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And They're Off! WiMAX, LTE, UMB, And The Race To 4G Wireless

By the yardstick of typical wireless standards, the development of WiMAX has been meteoric. In 2001, it became an acronym. By 2004, it was an approved standard for fixed service. By late 2005, it was an approved mobile standard. And today, it's moving toward wide-scale deployment. The big question, of

course, is whether WiMAX will live up to its potential as a classic disruptive technology and strike fear into the hearts of the proponents of the other communications services with which it will compete.

The champions of WiMAX have promoted it as a direct competitor to almost every wired or wireless communications and media delivery service on the planet, including traditional GSM and CDMA-based wireless services, DSL and cable broadband access, backhaul for cellular and public safety, links between Wi-Fi hotspots, and municipal wireless networks.

However, its greatest potential appears to be in the wireless arena. But it will fight for room there next to two very mature technologies, each of which has a roadmap projecting similar performance as WiMAX at about the same time.

Like WiMAX, both the Long Term Evolution (LTE) enhancement to GSM-based UMTS and the Ultra Mobile Broadband (UMB) enhancement to cdma2000 1xEV-DO claim downlink data rates of 100 Mbits/s or greater.

All three also employ advanced technologies such as orthogonal frequency-division multiplexing (OFDM) and are IP-based networks. While the cost to deploy them might appear to be less than that of WiMAX, this remains to be seen.

WITHER WiMAX? • WiMAX has no obvious performance advantage, and it has entrenched competition with a global base of more than 2.6 billion subscribers. *The Economist* magazine then stated the obvious question best in the headline of its February article on the topic: "WhyMAX?" The simple answer is twofold.

First, the impetus for WiMAX came not from the wireless community but from the computer industry looking for a way to insert itself into the wireless "space." And there's no doubt that the second reason then heightened the enthusiasm of these PC industry luminaries.

When they were contemplating this circa 2000, it was becoming obvious that the challenges inherent in deploying 3G wireless services would delay network operators' ability to provide the high data rates required for services like video streaming. In fact, they are only just now poised to fully deliver them—as a fourth wireless generation in the form of LTE and UMB.

Going forward, such a simple explanation is inadequate to form an opinion of how WiMAX will fare. From the perspective

of the standards process, WiMAX has an edge over LTE and UMB, since its fixed and mobile standards have been ratified, while the others are only now nearing completion.

Unlike its competitors, though, WiMAX is not an enhancement to an existing network but rather an entirely new technology that must be rolled out from scratch. While a startup could deploy WiMAX given enough capital, WiMAX in the U.S. is more likely to be "bolted on" by existing wireless carriers to their existing infrastructure. However, this would appear to conflict with the LTE or UMB solutions that would presumably be the most logical path to 4G.

THE STARTING GUN • Nevertheless, it hasn't stopped Sprint from jumping into WiMAX with both feet, the only U.S. wireless service provider to do so. The company has stated that it will spend \$2.5 billion on WiMAX deployment by the end of 2008. It also has inked a deal with WiMAX provider Clearwire (founded by wireless visionary Craig McCaw). And, it is projecting revenue between \$2 billion and \$2.5 billion in its 2010 fiscal year for its WiMAX service, dubbed Xohm.

Vodafone, the world's largest wireless carrier, joined the WiMAX Forum in August. But in late September, Verizon and Vodafone executives told analysts that they will both employ LTE as their 4G evolutionary path. (The two jointly control Verizon Wireless.)

This would seem to put LTE in conflict with UMB, the logical "evolutionary path" for Verizon's cdma2000-based network. But since both companies are investigating WiMAX as well, the announcement cannot be construed as selection of only one technology. Other major carriers remain on the fence.

Regardless of how the WiMAX wave rolls forward, the ensuing years will be volatile for wireless carriers, as they embrace or try to fend off the only formidable competitor they have ever faced. It will also be a potentially lucrative time for electronics manufacturers. And with any luck, the pressure exerted by WiMAX will expedite the benefits of 4G technology to consumers as well. ☛

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