

LTE Device Chipsets: The Workhorses of LTE

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Executive Summary

LTE is a truly evolutionary communications platform. However, the biggest impediment to LTE growth is the success of 3G and HSPA and HSPA+ networks. Mobile operators will leverage their existing infrastructures for as long as they possibly can. Without compelling reasons to be the first chipset manufacturer in the space, there will be a “wait-and-see” type of attitude that permeates mobile operators, OEMs, and chipset manufacturers.

The LTE ecosystem does not support rapid expansion either. In many countries, optimal spectrum is still being used by analog TV broadcasters. The “digital dividend” (790–862MHz is the commonly used definition) is being allocated in Europe. Additionally, it is still difficult to design mobile phones with embedded antennas in the accepted form factor.

These factors leave In-Stat with a relatively conservative outlook for the forecast period of this report (2008–2013). This does not mean that In-Stat is ultimately bearish on LTE fortunes—in the longer term, LTE will become the dominant 4G technology. At some point in the 2020s, LTE will be the most used mobile platform globally.

On December 14, 2009, TeliaSonera rolled out the first commercial LTE network. The rollout initially covers Oslo, Norway and Stockholm, Sweden, and is limited even within the geographies of those cities. Even though the first deployment is in Western Europe, In-Stat believes that North America and Asia/Pacific will be the first regions to have large numbers of subscribers to LTE services. North America will have roughly X million new LTE subscribers in 2013, and Asia/Pacific will have X million new subscribers that year.

The report focuses on LTE chipsets (also known as modems) in end-use devices. By the end of 2013, the cost of chipsets for LTE handsets will be under US\$X. This forecast does not include the value of the silicon needed for the display and functionality around the display.

HIGHLIGHTS

- The first widely deployed LTE end-use devices will be USB dongles and PC cards. The ultimate fruition of LTE is to have widespread adoption on mobile handsets. This will begin to happen in the second half of X.
- In 2013, the global value of LTE chipset silicon will be US\$X billion. Also in 2013, there will be slightly more than X million LTE chipsets sold.
- Throughout the forecast period, North America and Asia/Pacific will be the fastest adopters of LTE technology.
- LTE chipset technology is not developed in a vacuum. Only when each mobile operator independently determines that LTE is in their own best interest will LTE start to flourish.
- On December 14, 2009, TeliaSonera announced the first global commercial deployment of LTE. The first commercial device enabling LTE technology is a USB LTE-only dongle—the Samsung GT3710.
- In 2013, In-Stat forecasts the value of LTE components in an LTE chipset will be US\$X. The figure is somewhat misleading because this does not include the silicon needed for the display technology.

In 2010, the global value of silicon in LTE end-use devices is forecast to be US\$X million. Of this figure, not one dollar will come from a commercially deployed mobile handset. By 2013, the total value of global end-use device silicon will be US\$X billion. By 2013, much of the value of the silicon will be comprised of technology that can be directly integrated onto the circuit board of mobile phones and that market will be worth US\$X billion.

Figure 1. Global Opportunity for Silicon in LTE End-Use Devices, 2010–2013 (US\$ in Millions)

XX

Table of Contents

Executive Summary.....	1	Baseband Solutions	25
Introduction	4	RF Solutions.....	26
LTE End-Use Device Architecture Overview.....	6	Altair Semiconductor.....	26
How Does In-Stat Define an LTE Chipset?	6	BitWave Semiconductor.....	29
LTE System Architecture Evolution, Flat Architecture	6	Comsys Mobile	31
Characteristics of LTE Chipsets.....	7	Infineon	33
PHY—OFDM.....	8	Qualcomm.....	33
Basic Protocol Layers in an LTE End-Use Device	10	Samsung.....	35
RF Transceiver.....	10	ST-Ericsson.....	35
LTE PHY	12	Wavesat	36
LTE MAC.....	14	Others	36
Radio Link Control.....	15	Market Forecasts.....	39
Packet Data Control Protocol.....	16	LTE USB Dongles and External Devices.....	40
Radio Resource Control.....	16	LTE Embedded Chipsets (Excluding Mobile Handsets)	42
The Mobility Management Entity.....	16	Challenges to Building an LTE Chipset for Mobile Handsets.....	45
LTE Ecosystem.....	17	In Handsets, For All That Is Different, Much Remains the Same.....	45
Major Mobile Operators Determine how Quickly LTE is Widely Deployed	17	Limitations	46
LTE Patent and Royalty Pool.....	18	Discrete Applications Processors	47
What is Reusable Between WiMAX and LTE.....	19	Time-to-Market.....	47
Spectrum.....	20	Antenna Technology	48
Recent Developments within the LTSA (The LTE/SAE Trial Initiative).....	21	Regional Handset Shipments	50
About LTE and LTE Advanced	22	Roll-Up Charts and Non-Silicon Costs	53
Moving From First-Generation LTE Chipsets to Next-Generation LTE Chipsets	22	Non-Silicon Costs in LTE Devices	54
LTE End-Use Chipset Vendor Landscape	24	Methodology	56
The Samsung GT-B3710, the First Batter Up.....	24	Glossary.....	57
		List of Tables	61
		List of Figures	62
		Related In-Stat Reports	63

Introduction

This report starts with an overview about LTE chipset architecture. The section describes how OFDMA was selected as the LTE PHY and what technologies will be reusable between LTE and WiMAX. There is also an overview about the protocols in LTE. In this section, there is good detail provided about how an end-use device communicates with the eNodeB (base station or femtocells in some cases). The mapping protocols from the end-use device MAC to its PHY and radio-link control and, subsequently, the mapping from the MAC to eNodeB channels are particularly interesting.

