**Before the**
**Federal Communications Commission**
**Washington, DC 20554**

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|---|---|---|
| In the Matter of | ) | |
| | ) | |
| Wireless Telecommunications Bureau | ) | WT Docket No. 13-135 |
| Seeks Comment on the State of Mobile | ) | |
| Wireless Competition | ) | |

# COMMENTS OF CTIA – THE WIRELESS ASSOCIATION®


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## EXECUTIVE SUMMARY

In 2013, the wireless industry is more dynamic, innovative, and competitive than ever before and the Commission should confirm the existence of effective competition. Perhaps the best indicator of the industry's vibrancy is its capital investment record. Last year, America's wireless carriers invested $30 billion in their networks – representing a nine percent year-over-year increase from 2011 and a full quarter of global wireless investment in the same time period. Given that the United States comprises just five percent of the world's wireless market, there is no doubt about our nation's leadership in this crucial sector of the economy.

The carriers' massive capital infusion serves as a catalyst for what CTIA calls "the virtuous cycle of wireless investment and innovation." Sustained capital expenditures facilitate the creation of networks capable of supporting greater speeds and functionalities, which, in turn, bring about new, more powerful and more useful devices. The availability of new devices encourages the development of new applications and content, which help drive consumer usage. And, as usage increases, so does the need for more robust networks, more spectrum and, of course, more investment.

Wireless providers today continue to upgrade their mobile networks, adding new cell sites and technologies, and differentiating themselves through speed, reliability, capabilities, and coverage. In the United States, LTE deployments have produced 50 percent of the world's 4G subscribers. Rural coverage is also increasing, with service provided by small, regional, and national carriers. In addition, a variety of service providers, including Mobile Satellite Service ("MSS") providers and Mobile Virtual Network Operators ("MVNOs"), are seeking out

unfulfilled demand, diverse customer bases and geographic areas, thereby enhancing competition in the wireless marketplace.

But the competition clearly does not stop at the carrier level. Competition in the infrastructure, device, operating system, and application markets is as robust, and is delivering significant rewards for U.S. customers. Fierce competition in the U.S. wireless ecosystem has led to a huge variety of product options, cutting-edge innovation and device capabilities, as well as declining prices. Today, at least 32 different device manufacturers offer more than 630 different handsets and devices. Over half of the phones in use today are smartphones, and the number and type of applications available to those consumers are increasing at a staggering rate. These phones operate across a range of operating systems. Application stores compete to present their offerings in the most compelling way, to allow syncing across platforms, to serve many interest groups, and to cater to security-conscious businesses. Similarly, many wireless carriers are embracing and promoting app developer communities.

American consumers are the beneficiaries of this virtuous cycle, and in turn the rate of mobile adoption and usage continues to climb. In addition to cutting-edge devices, super-fast networks, constantly evolving operating systems, and innovative applications, consumers enjoy considerable choice in voice and data plans and can easily obtain information about coverage, usage, payment options, privacy, security, and devices. Indeed, the continued, aggressive deployment of high-speed wireless networks has produced tremendous benefits across the entire U.S. economy, including for the healthcare, education, transportation, finance, energy, and agriculture sectors. Smart grids, smart cars, smart fields, and smart children all take advantage of wireless technology. Likewise, the wireless industry is making life easier for people with disabilities, including providing service and phones for the blind, apps for people with hearing

loss, and mechanisms to remotely adjust prostheses. The U.S. leads the world in the competitiveness of its mobile wireless market, and American consumers receive superior values on wireless services than do their counterparts abroad.

The biggest threat to maintaining the competitiveness of the U.S. wireless industry is the imminent shortfall of usable licensed mobile spectrum. As wireless adoption increases and mobile data usage explodes, much more bandwidth is needed to upgrade networks, serve additional consumers, and meet demand. New advanced technologies have been deployed to get the most out of existing spectrum allocations and carriers are off-loading traffic to Wi-Fi from their own networks, but those efforts are not enough. Spectrum is a crucial component of the virtuous cycle and more spectrum must be identified, allocated, and auctioned to ensure continued investment in this critical, ever-expanding industry.

