spectrum bands:

- License-Exempt 5 GHz: The frequency ranges of interest includes bands between 5.25 and 5.85 GHz. (The band between 5.15-5.25 is most commonly designated for low power, indoor applications which makes it of less interest to WiMAX applications.) Because in the majority of countries license-exempt spectrum is

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"free" to use[1], this band is strategic for enabling grass roots deployments in underserved, low population density rural and remote markets. Different from Wi-Fi which is primarily targeted for Local Area Network (indoor) applications, WiMAX is targeted for longer range Metropolitan Area (indoor & outdoor) applications and thus benefits from higher allowable power output levels. In the upper 5 GHz band (5.725- 5.850 GHz), many countries allow higher power output -- 4 Watts vs. 1 Watt or less EIRP in the lower 5 GHz bands -- which makes this band more attractive to WiMAX applications.

  - The WiMAX Forum will commit additional resources -- notably in the European continent -- to promote wider release of this band in a harmonized and timely manner.
  - The U.S. administration is considering proposals to increase power output in license exempt bands in rural areas to facilitate less costly deployments in under-served areas. Power outputs up to 25 Watts have been proposed.

- Licensed 3.5 GHz: The primary licensed spectrum allocated for BWA applications in this general vicinity lies between 3.4 and 3.6 GHz although there are some new allocations between 3.3-3.4 and 3.6-3.8 GHz. Bands between 3.4 and 3.6 GHz have been allocated for Fixed Wireless Access in the majority of countries, with the exception of the U.S. In these bands, the focus of the WiMAX Forum will be to minimize unnecessary technical and regulatory requirements that might inhibit typical BWA usage models, e.g., nomadic or portable laptop use, and overall market development.

[1] A minority of countries require a license to use these bands for commercial applications, and others have requirements commonly referred to as "light licensing" to coordinate use with legacy applications.

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- Licensed 2.5 GHz: The bands between 2.5 and 2.7 GHz have been allocated in the U.S., Mexico, Brazil and some Southeast Asian countries. The WiMAX Forum is participating in ongoing global efforts – stemming from recommendations that came out of the World Radio Conference (WRC) '00 – with the objective to widen the availability of these bands for fixed, portable and mobile broadband applications. Also prevalent in Southeast Asia (including Australia, South Korea & New Zealand), is the 2.3 GHz band, which the Forum expects some equipment manufacturers to cover with their 2.5 GHz radios.

New Bands of Interest in Lower Frequencies

Not all spectrum is equal. Radio waves propagate further the lower the frequency band, creating a direct relationship between the number of base stations required to cover a given service area. More specifically, the lower the frequency band, the fewer base stations are required. Since cost of deployment is one of the key factors to accelerating deployment of BWA, access to lower frequency bands is critical. There are many examples in developing nations of the use of lower frequency bands to increase teledensity. Availability of lower frequency bands for broadband access will similarly increase broadband penetration.

The WiMAX Forum will work with world standards and regulatory bodies to advance the allocation of licensed and license-exempt spectrum in lower frequency bands. Bands in the sub 1 GHz frequency range – specifically bands currently vacant or used for analog TV spectrum in the < 800 MHz range -- are expected to become available as television stations transition from analog to digital broadcasting. For example in the U.S., the Federal Communications Commission (FCC) has already licensed spectrum for broadband wireless access in the former UHF TV channels 52-59 (~699-741 MHz) and is

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considering auction of UHF channels 60-69 (747-801 MHz.) The FCC has also issued a consultation for license exempt use of vacant TV channels below 700 MHz. Ranges between 512 and 698 MHz (~ channels 21-51) are most applicable because antennas may become cumbersome for frequencies below 500 MHz (~channels 2-20.)

It should be noted that incumbent analog TV broadcasters are not required to vacate spectrum until the 2009/2010 timeframe, so efforts are under way to devise win-win solutions with these broadcasters and administrations to motivate a faster transition. The WiMAX Forum will develop sharing studies to show how WiMAX Forum Certified equipment can operate compatibly in bands adjacent to TV broadcasters and other applications in lower frequency bands.

Summary

In today's world, broadband access is essential for the economic growth of nations. The Forum believes it is imperative for administrations to take a leadership role in ensuring that its citizens benefit from the greatest choice of broadband access suppliers and the most cost effective broadband access services & devices.

Request for Action

We are seeking regulator feedback and comments on these arrangements, and would like to gain insight into your current spectrum policies and the compatibility of these plans in the proposed allocations.