

November 30, 2007

SIGNALS Flash!

Signals Flash provides timely information and analysis on major wireless events as they occur. It is a complimentary research bulletin that is intended for the clientele of Signals Research Group, LLC and the subscribers of its Signals Ahead newsletter. For additional information about SRG and the various research and consulting services that we offer, please visit our web site at www.signalsresearch.com.

All on board, the LTE train is leaving the station

Verizon Wireless picks LTE as its next-generation network technology.

- ◆ VZW indicated that a healthy ecosystem of device suppliers on a global basis was a primary reason behind the decision.
- ◆ While initial trials will start in 2008 and the LSTI initiative has been established to accelerate LTE, commercial deployments are still not likely until 2010+.
- ◆ VZW stresses that consumer electronics companies will play a large role in LTE (e.g., like WiMAX), separately we question how “open” the VZW network really will become.
- ◆ There is mixed levels of support for UMB and EV-DO Rev B among the vendor community – everything hinges on the commitment of an operator which has yet to happen.

Thoughts and Implications

On November 29th, Verizon Wireless announced its commitment to LTE (Long Term Evolution) as its next-generation wireless technology. Specifically, the company announced that it is joining forces with Vodafone to trial LTE in 2008 with plans to ultimately deploy the technology.

There was a widely-held belief that VZW had already announced, or at least hinted at, its decision at a investment bank’s client event. However, at the time VZW indicated to us that it had yet to make a decision. Following yesterday’s announcement, the operator once again stated that the decision had not been made at the time and that two separate comments made at the event were erroneously combined, thus resulting in the confusion. According to VZW, and confirmed by some of the companies mentioned in the press release, the operator informed its key suppliers earlier this week of its decision to go with LTE. We believe the decision was made earlier, albeit well after the earlier false announcement.

To us it was a bit surprising that Verizon Wireless made the announcement when it did, especially considering that LTE remains a 2010+ story and the operator has yet to trial the technology. In the case of EV-DO, Verizon Wireless didn’t commit to the technology until after it had done two exhaustive market trials. Further, LTE is not yet a complete standard, although we believe that the PHY/MAC is at least 70% complete with the core network architecture (SAE) likely to be completed by mid-2008.

Picking a technology without trialing it is not unprecedented – Sprint Nextel did it fifteen months ago – and at least the operator didn’t pick its LTE infrastructure suppliers without knowing how their respective solutions perform. Instead, the operator is inviting all of its current infrastructure suppliers (MOT, ALU, and NT) and two key partners who are involved in various core network interoperability projects (ERICY and NSN) to participate in the trial along with several device suppliers. Huawei is noticeably absent from the list and they are a pre-approved supplier for Vodafone, but they currently do not have a working relationship with Verizon Wireless. Yesterday’s announcement was exclusively a Verizon Wireless press release.

The timing of the announcement was driven by two considerations. First, VZW will soon enter into a quiet period when the 700MHz auction begins and if they had commented about this trial during the bidding process those comments could have violated the rules of the bidding process. Along those lines, VZW also felt that there was a lot of uncertainty in the industry and the investment community regarding their future roadmap and they wanted to set matters straight while they still could.

The promise of an LTE ecosystem on a global basis was one of the primary reasons why VZW went with LTE.

Second, VZW indicated with a fair amount of emphasis that they want to be out front in driving their vendors and the industry to provide them with a robust LTE device ecosystem. In fact, the promise of an LTE device ecosystem on a global basis, including the contribution from Vodafone, was one of the primary reasons why VZW went with LTE versus UMB.

The operator also firmly believes that the traditional suppliers will not be the only ones to have a role in supporting VZW’s LTE requirements. Verizon Wireless expects to have a strong contribution from the consumer electronics industry, not to mention machine-to-machine applications that leverage LTE.

In order to ensure that this ecosystem is in place when LTE is deployed, the operator wanted to announce its plans now in order to give the industry time to prepare and respond with a suite of solutions.

This strategy harkens back to a recent Signals Ahead issue (SA 090907, “*The Vicious Subsidy Circle*”) in which we questioned whether or not Sprint Nextel’s Mobile WiMAX device strategy was going to be successful in the long term. Without rehashing all of our analysis, we questioned why other operators couldn’t simply replicate the strategy and why the strategy was unique to WiMAX.

Ultimately, we believed, and continue to believe, that the CE industry is going to go where the money is. The CE industry, or the PC industry, is going to look at the addressable market for each technology that it is being asked to support – a bigger market means a bigger revenue opportunity.

These industries will also look at how much cost they have to bear to embed the new technology(s) and how they get compensated for this effort. While a Sony or a Nintendo could support multiple technologies with different SKU’s, they won’t do it for free – they may even just focus on one technology. Ultimately, operators and lead proponents for these next-generation wireless technologies will resort to subsidies or other financial incentives in order to create the ecosystem that they need and drive subscribers and traffic onto their own network.

