

Special Report: New Media

UPDATE ON WIRELESS TECHNOLOGY

By Rick Dearborn

Last year, I noted that WiMax, a new wireless technology, will be capable of “broadcasting” and should be watched closely by the radio industry (Radio Ink, May 19, 2005). With the wireless developments since then, it’s time for a 2006 snapshot.

Four wireless technologies are worth watching: WiMax, 3G/4G, WiFi, and UWB. Each will be capable of delivering high-bandwidth media signals, yet each is being developed for a different purpose.

WiMax and 3G/4G have mobile capabilities; WiFi and UWB don’t. Consequently, the mobile technologies will have the greatest impact on radio broadcasting, providing high-bandwidth service in automobiles. On the other hand, WiFi and UWB will provide high-bandwidth service in homes and offices, diluting radio’s stationary audience.

WIMAX: WiMax is an acronym for a new wireless Internet protocol known in technical circles as 802.16. WiMax is being

promoted as having up to 70-Meg capacity per “cell,” and a range up to 30 miles. (To put this in perspective, a DVD runs at 10 Meg, and WiFi wireless has a range of less than 300 feet.) WiMax will also work in moving vehicles.

At present, all wireless data technologies operate at microwave frequencies, which means they don’t pass through physical objects well, if at all. Inventors have worked hard to make WiMax better capable of Non Line of Site (NLOS) transmission. WiMax is able to adapt automatically to changing conditions in the following ways:

- Transmit with multiple signal carriers;
- Combine signals into sub-channels to extend reach when needed;
- Use adaptive antennas that can electrically steer and focus to a particular direction;
- Change between four different modulation methods;
- Provide advanced error correction;
- Adjust transmit power output as necessary to improve range or conserve power.

WiMax is being released as two standards, Fixed (802.16-2004) and Mobile (802.16e). The fixed standard was approved in December 2004, and equipment is hitting the street now. It is likely to be a wireless replacement for wired Internet services such as DSL, Cable, T-1, and beyond.

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Mobile WiMax, approved as a standard in December 2005, enters testing this year with planned availability in 2008. WiMax equipment manufacturers are already talking about dashboard-mounted, Internet-browser radios with removable memory cards, so users can take their “favorites” from car to car anywhere in the world.

3G (AND 4G): 3G and 4G are fancy names for cellular technology. 1G (first-generation cellular) is the old analog version. 2G (second-generation) is better known as Digital PCS. 3G, enabling the video and audio capabilities on cell phones now hitting the street, has a capacity of up to 1 Meg. Expected in 2010, 4G is in development for up to 100-Meg capacity.

With mobile media delivery capability, 3G/4G is an alternative to WiMax, but it is primarily a telephone technology. It is part of the cellular industry’s strategy to get long-term ROI on its nationwide network of towers, infrastructure, and the licensed frequencies obtained at auction. In addition, 3G/4G is intended for use by small personal devices, such as cell phones, BlackBerrys, and PDAs.

WiMax, a data technology, is likely to be available in unlicensed and licensed spectrum. Intended for devices of all sorts, it is a means of delivering large amounts of bandwidth to large networks as well as portable and mobile devices.

WiFi: In recent years, WiFi (802.11 a/b/g) has become ubiquitous as a wireless networking standard. Consumer routers for home and office networks now sell for under \$100. It is inexpensive, works well, and can be set up and operated by the end-user with relative ease.

WiFi is best suited for service in small areas such as the home or office. Citywide implementation requires ganging-up hundreds of hotspots, which can make WiFi complicated to set

up and operate. And because it is an unlicensed technology, it is vulnerable to interference.

The latest version of WiFi (802.11g) is capable of speeds up to 54 Meg. Yet WiFi’s limited range of approximately 300 feet means it is not a mobile technology. As users move from one hotspot to another, they are forced to re-establish connections.

In January 2006, IEEE accepted the draft proposal for the next level of WiFi technology. Known as 802.11n, this version has a range up to 1,000 feet and a speed of 100 Meg, with some talk of 200-300 Meg or even 600 Meg. At those speeds, “n” WiFi will be capable of delivering HDTV over short distances. Current estimates are that the 802.11n standard will be ratified in 2007 with testing to follow. Products are unlikely to hit the streets before 2008, which puts it in step with mobile WiMax.

UWB: The Ultra Wide Band (UWB) standard is being developed as a wireless form of USB. It will provide ultra-high-speed (480 Meg), short-range (less than 30 feet) wireless connections between devices — delivering HDTV between your computer, large screen TV, cable box, and DVD without wires.

UWB works by spreading its signal over a very wide frequency area, hence the term ‘Ultra.’ It is so broad that it can be operated on top of other services and be virtually undetected by them. For this reason, the FCC has approved UWB for U.S. operation anywhere between 3.1 GHz and 10.6 GHz.

The UWB Forum favors a computer-based approach, and the WiMedia Alliance more of a multi-media approach. The UWB Forum expects products to hit the market mid-year. WiMedia predicts its products will be on the street toward the end of 2006.

Dearborn’s Tech-Zone radio programs are heard on stations across the country. Contact him via www.rickdearborn.com.

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