The next section of the report speaks to the LTE ecosystem. Without exaggeration, the LTE ecosystem could be a lengthy report in and of itself. To summarize what is upcoming in the larger section, one fair sweeping statement can be attached to the LTE ecosystem. The LTE ecosystem is exactly as strong as its individual members. Even as there are efforts to unify standards for LTE by its sponsoring body, the 3GPP, the deployment of the LTE transition is dependent upon each participant. Every global mobile operator has to decide when it is right to invest LTE infrastructure. Handset and networking equipment manufacturers must have sufficient markets to produce products in volume and enjoy the economies of scale. In many markets, spectrum still has to be made available. More succinctly, this section discusses the non-silicon considerations that affect silicon.

The report then reviews the LTE chipset vendors. Altair Semiconductor, BitWave Semiconductor, and ComSys Mobile are three semiconductor IP companies hoping to compete with larger vendors like Qualcomm and Samsung in LTE end-use silicon. The LTE market is truly nascent—we know that Qualcomm, Broadcom, and Infineon have plans, and in some cases, announced platforms in LTE. We do not know the timescale and internal investments that these mainstream silicon vendors have dedicated to LTE.

The next-to-last section unifies everything else in the report. By defining the protocols, understanding the LTE ecosystem, and reviewing what we know about the LTE chipset manufacturers at this moment, we can at least estimate which devices will enter the market. The TeliaSonera launch currently supports one device—an USB, data-only LTE dongle provided by Samsung from their Kalmia platform. The first devices in serious proliferation will be dongles and PC cards. After that there will be integration into PCs, ultra mobile devices and MIDs.

The last section of the report reviews the integration of LTE chipsets into mobile handsets. Mobile handsets are the most successful consumer electronics devices ever. The challenges in integrating LTE silicon onto handsets are many. To begin with, mobile handset manufacturers do not believe that the form factor of the phone can be changed. Secondly, the same manufacturers also think that consumers will want the same or better battery life in the upcoming platform. Before there are widespread LTE deployments in mobile handsets, there has to be movement in the LTE ecosystem and much to discover to make LTE chipsets power-efficient and inexpensive. In-Stat believes that this will happen in the latter half of 2012.

List of Tables

Table 1.	Techniques that are Used to Improve Bit Rates on the LTE Platform.....	7
Table 2.	Characteristics of First-Generation LTE Chipsets and Next-Generation LTE Chipsets	23
Table 3.	Comparison of Altair, BitWave, ST-Ericsson, and Wavesat LTE Chipsets for End-Use Devices	28
Table 4.	Total Regional Shipments of LTE USB Dongles and External Clients, 2010–2013 (Units in Thousands)	40
Table 5.	LTE USB Dongles and External Clients Silicon BOM, 2010–2013 (US\$)	41
Table 6.	Total Value of LTE USB Dongle and External Clients Silicon, 2010–2013 (Units in Thousands and US\$ in Millions)	42
Table 7.	LTE Portable End-Use Device Shipments, Excluding Handsets, 2010–2013 (Units Thousands)	42
Table 8.	LTE Portable End-Use Devices by Region, Excluding Handsets, 2010–2013 (Units in Thousands) .	43
Table 9.	LTE Embedded Chipset Silicon BOM in Portable End-Devices, Excluding Handsets, 2010–2013 (US\$)	44
Table 10.	Global Silicon Opportunity for LTE Embedded Chipsets in Portable End-Use Devices, 2010–2013 (Units in Thousands and US\$ in Millions)	44
Table 11.	LTE Handset Shipments by Region, 2010–2013 (Units in Thousands)	50
Table 12.	LTE Handset Silicon BOM, 2010–2013 (US\$).....	52
Table 13.	Total Value of Global LTE Mobile Handset Silicon, 2010–2013 (Units in Thousands and US\$ in Millions)	52
Table 14.	All LTE Devices Roll-Up by Region, 2010–2013 (Units in Thousands).....	53
Table 15.	Total LTE Chipset Revenues by Device Type, 2010–2013 (US\$ in Millions).....	53
Table 16.	Average Cost for LTE MAC Software and IP Royalties, 2010–2013 (US\$)	55

[Return to Table of Contents](#)

List of Figures

Figure 1.	Global Opportunity for Silicon in LTE End-Use Devices, 2010–2013 (US\$ in Millions)	2
Figure 2.	Basic Protocol Layers in an LTE End-Use Device.....	10
Figure 3.	The Samsung GT-B3710 Kalmia Dongle.....	25
Figure 4.	Conceptual Representation of Analog Functions Moved to Digital Control in Wireless Chipsets	30
Figure 5.	Comsys ComMAX CM1125—Handset Reference Design Schematic	32
Figure 6.	Conceptual Representation of Chipset Integration in Mobile Handsets	46

[Return to Table of Contents](#)

Related In-Stat Reports

- #IN1004525WBB *In-Depth Analysis: The Road to LTE: Is WiMAX Really the Enemy?*, January 2010
<http://www.instat.com/abstract.asp?id=281&SKU=IN1004525WBB>
- #IN0904594WBB *3Q09 WiMAX/LTE Contract, Deployment, Infrastructure, and Subscriptions Database*, October 2009
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