Sidebar Discussion.

While on the subject of devices (we’ll get back to LTE in a bit), we are a bit skeptical about the announcement from Verizon Wireless in which it announced that it is going to have an “open network” that will support any and all devices. In addition to the obvious caveat – the device must support CDMA2000 or EV-DO in the 850MHz and/or 1900MHz – the operator also indicates that the devices must first pass a minimum set of performance requirements, including software and hardware related.

For readers that weren't aware, VZW has perhaps the toughest requirements in the industry. Therefore, its definition of "minimum requirements" could differ dramatically from the definition of a potential supplier.

While we are skeptical that the network will be open, we are even more skeptical that wireless networks should be open in the first place. Unlike the wireline or cable networks, a poor performing wireless device can impact the performance of a wireless network. In a CDMA network a rogue device can consume more network resources (e.g., capacity) than a well-behaved device, not to mention that a poor performing device impacts the user experience with the user generally blaming the problem on the operator's network versus the device supplier.

While we are skeptical that the VZW network will be open, we are even more skeptical that wireless networks should be open in the first place.

For readers that question this view, we note we recently proved (SA 062507, "Chips and Salsa VI: Of Mice and Men") that there are even vast performance differences in commercial handsets that have made it through an operator's test lab. Fortunately, the "poor" performing devices that we tested still performed reasonably well, but we imagine this would not be the case if we opened up the test to any and all handset/chipset combinations that have ever been submitted to an operator for approval.

The question one has to ask is what type of device supplier would go this route? A leading handset manufacturer who currently supports VZW has no interest in this strategy. They are already able to get handsets in the operator's store and on its website. VZW is, in many cases, even helping to co-market or advertise the phone. Obviously, this is a much better strategy for selling lots of handsets than a handset manufacturer doing these activities on its own, including setting up a distribution system and

convincing a consumer electronics store to sell its phone(s).

Frankly, we believe that the only handset manufacturers who will pursue this strategy are those handset manufacturers who are desperate for business and who probably don't have a very compelling handset in the first place. Maybe, just maybe, a few handset manufacturers and their handsets will go this route, but it is hard to fathom the iPhone going through the back door at Verizon Wireless if the front door isn't open.

It is hard to fathom the iPhone going through the back door at Verizon Wireless if the front door isn't open.

At a minimum, VZW will at least ensure that these handsets won't impact the performance of the network and that the open handsets won't cause the operator's network to become non-compliant with the E-911 mandate. At the extreme, if the operator allowed a completely open network it would have no control over whether or not the handset even met the E-911 requirements. These requirements, which if not met can result in fines and other penalties, are the responsibility of the operator and not the device supplier. In Google's view of world, it isn't clear how the operator could enforce a requirement if an operator had absolutely no control over it.

Our comments in this section are specific to the traditional handset. It is not practical for an operator to start locking devices to its network and sell every single device in its stores once consumer electronics devices start supporting wireless wide area network technologies or once M2M applications become more commonplace. These devices, however, will largely include nothing more than a basic communications modem, and that is an entirely different beast than a full feature handset that is commonly sold today.

Back to the Show. The joint VZW-VOD LTE trials will begin sometime next year but an actual deployment is not likely until 2010. The exact

timing is somewhat TBD with Verizon Wireless indicating that part of the timing decision to deploy LTE will be based on the market demand as well as the competitive landscape.

From a maturity perspective, the LTE standard is still not finished, thus the trials that will take place next year will largely be “pre-standard” solutions. At the moment we believe that the PHY/MAC is about 70% complete with a completion date of the end of this year. Likewise, the core network standardization process is still ongoing with a target completion date of mid-2008.

That being said, Verizon Wireless indicated that TS 23.402 (Architecture Enhancements for non-3GPP accesses) should be approved next week. This specification includes support for many of the core network features that the operator was driving as part of its A-IMS initiative – a topic that we covered last year (8/23/06, “*Advancing IMS/MMD to the head of the class*”). As a side note, we will be covering next-generation core network architectures in our next Signals Ahead, coming out in early December.

The LSTI is charged with the sole purpose of advancing LTE through the testing process.

In order to help accelerate LTE, the NGMN (Next Generation Mobile Networks) initiative has created LSTI (Long Term Evolution/System Architecture Evolution Trial Initiative). This initiative is essentially the execution branch of NGMN with the sole purpose of advancing the technology through the testing process. In many respects, NGMN is comparable to the WiMAX Forum, and this may be important given some of the early interoperability challenges that UMTS faced. Further, with the LTE standard containing so many features, LSTI can be used to ensure that all manufacturers are developing their individual solutions against a common set of requirements – again, very comparable to what the WiMAX Forum is doing.

