



# Technology Brief...

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## Does Sprint Have WiMax on the Run?

Sprint's recent financial woes and its consequential divorce from a Clearwire bilateral agreement (though never fully consummated), to build out a unified WiMax network across much of the population centers of North America have many asking if WiMax is dead. Indeed, even though Sprint professes to continue its interest in building out its own WiMax network (through its Xohm brand), there exists some doubt if even this reduced commitment is genuine and might not be cancelled in the back office decisions typical of a company trying to restructure. Moreover, with a new management team in place, one not originally involved in making the WiMax decision, it is uncertain how committed they might be to making WiMax and Xohm a long term play.

We do not believe that the public breakup of Sprint and Clearwire will derail WiMax (though it may delay its uptake somewhat). Sprint needs to obtain new revenue streams as its cellular business reaches saturation. There is very little new growth left in the cellular market in the US and Sprint has been losing subscribers of late to the competition. Despite improvements in obtaining some additional ARPU as a result of data plans, this is a slow growth strategy as many consumers do not yet see the need for broadband connections on smart phone devices, or even the need to purchase such devices. WiMax can deliver a new revenue stream for data services, and at a lower cost than cellular (despite a need to invest billions in new infrastructure to make it happen). Further, WiMax has the potential to add many more devices (and subscribers) to the carrier's network than smart phones (e.g., internet devices of all types, automotive devices, personal electronics). We believe that Xohm could give Sprint a competitive advantage in the marketplace. No other carrier currently has the necessary spectrum available (i.e., Sprint has a substantial amount of 2.5 GHz spectrum which it owns). By deploying WiMax, Sprint can maximize utilization of a resource which is currently not producing a significant business advantage. It might even make Sprint attractive as an acquisition target, potentially to a foreign operator wanting to establish a full service operation in North America. It will also make Sprint more attractive as a carrier choice, especially to business users, by offering customers a more complete connectivity option from a single supplier (e.g., 3G, WiMax, WiFi), especially as WiMax capable devices proliferate.

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For its part, Clearwire continues to build out its network. However without the Sprint partnership it can not achieve the cross network roaming that would have made its subscriber base grow more quickly. Clearwire has some very large backers (e.g., Intel, Motorola) that can help it achieve its goals. But we believe that ultimately, Clearwire will be acquired by a larger entity (possibly even Sprint). It is in both Clearwire's and Sprint's best interest to see a partnership succeed, and we believe the partnership, though now more subdued, will ultimately re-emerge as a visible and important strategy for both companies.

A question exists as to whether or not Intel, a driving force in WiMax, will continue its investment. We believe that Intel is too far down the road on WiMax with too much invested worldwide (not just in North America) to back out. Indeed, it is on the verge of shipping chips that will be incorporated into all mainline machines, particularly notebooks, over the next 3-4 years (see our analysis in the article below).

**Bottom Line:** We expect WiMax to become an important broadband wireless option in North America (and many other parts of the world) by 2009/10, with a significant installed base of users and a variety of connected devices. Sprint and Clearwire will renew their cooperation as it will accelerate both companies' marketing and sales and provide added confidence to businesses and consumers that the service will be broadly available. We expect Sprint and Clearwire to "re-connect" their WiMax initiatives within the next 6-12 months.

## WiMax Trends: Almost upon us?

We believe, despite some industry views to the contrary, that WiMax will be a significant success, both in North America and other parts of the world. It will not eclipse 3G, but supplement it just as WiFi does. In fact, we expect WiMax to undergo a substantial growth phase over the next 2-3 years and to become common in nearly all metropolitan areas of North America to both consumers and business users at an affordable price. Below we discuss our expectations and projections for the success of WiMax, particularly in North America.

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**Technology:** WiMax technology is well developed and standardized and will not be a major issue in its deployment, even though several versions exist (e.g., 802.16d, 892.16e, WiBro). This will be resolved in silicon and will be transparent to the end user. Spectrum allocations could potentially be an issue, as different parts of the world have allocated different frequencies (unlike WiFi which is nearly universal). Currently we expect 2.5/3.5GHz to cover the majority of countries worldwide, with any remaining frequencies being handled by additional radios within the WiMax chips. When 700MHz becomes available in US in the next 2-3 years, this could require an additional on-chip radio as well (700 is better at building penetration, has fewer reflections, and has increased range requiring fewer base stations). We believe WiMax chip vendors (e.g., Intel, Beceem) will easily accommodate multiple radios (3-4) per chip without a major impact on chip costs. WiMax has also learned from the many

missteps of WiFi by created a more robust security infrastructure.

