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WiMAX Promises True Mobile Wireless Broadband Service

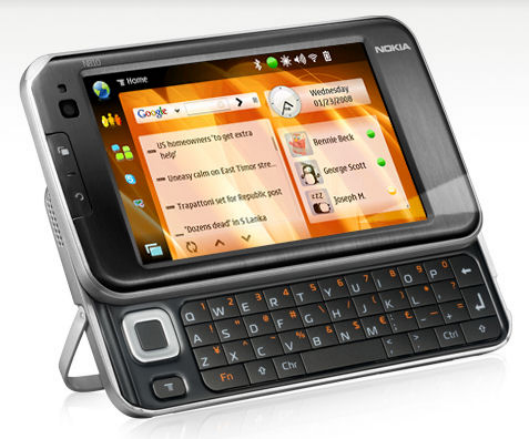
Wi-Fi technology has revolutionized the way that people use the Internet by allowing for a convenient and (most of the time) easy-to-use wireless connection to laptop computers and other portable devices. A new type of wireless service, called "WiMAX" (for Worldwide Interoperability for Microwave Access), promises to provide a much improved wireless Internet experience (compared to Wi-Fi) and will even support a true mobile, in-motion connectivity for users in automobiles as well as a true Internet-based wireless broadcast service. A comparison of some of the key parameters of Wi-Fi and WiMAX is shown in the table below.

WiMAX comes in two "flavors," fixed (IEEE standard 802.16-2004) and mobile (802.16e-2005). While fixed WiMAX services offer an alternative to wired Internet service to the home, mobile WiMAX will provide a broadband cellular phone-like service operating multiple times faster than so-called "3G" cellular networks which offer connection speeds from 144 kbps to 2.4 Mbps (3G is currently supported in the U.S. by a number of cellular service providers including AT&T, Sprint/Nextel, TMobile and Verizon). With embedded mobile WiMAX chipsets in laptops, phones, PDAs, mobile Internet devices and consumer electronic equipment, mobile WiMAX technology is expected to allow users to wirelessly access a range of multimedia applications, such as live videoconferencing, recorded video, games, large data files and more, anywhere within the WiMAX network coverage area.

In addition, the Mobile WiMAX standard includes a Multicast and Broadcast Service (MBS) specification designed to support a broadcast (i.e. point to multipoint) mode of operation, in contrast to the point-to-point connectivity more typically supported by ISPs and existing cellular networks. Some of the features of the WiMAX MBS include high data rates and coverage using a Single Frequency Network (SFN); a flexible allocation of RF channel resources; low mobile-station power consumption; support for datacasting in addition to audio and video streams and fast channel-switching. At the 2008 NAB Show, French technology developer UDcast (Sophia-Antipolis, France, www.udcast.com) previewed a mobile TV architecture based on the WiMAX

Parameter	Wi-fi	WiMAX
Usage (typical)	Provides end-user connectivity and may or may not be connected to the Internet	Point-to-point connection from an Internet Service Provider (ISP) to end user
IEEE Standard	802.11g (also legacy 802.11b)	802.16e ("Mobile WiMAX")
RF frequency band (typical, U.S.)	2.4 GHz ISM band, unlicensed spectrum operating under Part 15	2-11 GHz, licensed spectrum (Xohm to be deployed in 2.5 GHz band)
RF modulation	Orthogonal Frequency Division Multiplexing (OFDM)	Scalable Orthogonal Frequency Division Multiple Access (SOFDMA) used in conjunction with Multiple Input Multiple Output (MIMO) smart antenna technology
Range (typical)	Tens of meters	Ten kilometers
Data rate	Up to 54 Mbps, typically 23 Mbps	Up to 70 Mbps; typically 10 Mbps at 10 km
Access	Stations compete on a random interrupt basis which favors nearer stations over farther-away stations	After initial entry into system stations are allocated an access slot providing greater stability in overload situations and allowing for bandwidth allocations
Quality of service (QoS)	WiFi Multimedia (WMM) can be used to prioritize traffic but does not provide guaranteed throughput	Scheduling algorithm can adjust QoS for specific users

MBS specification; for more information, visit the UDcast Web page at www.udcast.fr/solutions/udcast_solutions_tv_wimax.htm.



Recently, Sprint Nextel announced that it will launch its first commercial mobile WiMAX service in Baltimore in September, and expects to add two others cities—Chicago and Washington, D.C.—by the end of the year. Sprint has been testing its mobile WiMAX service (called Xohm, pronounced "Zoam," like "Foam" with a "Z") with download speeds of between 2 and 4 Mbps since the end of 2007 in Chicago and the Washington/Baltimore area. Sprint has also recently announced that it is spinning off its WiMAX assets and teaming with WiMAX service provider Clearwire (Kirkland, WA, www.clearwire.com). The new joint venture, to be called Clearwire, will be majority-owned by Sprint with significant investments from Comcast, Time Warner Cable, Intel and Google.

Clearwire hopes to offer Xohm at a price of $40 per month, for a mobile wireless Internet service with 2-4 Mbps download speed and 500k-1.5 Mbps upload speed. Clearwire expects that by the end of 2008 there will be WiMAX chips in more than 20 different devices (shown here is the Nokia 810 mobile phone, available now, which is already WiMAX enabled).

Some of the functions that the Xohm service will offer include streaming video and music, as well as the ability for users to stream camcorder video in real time back to others (so-called "live streaming"). Xohm contrasts the full Internet connectivity it will provide to mobile users to the limited, "walled garden" experience currently available to customers that connect to the Internet over the cellular phone network. For additional information, visit the Xohm Web site at www.xohm.com.

NAB AM Antenna Computer Modeling Seminar
November 20-21, 2008
NAB Headquarters
Washington, DC

Don't miss this opportunity for broadcast engineers to learn the basics needed to utilize modeling software such as MININEC and nodal analysis for designing performance-optimized AM directional antenna phasing and coupling systems and proving the performance of directional antenna patterns.

You will learn about:

- Moment Method Modeling Basics
- DA Proofing Using Moment Method Modeling
- Overcoming Limitations of Using Field Strength Measurements for DA Proofs
- State of the Art in Phasing System Design Nodal Analysis of AM DA Phasing and Coupling Systems
- Pattern Design Considerations for Optimum Performance

AM antenna experts Ron Rackley and Ben Dawson, along with antenna modeling software specialist Jerry Westberg, will lead the seminar demonstrating how moment method modeling makes analysis of actual tower current distributions possible and how a model can be used to proof an array provided the proper criteria are considered. All instructors are well known in the radio industry as experts in the field of directional antenna design and maintenance. Their decades of experience offer

station engineers an opportunity to learn techniques, tips and tricks that can be immediately useful.

Seminar fee: $395.00 (NAB members) and $495.00 (non-members). For more information on the curriculum, how to register or housing go to AM DA Seminar on the NAB Web site or call Sharon Devine at (202)-429-5338. Register now for the NAB AM Antenna Computer Modeling Seminar!