UMB and Rev B on the sidelines. Today’s announcement does call into question the future of UMB, as well as EV-DO Rev B. Our view was that if Verizon Wireless didn’t pick UMB that there wouldn’t be a big enough market opportunity to support the technology. In total, there may be a lot of other CDMA subscribers – by our calculation VZW only represents ~14% of the CDMA2000 market – but the remaining 86% of the market is spread across 243 operators.

Some of the larger operators have also announced plans to follow a different technology roadmap (SKT, KTF, Sprint Nextel) or they haven’t even deployed EV-DO (Reliance, Tata, China Unicom). One could argue that the last three operators could bypass EV-DO and go directly to UMB, but given the operators and their particular markets that is unlikely.

There are two possibilities. KDDI is in a very competitive market and they need to respond when NTT DoCoMo launches its pre-LTE solution later this decade. Historically, KDDI has always been a trendsetter and a bit unconventional so it could announce UMB, at which point other operators could follow. Satellite providers in North America are another possibility. In their case, the technology they deploy will already need to be highly customized due to their unique situation (SA 5/28/07, “*MSS – death from above*”) so it is conceivable that they could go this path since they would not necessarily reap the benefits of going with a more mainstream solution.

Vendor commitment for UMB and Rev B is mixed.

For its part, Qualcomm remains committed to the technology and it plans to continue promoting it. From the infrastructure side there are varying degrees of commitment. Alcatel Lucent indicates that it is developing UMB products and demonstrating UMB solutions while Motorola indicates that UMB still could gain operator traction – Motorola supports KDDI. Nortel points out that it

was the first vendor to demonstrate a UMB call (with QC) last April and CTIA while Huawei indicated at its analyst event last May that it is developing a UMB solution for unnamed customers.

We are not going to writeoff the technology just yet, but the window is closing. Verizon Wireless commented that it didn't see anything compelling about UMB having a two year time to market advantage over LTE and as that window shrinks the time to market advantage also diminishes.

Rev B is the other question mark on many people's minds. Some infrastructure suppliers (NT, MOT, Huawei) don't seem to be doing much regarding Rev B, although they would do so following the interest from operators. ALU and Airvana seem more committed to the standard – probably more so with Airvana – but we have yet to hear of an operator wanting the technology.

For its part, Verizon Wireless indicated that it isn't interested in Rev B due to concerns about device availability. KDDI hasn't expressed an interest. Sprint Nextel is a possibility and we have heard they are, or at least were, driving the development of the standard. In its case, Sprint Nextel could use the technology for its PTT service while Rev B would make a compelling complement to its Mobile WiMAX network.

We'll be back soon with a detailed Signals Ahead report on next-generation core network architectures.

Biography

Prior to founding Signals Research Group, LLC in 2004, Michael Thelander was an analyst with Deutsche Bank, where he covered the wireless telecommunications industry. At Deutsche Bank, he spearheaded the creation and subsequent publication of the *Signals to Noise* (S2N) newsletter and *The Rise of the 3G Empire* thematic reports, which many industry followers considered to be the preeminent research products of their kind. Prior to joining Deutsche Bank, Mr. Thelander was a consultant with KPMG (now known as BearingPoint) and a communications officer with the United States Army. Mr. Thelander has also published numerous articles for leading trade publications and engineering journals throughout his career.

Mr. Thelander holds a Masters of Science in Solid State Physics from North Carolina State University and a Masters of Business Administration from the University of Chicago, Graduate School of Business.

Please note disclaimer: The views expressed in this newsletter reflect those of Signals Research Group, LLC and are based on our understanding of past and current events shaping the wireless industry. This report is provided for informational purposes only and on the condition that it will not form a basis for any investment decision. The information has been obtained from sources believed to be reliable, but Signals Research Group, LLC makes no representation as to the accuracy or completeness of such information. Opinions, estimates, projections or forecasts in this report constitute the current judgment of the author(s) as of the date of this report. Signals Research Group, LLC has no obligation to update, modify or amend this report or to otherwise notify a reader thereof in the event that any matter stated herein, or any opinion, projection, forecast or estimate set forth herein, changes or subsequently becomes inaccurate.

If you feel our opinions, analysis or interpretations of events are inaccurate, please feel free to contact Signals Research Group, LLC. We are always seeking a more accurate understanding of the topics that influence the wireless industry. Reference in the newsletter to a company that is publicly traded is not a recommendation to buy or sell the shares of such company. Signals Research Group, LLC and/or its affiliates/investors may hold securities positions in the companies discussed in this report and may frequently trade in such positions. Such investment activity may be inconsistent with the analysis provided in this report. Signals Research Group, LLC seeks to do business and may currently be doing business with companies discussed in this report. Readers should be aware that Signals Research Group, LLC might have a conflict of interest that could affect the objectivity of this report. Additional information and disclosures can be found at our website at www.signalsresearch.com. This report may not be reproduced, copied, distributed or published without the prior written authorization of Signals Research Group, LLC (copyright ©2004, all rights reserved by Signals Research Group, LLC).