**Timelines:** Preliminary networks (e.g., Clearwire) have been in operation for several years. Additional networks (e.g., Xohm) will be operational in the next 12-18 months for commercial services. We expect early adopters to employ WiMax in 2008, with mainstream adoption in 2009/10. Because of Intel's drive to make it successful, we expect 80% of notebooks to be enabled with WiMax by 2010 (up from 50% in 2009 and 15% in 2008). This growth will be driven by falling prices, with cost per machine of \$50 in 2008, \$25 in 2009 and \$15 in 2010. Other devices (e.g., dual mode phones) will enter the market in late 08 for early adopters, with 2<sup>nd</sup> generation devices for mainstream users in 2009/10.

**Service Providers:** We expect many carriers to ultimately add WiMax services, although spectrum allocation for many may be a challenge. We also expect WiMax-only service providers to emerge. However, the service providers must understand their market if they are to succeed. They need to have a clear understanding that they compete primarily with Cable/DSL services and wireless data access, not with voice cellular/3G, and price accordingly. If they fail to meet user price expectations (under \$40/month with substantial discounts/no additional cost for multiple device users), then the market will be severely limited. We expect to see some very aggressive pricing in the early stages to win new customers, but ultimately, we expect prices to stabilize in the \$40-\$50 per month range. Further, service plan flexibility and seamless roaming are "make or break" issues. Roaming agreements (internationally) could happen in 08/09 to allow traveling with notebooks, but we expect roaming to take 3-4 years to become standard. For notebooks, mobile WiMax will be less important, as most machines will go somewhere and be fixed while computing. Mobile is imperative for phones and other personal devices. Sprint and Clearwire currently have a clear lead. The primary impediment keeping others from the market will be spectrum. We expect some MVNO type operations to emerge, as WiMax carriers look to increase use of their network capacity, especially in the early stages.

**Bottom Line:** We expect WiMax to grow substantially over the next 3-4 years, for both enterprise and consumer use. Further, we expect the price of adding WiMax to computers and other devices to fall rapidly, and become a non-barrier to entry. However, unless service providers offer quality services at an affordable price, the market will not develop despite the availability of inexpensive technology.

## RIM: BES Gets Personal

Recently, Research In Motion (RIM) announced two new software packages aimed at expanding its Blackberry Enterprise Server (BES) capabilities beyond its large company focus, to include small firms and even directly to consumers. This expansion of SW assets, together with a growing base of consumer-friendly devices (e.g., Pearl, Curve), are moving RIM into territory beyond its traditional enterprise users. We expect this new focus for Blackberry to stimulate demand even further for an already attractive

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product mix, and to add “stickiness” to its installed base of users, especially in the prosumer space where brand loyalty is difficult to maintain. This should aid it in competition with Nokia, Motorola, Palm and Microsoft-powered devices (e.g., HTC, HP) in the rapidly growing smart phone market. As a result, we expect BlackBerry sales to continue to rise and RIM to increase its overall market share over the next 2-3 years to 8%-10% of the smart phone market (we expect the smart phone market to be 200M-250M units in 2010).

BlackBerry Professional (BBP) is aimed at the SMB market with an entry price of \$499 for 5 users or \$899 for 10 users. Since few SMBs have an IT department, ease of set up and management through a wizard-based approach are key requirements. The more extensive capabilities of BES require an experienced professional to set up and maintain, including connection to an internal email server like Exchange or Notes, which few SMBs have in place, and which capability BBP does not include. BBP has also eliminated connection to IM systems and mobile application extensions which BES provides. Unlike BES, BBP does not require a separate server, allowing an existing server or PC to be used. At its core, BBP shares code with BES, so companies who grow beyond this application (its upper limit is 30 users) or who need mobile applications (through MDS) can seamlessly upgrade to BES.

BlackBerry Unite (BBU) is a freely downloadable package focused on prosumers who have more than one BB device in a family or group. It enables up to 5 devices to be centrally managed, including sharing calendars and scheduling information, connecting to Internet email accounts, sharing files, security settings, and managing device applications and content (e.g., parental control). The application runs on a PC through a browser-based interface. We expect BBU to be attractive to the increasing number of multi-device families who would like to maintain group scheduling of activities, and who also wish to provide an additional level of protection and monitoring for children. While this application may be suitable for very small businesses, we believe the limited functions available will likely push even small businesses toward BBP. Nevertheless, we expect BBU to provide an attractive incentive for users of “Family Plans” to purchase BB devices, especially since those devices are being offered at an attractive price, and BB devices have reached a “coolness factor” with consumers.

**Bottom Line:** RIM has provided an interesting mix of SW capabilities that will make its devices more appealing to a larger segment of the population, and will enhance its ability to sell to SMB and prosumer markets. Nokia, Motorola, et al, will have to respond by offering similar capability to remain competitive (e.g., through Motorola’s Good and Nokia’s Intellisync subsidiaries). This should help the smart phone market overall, and provide a clear growth path from the SMB/prosumer ranks up into the enterprise. Smart phone vendors without SW capabilities (e.g., Palm) will be at a competitive disadvantage. Microsoft will need to respond as well, but we do not expect this to occur in the short term, as Microsoft will be hard pressed to scale its systems down to these levels.



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