



# SIGNALS Ahead

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Volume 6, No. 7 PREVIEW  
June 8, 2010

Michael W. Thelander  
(510) 338 1284  
mike@signalsresearch.com  
www.signalsresearch.com

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## Chips and Salsa XII: A chip of a different color

### Mobile WiMAX Chipset Performance Benchmark Results

**T**his report preview contains an overview of a separately published 20-page report which provides results for the industry's first independent performance benchmark tests of Mobile WiMAX chipsets. For this exercise we collaborated with Agilent Technologies to get access to their test equipment (the Agilent E6651A Mobile WiMAX Test Set and PXB Channel Emulator) and engineering support in order to obtain highly objective results.

We tested chipsets from Beceem, GCT, Intel, MediaTek, and Sequans, who submitted their solutions in early 2010. In order to include as many companies as possible we did not impose strict requirements regarding the form factor of the platform that they submitted. As such, we tested solutions which ranged from production stock USB dongles to a desktop modem or CPE (consumer premises equipment). While we recognize and comment throughout this report that the form factor of the solution could impact the results of the underlying chipset, we made no attempt to quantify the impact.

In this report preview we include a complete table of contents, list of figures and tables (24 figures and 1 table in total), and a sample figure with sanitized results from the report.

Given the highly differentiated information that we provide, this report is critical reading for:

- > Wireless IC suppliers looking for competitive intelligence on the performance capabilities of their peers, customers, partners, or potential partners
- > Mobile WiMAX device manufacturers who want to identify best-in-class chipset performance
- > Operators who want insight into which chipset/device suppliers offer the most network efficient chipset solutions
- > Financial institutions who are making short-term or strategic investment decisions

This report is divided into several sections. Following the introduction, we provide a section entitled "Why Performance Matters" to explain why the performance of the chipset matters to operators, device suppliers and end users. We then discuss our test methodology

**Table 1. Participants**

| Device Supplier   | B/B Chipset                            | RF Chipset | Protocol Stack | Form Factor        | Commercial Status | Other  |
|-------------------|--|------------|----------------|--------------------|-------------------|--|
| SEQUANS           | SEQUANS SQN1210                        | SEQUANS    | SEQUANS        | USB Dongle         | reference design  | 65nm, monolithic single die RF+B/B; UL MIMO (not tested), tri-band   |
| Ubee              | Beceem BCSM250                         | Beceem     | Beceem         | USB Dongle         | Commercial (OTS)  | transmit diversity (not tested), single chip BB+RF+memory            |
| Intel Corporation | Intel Centrino Advanced-N + WiMAX 6250 |            |                | PCIe half Minicard | Commercial        | tri-band (2.3/2.5/3.5GHz) with integrated enterprise Wi-Fi (a/b/g/n) |
| GCT               | GCT GDM7205                            | GCT        | GCT            | USB Dongle         | Commercial        | RF + BB single chip, single die                                      |
| MediaTek          | MediaTek MT711x                        | Maxim      | MediaTek       | CPE                | Commercial        | 65nm CMOS  |

Source Vendors and SRG

before providing the results for a series of tests with varying parameters, including MCS (modulation and coding scheme), transmit power level, and receive signal level. The four tests are “Receive CINR Sweep without Fading,” “Receiver Sensitivity without Fading,” “Transmit Power and Modulation Accuracy,” and “Receive Power Sweep with PB3 Fading Conditions.”

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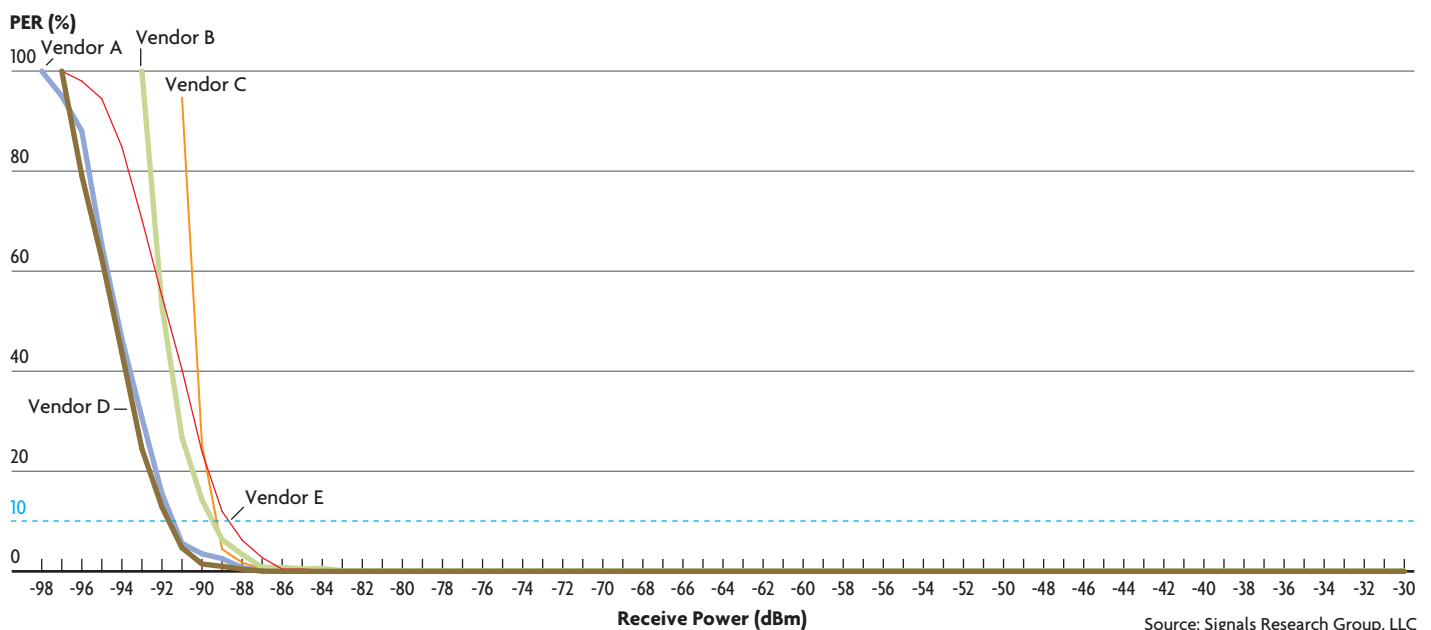
and we do this since we know that once a company subscribes to our research, they will most likely remain loyal clients for years to come.

