

U.S. LTE Infrastructure Market: *Leading the Global Transition to LTE*

Market Study
Second Quarter, 2013





U.S. LTE Infrastructure Market: Leading the Global Transition to LTE

A Market Study

Published Second Quarter, 2013
Version 1.0
Report Number: 2Q2013-06

iGR
12400 W. Hwy 71
Suite 350 PMB 341
Austin TX 78738

Table of Contents

Abstract	1
Executive Summary	3
LTE Infrastructure CapEx and OpEx	3
Figure A: Total U.S. LTE Infrastructure Spending, 2012-2017 (\$M, depreciated CapEx)	3
Figure B: Share of U.S. LTE Infrastructure Spending by Component, 2012-2017	4
Figure C: U.S. Total LTE Network OpEx, 2012-2017 (\$M)	5
Figure D: Total U.S. LTE Network CapEx and OpEx Spending, 2012-2017 (\$M).....	6
4G Metrocells	6
Figure E: U.S. 4G Metrocell TAM, 2012-2017	7
LTE Advanced.....	7
LTE Carrier Aggregation.....	8
Methodology	10
LTE CapEx and OpEx Cost Model Methodology	10
Cost Model Assumptions	10
LTE Cost Estimate Assumptions.....	11
LTE: Which U.S. Operators?.....	13
Verizon Wireless	13
AT&T Wireless.....	13
Sprint.....	14
T-Mobile USA	14
MetroPCS	15
U.S. Cellular.....	16
C Spire	16
Clearwire.....	17
Other operators	17
U.S. LTE Subscriber Estimates & Forecast	19
U.S. Cellular Subscriber Growth	19
Table 1: Forecasted U.S. Cellular Subscriber Growth, 2012-2017 (Millions)	19
Figure 1: Forecasted U.S. Cellular Subscriber Growth, 2012-2017 (Millions)	19
U.S. LTE Subscriber Growth.....	20
Table 2: Average U.S. LTE Subscribers, 2012-2017 (Millions)	20
Figure 2: Average U.S. LTE Subscribers and Total U.S. Subscribers, 2012-2017 (Millions) ...	21
U.S. LTE Mobile Data Traffic Forecast	21
Table 3: Assumed U.S. LTE Network Usage, 2012-2017	22
Table 4: Assumed Total U.S. LTE Network Usage, 2012-2017	22
Figure 3: Assumed Total U.S. LTE Network Usage, 2012-2017 (GBs).....	22
U.S. LTE Infrastructure CapEx Forecast	22
Table 5: U.S. LTE Infrastructure CapEx, 2012-2017 (\$M, depreciated CapEx)	23
Figure 4: U.S. Total LTE Infrastructure CapEx, 2012-2017 (\$M, depreciated CapEx)	23

Quoting information from an iGillottResearch publication: external — any iGillottResearch information that is to be used in press releases, sales presentations, marketing materials, advertising, or promotional materials requires prior written approval from iGillottResearch. iGillottResearch reserves the right to deny approval of external usage for any reason. Internal-quoting individual sentences and paragraphs for use in your company's internal communications activities does not require permission from iGillottResearch. The use of large portions or the reproduction of any iGillottResearch document in its entirety does require prior written approval and may have some financial implications.

Copyright © 2013 iGillottResearch, Inc. Reproduction is forbidden unless authorized.

FOR INFORMATION PLEASE CONTACT IAIN GILLOTT (512) 263-5682.

U.S. LTE infrastructure CapEx by network component	24
Table 6: U.S. LTE Infrastructure CapEx by Component, 2012-2017 (\$M, depreciated CapEx)	24
Figure 5: U.S. LTE Infrastructure CapEx by Component, 2012-2017 (\$M, depreciated CapEx)	25
Table 7: Share of U.S. LTE Infrastructure Spending by Component, 2012-2017.....	25
Figure 6: Share of U.S. LTE Infrastructure Spending by Component, 2012-2017	26
U.S. LTE Network OpEx Forecast	26
Table 8: U.S. LTE Network OpEx, 2012-2017 (\$M).....	27
Figure 7: U.S. Total LTE Network OpEx, 2012-2017 (\$M).....	27
Total Addressable Market for Metrocells	28
TAM: Methodology Overview	28
TAM: Detailed Methodology	28
Estimating Supply/Capacity	28
Estimating Demand.....	30
4G Metrocell Total Addressable Market	33
Table 9: U.S. 4G Metrocell TAM, 2012-2017.....	33
Figure 8: U.S. 4G Metrocell TAM, 2012-2017	34
LTE Advanced	35
What is the Current State of Standards?	35
Table 10: 3GPP Release 8 – 11 Capabilities	35
Table 11: 3GPP Releases 8 – 12 Standardization and Commercialization Schedule.....	36
LTE Advanced - What is the Current Status in the Market?	36
Table 12: Worldwide Rollout of Release 10 of 3GPP	36
Who are the Players?	37
Table 13: LTE Advanced Players.....	37
How Will It Impact Current Technology?	38
Table 14: LTE Advanced Functionality	38
LTE Advanced SWOT Analysis	39
Figure 9: SWOT Analysis.....	40
LTE Advanced Outlook	40
Table 15: Outlook for LTE Advanced, 12-24 Months	40
Table 16: Outlook for LTE Advanced, 24-48 Months	41
LTE Carrier Aggregation	43
Inter-band and Intra-band CA	43
Figure 10: Inter-band and Intra-band Aggregation	44
CA Terminal Considerations	44
Figure 11: Uplink and Downlink Communications	45
CA Roaming Issues	46
What is the Current State of Standards?	46
Table 17: 3GPP Releases 8 – 12 Standardization and Commercialization Schedule.....	46
Who are the Players?	48
Table 18: Carrier Aggregation Players.....	48

Quoting information from an iGillottResearch publication: external — any iGillottResearch information that is to be used in press releases, sales presentations, marketing materials, advertising, or promotional materials requires prior written approval from iGillottResearch. iGillottResearch reserves the right to deny approval of external usage for any reason. Internal-quoting individual sentences and paragraphs for use in your company's internal communications activities does not require permission from iGillottResearch. The use of large portions or the reproduction of any iGillottResearch document in its entirety does require prior written approval and may have some financial implications.

