



# SIGNALS Ahead

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## United we Stand, Fragmented we Fail

### Report Preview

*This document contains an overview, including a complete Table of Contents and Index of Figures for a separately published report that provides the key takeaways from the LTE World Summit which was held in Amsterdam. This report is included as part of a normal subscription to our research services or it can be purchased separately for \$595.*

*Following this short introduction and the table of contents we include an overview of recently published research reports, and our tentative research publishing schedule for the next 6-9 months.*

We have been attending the LTE World Summit, which takes place every late spring in Europe, for three years running. At each subsequent event the number of operators has increased and the hot topics have evolved from the theoretical – we think LTE works, but we aren't sure – to the actual – here is how my commercial LTE network is performing. The 2011 event, which took place in Amsterdam, was no exception.

Based on our active participation at the event and the meetings that we attended, we have come up with a list of this year's hot topics, appropriately filtered to reflect the stuff that interests us the most. Spectrum fragmentation tops the list with operators deploying LTE in at least 12 frequency bands with more frequency bands likely in the next couple of years. Unfortunately, while the industry was able to consolidate

on a single technology it just isn't possible to consolidate on a single frequency band or even a minimum number of frequency bands. That being said, 1800MHz is growing in popularity for those operators that have it. In addition to supporting both coverage and capacity requirements, it is well suited for indoor deployments, not to mention the potential ability to reuse existing cell site infrastructure.

Voice over LTE, or the lack thereof, is still on everyone's minds, despite the dearth of LTE smartphones outside of MetroPCS and Verizon Wireless. Interim solutions, such as CSFB, were supposed to provide a smooth transition to full-blown VoLTE, but as it turns out CSFB won't be commercially viable from at least some vendors until early 2012. Two second multi-RAT handover times may also be acceptable for a data call

that can leverage data buffering, but it won't suffice for real-time voice services.

HSPA+, including DC-HSDPA, was on several operators' minds – with one notable, albeit predictable, exception. Operators are looking to use both technologies, in particular DC-HSDPA, as a more suitable fallback technology where LTE coverage does not exist. DC-HSDPA is also no longer the technology for LTE “wannabes.” In fact, two of the first LTE operators – TeliaSonera and CSL – also offer DC-HSDPA services.

Spectrum fragmentation and the growing interest in HSPA+/DC-HSDPA should put chipset and device suppliers on notice. At the extreme, tri-band or dual-band LTE devices which also support DC-HSDPA are starting to crop onto operators' requirement lists. There may be a market for single-mode LTE/TD-LTE devices/chipsets, but it will not represent the mainstream.

Finally, unlike last year, but consistent with the event from two years ago, there was a lot of talk about WiMAX. Unfortunately, this time around it was all about how WiMAX operators can transition to TD-LTE. C'est la vie.

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## Potential topics for the coming year include:

- The Mother of all Network Drive Tests (LTE, DC-HSDPA, HSPA+, Rev A and Mobile WiMAX)
- The challenges of delivering video in a mobile network
- How network performance (throughput and latency) impacts the user experience
- Embedded modules/netbooks
- Mobile OS Technical implementation considerations
- TD-LTE network performance benchmark results
- HetNet and LTE Advanced – implications and market opportunity
- CoMP and LTE Advanced
- Going Green – financial implications and challenges
- Smartphone signaling implications and LTE
- LTE chipset performance benchmark test results
- The impact of Type 3i receivers on UE performance (includes chipset benchmark tests of leading solutions)
- Whatever happened to IMS?
- LTE Americas
- 4G World and GSMA MAC

## IN CASE YOU MISSED IT

- **5/16/2011 “HETNET: WHEN BIG CELLS AND SMALL CELLS COLLIDE”** In addition to covering the basics of heterogeneous networks (HetNet), a key LTE-Advanced (R10) feature, we present a compelling series of analytical studies which demonstrate the need for macro network offload, starting as early as 2015. We also get into the technical details of how HetNet works, including discussions on eICIC, ABS and the importance of interference cancellation in the handset. Finally, we look at what is being done with legacy 3G femtocells to limit interference-related problems that they introduce, both with the macro network and between each other.
- **4/26/2011 “CHIPS AND SALSA XIII: NOW SEASONED WITH SOY SAUCE”** In collaboration with Spirent Communications we provide results from the industry’s only independent performance benchmark tests of HSPA+/HSPA chipsets. In the most recent benchmark study we tested 16 different device configurations, representing chipsets from 9 different suppliers, including new entrants, such as Samsung (HSPA+), Intel (HSPA+), MediaTek and HiSilicon. We provide the results, based on a total of 42 HSPA+ test scenarios and 26 HSPA test scenarios.
- **3/15/2011 “LOOKING BEYOND HSPA+: KEEPING UP WITH THE JONESES”** Based on interviews with 3GPP member companies and a thorough review of 3GPP submissions, we offer an in-depth look at the future of HSPA+ (Release 11 and beyond). Ultimately, we conclude that many of the features that are being incorporated into LTE will find their way into HSPA+, thus blurring the performance differences between the two technologies. Latency and the impact of new features on legacy devices are two areas of prime importance where HSPA+ could face challenges relative to LTE.
- **1/12/2011 “DC-HSDPA: DOUBLE THE BANDWIDTH, DOUBLE THE PLEASURE, PART II”** In collaboration with Accuver, who provided us with its XCAL-W drive test tool and XCAP-W post-processing software, we provide results and analysis from an extensive drive test of Telstra’s DC-HSDPA network. We compare DC-HSDPA with HSPA+ performance in a number of side-by-side tests.
- **1/12/2011 DC-HSDPA: “DOUBLE THE BANDWIDTH, DOUBLE THE PLEASURE, PART I”** In collaboration with Accuver, who provided us with its XCAL-W drive test tool and XCAP-W post-processing software, we provide results and analysis from an extensive drive test of Telstra’s DC-HSDPA network. We compare DC-HSDPA with HSPA+ performance in a number of side-by-side tests.
- **12/20/10 “CAN YOU SCHEDULE ME NOW?”** In collaboration with Sanjole we examine how some of today’s commercial LTE eNodeBs allocate network resources when serving multiple devices. We determine that while LTE may deliver a compelling user experience, it is largely due to an empty network and the large channel bandwidths, and that further improvements are necessary if LTE is going to support multiple users in an efficient manner.
- **12/03/10 “A PERSPECTIVE FROM LTE AMERICAS AND THE GSMA MOBILE ASIA CONGRESS”** We provide and discuss various data points which stem from our participation at the LTE Americas event in Dallas and the GSMA MAC event in Hong Kong. We provide an LTE market update, including TD-LTE, discuss the debate about a smart or dumb pipe strategy, and the impact of smartphones and social networking services, including the use of cloud computing, intelligent networks, network offloading and data caching.

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