

Fixed Wireless

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Broadband fixed wireless systems may someday offer readily deployed, low cost, high capacity last-mile links that can bypass wired networks of incumbent LECs (local exchange carriers) and cable operators, and provide complementary network extensions where the wired networks are uneconomic.

To date, the fixed wireless story has been downright sobering due to: limitations of line of sight technologies; high cost of terminal equipment; difficulties securing rooftop rights for antennas; high capital costs to provide coverage; network capacity limitations; signal interference problems; and a credibility gap with users.

Late 1990s fixed wireless high-fliers, Teligent and Winstar, which filed for bankruptcy in 2001, operated at 24 GHz (Teligent) and at 38GHz and LMDS bands between 27GHz and 31 GHz (Winstar).

Sprint and Worldcom pursued second-generation 2GHz MMDS (Multichannel Multipoint Distribution System) systems for high-bandwidth last-mile connections, involving multiple cell sites and near-line-of-sight connectivity. AT&T developed an MMDS variant at 2.3GHz and claimed that its system would support 512Kbps throughput, expected to increase to 1Mbps, at an \$800 cost per home.

Subsequently, Sprint placed a hold on its fixed wireless plans and took a write-off on its MMDS assets. Similarly, AT&T Wireless terminated its fixed wireless program and took a \$1.3B charge.

The jury is still out on a new form of fixed wireless systems: Free Space Optics (FSO). FSO links can provide much greater capacity than the microwave systems. fSona advertises systems providing 1.5Mbps-2.5Gbps for links up to 3 miles. Lightpointe similarly offers FSO systems that transmit up to 2.5Gbps with high reliability based on sending four separate beams to ensure connectivity despite occasional obstructions such as birds, window washers, or fog.

FSO proponents claim they have a viable choice for commercial office buildings which lack enough traffic to justify a fiber connection; that FSO links are cost-effective since they can be set up specifically for buying customers rather than ahead of demand, with almost all of the cost going for CPE (customer premises equipment) rather than street work, rooftop equipment or inside wiring; and that most of the investment can be recovered if the customer leaves since the equipment can be re-deployed. Since FSO cost is not capacity-sensitive, FSO links are most competitive for customers needing very high 100Mbps+ capacity.

Meanwhile, Intel and other significant players have adopted the WiMax (IEEE 802.16) standard as a basis for wireless high speed Internet access services for fixed and nomadic (slowly moving) terminals. The initial standard was adopted in 2001 and extended in 2003 (IEEE 802.16a) to work over the 2GHz-11GHz frequency bands that include educational ITFS (Instructional Television Fixed Service) and MMDS. Intel plans to incorporate WiMax in laptop PC chips much as the current Intel Centrino chip supports WiFi, once large service providers begin to offer WiMax-based services.

Recently Intel announced an investment in Craig McCaw's Clearwire to develop WiMax-based fixed wireless services. Clearwire has leased ITFS spectrum from license holders in many markets and provides an initial fixed wireless service in Jacksonville, Florida.

Nextel, a major holder of MMDS licenses, has introduced Nextel Wireless Broadband in Raleigh-Durham, NC., using Flarion Technologies' proprietary air interface called FLASH-OFDM (Fast Low-latency Access with Seamless Handoff – Orthogonal Frequency Division Multiplex).

The Clearwire and Nextel offerings represent market and technology tests prior to broader roll-outs. Each currently provides up to 1.5Mbps download data rates and claims to support both fixed wireless modems and PC cards for nomadic use.