Copyright © 2013 iGillottResearch, Inc. Reproduction is forbidden unless authorized.

FOR INFORMATION PLEASE CONTACT IAIN GILLOTT (512) 263-5682.

How will It Impact Current Technology and the Mobile Market?.....	48
Spectrum.....	48
Market timing	49
Roaming	49
Contiguous vs. Non-contiguous	49
Operator strategies.....	49
LTE Carrier Aggregation SWOT Analysis.....	50
Figure 12: SWOT Analysis.....	51
LTE Carrier Aggregation Outlook	51
Table 19: Outlook for Carrier Aggregation, 12-24 Months	51
Table 20: Outlook for Carrier Aggregation, 24-48 Months	52
LTE Vendor Profiles	54
Alcatel-Lucent	54
Figure 13: Alcatel-Lucent Wireless Packet Core.....	55
Cisco	57
Figure 14: Cisco V2oLTE CSFB and SMS.....	58
Ericsson	60
Huawei	63
Juniper Networks	65
Figure 15: Juniper Networks LTE Core Solution	67
Figure 16: Juniper Networks' Separation of Service and Networking.....	68
Nokia Siemens Networks	69
Samsung Electronics	74
ZTE Corporation	75
Definitions	79
General	79
Device Types	79
Services	80
Network Technology	81
About iGR	86
Disclaimer	86

Abstract

Global LTE deployments are progressing worldwide, and the United States is leading the way with many U.S. operators adding new LTE markets each week. There is still a great opportunity for growth, as U.S. operators will continue to build out their LTE infrastructure to keep up with an increasing number of U.S. consumers who want to take advantage of the faster mobile data speeds of LTE. Operators must balance their network CapEx between coverage and capacity by providing sufficient coverage to be competitive and sufficient capacity for the growing subscriber base.

This report, which provides an overview of the LTE infrastructure market in the United States, is comprised of the following components:

- A status on the LTE rollout of the major U.S. operators
- A five-year forecast of the number of LTE subscribers in the U.S.
- A five-year forecast of LTE mobile data traffic in the U.S.
- A five-year forecast of the total U.S. LTE Infrastructure CapEx
- A five-year forecast of the U.S. LTE Infrastructure CapEx by network component
- A five-year forecast of the U.S. LTE Infrastructure OpEx
- A five-year forecast of the 4G (LTE) Metrocell market
- A detailed analysis of LTE Advanced, including its current state in the market, impacts on current technology, and timeframes for adoption
- A detailed analysis of LTE Carrier Aggregation, including its architecture, capabilities, impacts on current technology and the mobile market, and timeframes for adoption
- A profile of eight vendors that provide products and services for LTE infrastructure.

Key questions addressed:

- At what state of their LTE rollout are the major U.S. operators?
- What is the forecasted number of LTE subscribers in the U.S. through 2017?
- What is the forecasted mobile data traffic in the U.S. through 2017?

Quoting information from an iGillottResearch publication: external — any iGillottResearch information that is to be used in press releases, sales presentations, marketing materials, advertising, or promotional materials requires prior written approval from iGillottResearch. iGillottResearch reserves the right to deny approval of external usage for any reason. Internal-quoting individual sentences and paragraphs for use in your company's internal communications activities does not require permission from iGillottResearch. The use of large portions or the reproduction of any iGillottResearch document in its entirety does require prior written approval and may have some financial implications.

Copyright © 2013 iGillottResearch, Inc. Reproduction is forbidden unless authorized.

FOR INFORMATION PLEASE CONTACT IAIN GILLOTT (512) 263-5682.

- What is the forecasted LTE CapEx for U.S. operators through 2017?
- On what network components will the LTE CapEx be spent through 2017?
- What is the forecasted LTE OpEx for U.S. operators through 2017?
- What is the forecasted total addressable market for 4G LTE metrocells?
- What is LTE Advanced?
- What is LTE Advanced's current state in the market and what will be its impact on mobile technology?
- What is the outlook for LTE Advanced in the next one to four years?
- What is LTE Carrier Aggregation?
- What is LTE Carrier Aggregation's current state in the market and what will be its impact on technology in the mobile market?
- What is the outlook for LTE Carrier Aggregation in the next one to four years?
- Who are some of the vendors providing LTE infrastructure products and services?

Who should read this report?

- Mobile network operators
- LTE network infrastructure OEMs
- Small cell OEMs and vendors
- Financial analysts and investors.

Quoting information from an iGillottResearch publication: external — any iGillottResearch information that is to be used in press releases, sales presentations, marketing materials, advertising, or promotional materials requires prior written approval from iGillottResearch. iGillottResearch reserves the right to deny approval of external usage for any reason. Internal-quoting individual sentences and paragraphs for use in your company's internal communications activities does not require permission from iGillottResearch. The use of large portions or the reproduction of any iGillottResearch document in its entirety does require prior written approval and may have some financial implications.

Copyright © 2013 iGillottResearch, Inc. Reproduction is forbidden unless authorized.

FOR INFORMATION PLEASE CONTACT IAIN GILLOTT (512) 263-5682.