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**COMMENTS OF CTIA – THE WIRELESS ASSOCIATION®**

## I. INTRODUCTION

CTIA – The Wireless Association® ("CTIA")[1] respectfully submits these comments in response to the Public Notice ("Public Notice") released by the Wireless Telecommunications Bureau ("Bureau") of the Federal Communications Commission ("FCC" or the "Commission") in the above-captioned proceeding.[2] In the *Public Notice*, the Bureau seeks comment on the state of mobile wireless competition in the United States.[3] Specifically, the Bureau asks for input and data on industry structure, firm conduct, market performance, and consumer behavior with respect to mobile wireless services, as well as on input and downstream segments, intermodal competition, urban-rural comparisons, and international comparisons.[4]

[1] CTIA – The Wireless Association® is not a typographical error. *City of Arlington v. FCC*, 569 U.S. ___, ___ (2013) (slip op. at 3, n.1). More properly, CTIA is an orphan initialism. CTIA was founded in 1984 as the Cellular Telecommunications Industry Association. In 2000, CTIA merged with the Wireless Data Forum and became the Cellular Telecommunications & Internet Association. In 2004, we changed our name to CTIA – The Wireless Association®. This name better represents CTIA's diverse membership of service providers, manufacturers, wireless data and Internet companies, as well as other contributors to the wireless universe. More information about CTIA is available on the Association's website at http://www.ctia.org/aboutCTIA/.

[2] *Wireless Telecommunications Bureau Seeks Comment on the State of Mobile Wireless Competition*, WT Docket No. 13-135, Public Notice, DA 13-1139 (May 17, 2013) ("*Public Notice*").

[3] *Id.* at 1.

[4] *Id.*

From the expansion of next generation networks, to the development of new devices, to the evolution and introduction of operating systems, to the explosion of applications and content, investment in the U.S. mobile ecosystem, driven by robust competition, is keeping the United States in the lead worldwide. In the comments below, CTIA highlights data showing that flourishing competition exists in the mobile marketplace today, and that the wireless industry competes vigorously across the mobile ecosystem to serve customers. Investment in wireless networks continues to increase, and wireless providers continue to deploy advanced networks and improve network quality. Significantly, the entry and expansion of service providers, including MVNOs, MSS carriers, and rural providers, evidence the opportunity for entry or growing market participation.

There is no doubt that competition in the mobile wireless marketplace has generated tremendous benefits for consumers. Wireless providers have developed innovative calling plans, provided new ways to access information about networks, devices, and services, and have implemented usage and public safety alert systems. Consumers have responded by relying more and more on their mobile devices for an increasing variety of services. In addition, the virtuous cycle of investment and innovation in wireless has produced far-reaching benefits across all areas of our society, including health care, education, transportation, banking and finance, energy, agriculture, and accessibility.

Indeed, given its very success, there is an urgent need for additional spectrum. Although the wireless industry has deployed new technologies and infrastructure to improve spectral efficiency, those efforts are not enough by themselves to meet the skyrocketing demand for wireless services. It is crucial that more exclusively-licensed spectrum be made available for

commercial wireless services to ensure the investment and innovation – and consumer benefit – we see today continues unabated.

International comparisons demonstrate that the U.S. wireless marketplace leads the world in efficiency, competition, and value for consumers, and is one of the least concentrated markets in the world. Moreover, the U.S. wireless industry uses its limited spectrum resources more efficiently than most other countries, while outpacing them on high-speed mobile deployment.

The mobile wireless market in the U.S. consists of complex, interrelated segments, which individually and collectively are vigorously competitive. In this proceeding, the Commission should confirm the existence of effective competition.