Table 1 identifies the platforms that we tested with the Agilent E6651A Mobile WiMAX Test Set and PXB Channel Emulator.

Figure 1 provides some illustrative results for one of the tests.

In order to provide greater insight into the type of research that we provide, we have included brief summaries of recent reports that we have done as well as identified a list of likely topics that we will pursue in the coming year. Note that the research topics we pursue could change based on industry events and market trends, not to mention ideas that we develop through the course of doing normal research.

**Figure 11. Receive Power with PB3 Fading Conditions – QPSK 1/2 MIMO Matrix A**



Source: Signals Research Group, LLC

## Potential topics for the coming year include:

- > TD-LTE market update
- > Embedded modules/netbooks
- > The challenges of delivering video in a mobile network
- > LTE chipset performance benchmark test results
- > LTE Global Summit (Amsterdam)
- > Economic considerations with various backhaul solutions
- > Going Green – financial implications and challenges
- > The impact of Type 3i receivers on UE performance (includes chipset benchmark tests of leading solutions)
- > Whatever happened to IMS?
- > 4G World
- > LTE network performance benchmark results – retest of networks
- > DC-HSPA network performance benchmark results
- > Backhaul and NGN architecture considerations
- > HSPA+ (MIMO) network performance benchmark results
- > The impact of latency
- > TD-LTE network performance benchmark results
- > Public Safety Options with 700MHz
- > Technology and Market Outlook for 1X Advanced and EV-DO Advanced
- > EV-DO Rev B network performance benchmark results

## IN CASE YOU MISSED IT

- > **5/5/10 “VOICE OVER LTE – A MODERN DAY TOWER OF BABEL?”**  
We examine 5 different approaches for implementing VoLTE. We look at the technical merits of each solution, who is advocating the various solutions, as well as the probability that any given solution ever sees the light of day.
- > **4/12/10 “CHIPS AND SALSA XI – I’LL TAKE CATEGORY 14 FOR 21MBPS PLEASE”** In this issue, which was done in collaboration with Spirent Communications, we provide results the industry’s latest round of independent HSPA chipset testing. In this report we provide results for 10 different solutions, representing chipsets from five different leading suppliers. Tested chipsets supported Cat 8, Cat 9, Cat 10 or Cat 14 capabilities with 56 test scenarios for the Cat 8-10 platforms and 46 test scenarios for the Cat 14 (HSPA+) platforms. 3/11/2010 “186GB in an LTE Network – been there, done that (Part 2)” In part two of a special two-part series we provide results from the industry’s first independent drive test of a commercial LTE network. Part two is specific to the Oslo network, plus it puts the LTE throughput results into perspective, based on real usage scenarios.
- > **3/11/2010 “186GB IN AN LTE NETWORK – BEEN THERE, DONE THAT (PART 1)”** In part one of a special two-part series we provide results from the industry’s first independent drive test of a commercial LTE network. Part one provides the key conclusions and observations from testing two networks along with the detailed results for the Stockholm network. Detailed results include multiple KPIs which provide key insight into how the network performs (modulation scheme, MIMO type, throughput, # of resource blocks, CINR, RSSI, etc).
- > **1/28/2010 “THE TROUBLE WITH TWITTERS”** We look at the impact of smartphone signaling on an operator’s 3G network. As part of our research into this report, we leveraged the Anite Nemo Handy drive test tool to capture the signaling traffic while using seemingly benign applications. In addition to identifying the worst offenders, we offer commentary on what the industry needs to do to address the growing problem.
- > **1/04/10 “2010 – A LOOK AHEAD”** We provide our thoughts on the year ahead, including our list of important truisms and trends that we believe are and will continue to shape the wireless industry.
- > **12/15/09 “SERVICE ASSURANCE – ENSURING NEXT-GENERATION NETWORKS”** We look at the Service Assurance industry which provides the services that are necessary to ensure that services offered by operators meet pre-defined service quality levels and customer experience targets. In particular, we look at the ecosystem of suppliers, from large NEMs to small startups, and we present many of the key trends that will emerge in the years to come.
- > **11/19/09 “LTE IN THE AMERICAS”** We discuss the key themes and trends that emerged from the LTE Americas Summit that took place in Dallas, Texas and we compare those themes and trends with what emerged from the LTE event that took place during the summer in Europe.

*Full data for all charts  
and figures listed on the following pages  
are available in the complete report.*

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### MAILING ADDRESS

Signals Research Group, LLC – ATTN: Sales  
5245 College Avenue, Suite 824  
Oakland, CA 94618

Our **FAX** number is **(510) 338-1284**.

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