## II. THE LATEST DATA REFLECT THAT THE WIRELESS INDUSTRY COMPETES VIGOROUSLY ACROSS THE MOBILE ECOSYSTEM TO SERVE CUSTOMERS

### A. Competition Continues to Drive Increasing Investment in Wireless Networks.

#### *1. Capital Expenditures.*

The best indicator of the wireless industry's vibrancy and competitiveness is its capital investment record. As the Commission has recognized, "network investment remains a centerpiece of service providers' efforts to improve their customers' mobile wireless service experience."[5] In 2012 alone, wireless carriers invested more than $30 billion in their networks.[6] These capital expenditures represent a 9 percent year-over-year increase from the $27.5 billion carriers invested in 2011.[7] Far from being a chance occurrence, this growth represents a

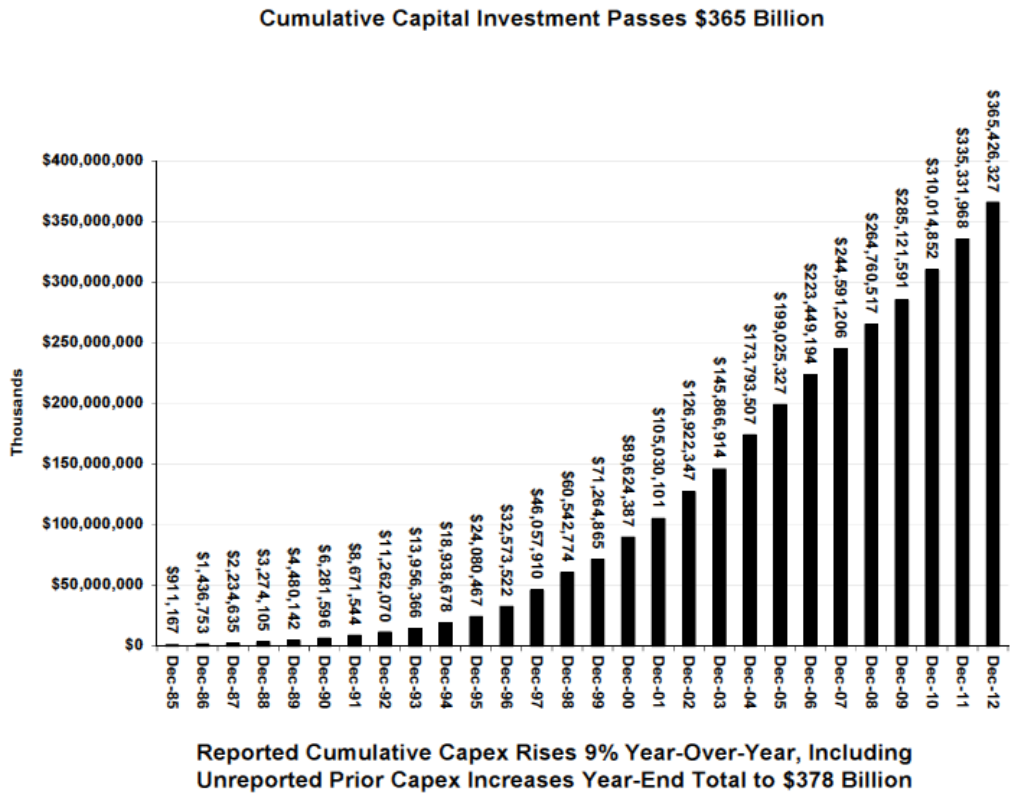
[5] *Annual Report and Analysis of Competitive Market Conditions with Respect to Mobile Wireless, Including Commercial Mobile Services*, Sixteenth Report, 28 FCC Rcd 3700 ¶ 181 (2013) ("*Sixteenth Report*").

[6] CTIA – The Wireless Association®, *CTIA's Wireless Industry Indices: Year-End 2012 Results*, 105 (May 2013) ("*CTIA's 2012 Wireless Indices*").

[7] *Id.*

consistent trend in the competitive wireless industry: since 2007, the level of annual mobile wireless capital expenditures has grown more than 70 percent.[8]

Capital expenditure data going back to the dawn of the wireless era confirm that the wireless market has always been a growth industry where firms invest substantial amounts to remain competitive. As shown in the graphic below, capital expenditures continue to grow, with cumulative capital investment at the end of 2012 totaling more than $365 billion, up 9 percent from the cumulative year-end 2011 amount.[9]




[8] Erik Bohlin, Kevin W. Caves, and Jeffrey A. Eisenach, *Mobile Wireless Performance in the EU & the US*, at 17 (GSMA /Navigant Economics May 2013) ("*2013 GSMA Report*") (attached as Appendix A).

[9] *See CTIA's 2012 Wireless Indices* at 114; *see also* CTIA – The Wireless Association®, *Background on CTIA's Semi-Annual Wireless Industry Survey*, at 12 (2013) ("*CTIA's 2012 Wireless Indices Graphics*"), *available at* http://files.ctia.org/pdf/CTIA_Survey_YE_2012_Graphics-FINAL.pdf (last accessed June 12, 2013).

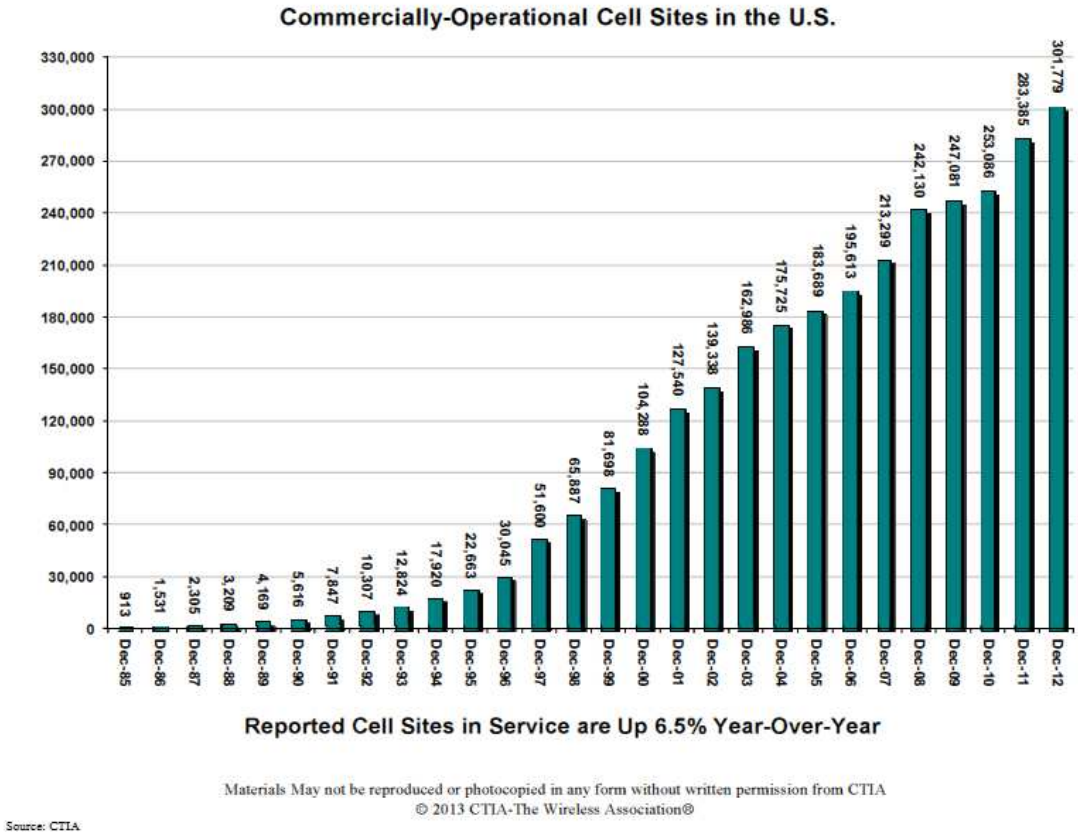
These robust investment figures represent a true success story for the U.S. wireless market and for the U.S. economy. For example, although the U.S. has just 5 percent of the world's wireless subscribers, these capital expenditures represent approximately a quarter of all global wireless investment.[10] These figures, moreover, do not tell the entire story. They do not include the more than $35 billion carriers have spent on spectrum auctioned by the FCC or the additional sums spent acquiring spectrum resources in subsequent market transactions.

### *2. Cell-Site Deployments.*

As the Commission has recognized, investment in expanding network coverage and increasing network capacity, such as by building cell sites, is one way that carriers compete.[11] Without robust competition, carriers have little incentive to expand and improve their network coverage, capacity, and quality but, as discussed below, U.S. wireless carriers continue to add new infrastructure to meet consumer demand.

[10] Didier Scemama, *Global Wireless CapEx: Increase 2013 Forecast by 7%*, Bank of America Merrill Lynch (Jan. 6, 2013).

[11] *See, e.g.*, *Sixteenth Report* ¶ 66.




Over the past two years, the number of active cell sites reported grew by 48,693, the most growth of any two-year period.[12] Put another way, the total number of wireless cell sites increased by more than 19 percent in the last two years alone.[13] Carriers added 18,394 of those sites in 2012, representing an annual growth rate of 6 percent, for a total of 301,779 reported cell sites nationwide at year-end.[14] Since 2009, carriers have added more than 50,000 cell sites, a

[12] *See CTIA's 2012 Wireless Indices* at 133.

[13] *See id.*

[14] *See id.*

remarkable increase of more than 20 percent.[15] The historical cell site figures similarly reveal a vibrant industry that is competing to improve network capacity, quality, and performance.[16]

### *3. Commission Actions Have Encouraged and Can Continue to Facilitate Greater Network Investment.*

The Commission's policies on tower siting act as a catalyst for wireless investment, helping to remove barriers to investment and leading to enhanced experiences for wireless customers. CTIA applauds the Commission's recent work promoting wireless investment and encouraging wireless build-out. In particular, by granting CTIA's petition related to the "shot clock" for limiting the time that a local zoning authority can delay deployment of wireless facilities, the Commission has shown how clear and transparent rules facilitate deployment.[17] They have played a role in encouraging the record level of cell-site deployment over the past two years. The Commission's rulings regarding the deployment of facilities attached to utility infrastructure in the utility right-of-way, including its confirmation that wireless carriers have the same right to attach to pole tops as they do to other parts of a utility pole, have also helped facilitate siting in a number of instances.[18] And, the Commission has further bolstered its track

[15] *See id.* at 130.

[16] *See CTIA's 2012 Wireless Indices Graphics* at 11. CTIA's semi-annual data measures the number of commercially operational cell sites, including DAS and a variety of cell-extending devices, while excluding microwave hops. *See CTIA's 2012 Wireless Indices* at 125. Note that the survey does not request carrier-specific cell site figures, so it cannot serve as a source for such figures.

[17] *Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(B) to Ensure Timely Siting Review and to Preempt under Section 253 State and Local Ordinances that Classify All Wireless Siting Proposals as Requiring a Variance*, Declaratory Ruling, 24 FCC Rcd 13994 (2009) ("*Shot Clock Declaratory Ruling*"), *affirmed sub nom City of Arlington v. FCC*, 133 S. Ct. 1863 (2013).

[18] *See Implementation of Section 224 of the Act*, Report and Order and Order on Reconsideration, 26 FCC Rcd 5240 (2011).

record on infrastructure issues in granting CTIA's petition to adopt interim rules revising the Antenna Structure Registration Process for temporary towers.[19]

Courts have overwhelmingly affirmed the Commission's efforts to remove barriers to infrastructure deployment. In *City of Arlington*, for example, the Supreme Court affirmed that the Commission was within its authority in issuing the *Shot Clock Declaratory Ruling*.[20] Likewise, the D.C. Circuit recently affirmed the Commission's efforts in improving access and reducing costs for wireless carriers to deploy in the utility right-of-way.[21]

The Commission should continue to build on these successes.[22] Removal of these and other barriers to wireless infrastructure build-out will ensure that carriers will be able to continue to deploy facilities at—or even greater than—the significant rates we have witnessed over the past few years.

### B. Wireless Providers Continue to Deploy Advanced Networks and Improve Network Quality.

The Commission has recognized that a "critical way in which mobile wireless service providers differentiate themselves is with the speeds, reliability, capabilities, and coverage of

[19] *Amendment of Parts 1 and 17 of the Commission's Rules Regarding Public Notice Procedures for Processing Antenna Structure Registration Applications for Certain Temporary Towers*, RM No. 11688, WT Docket No. 13-32, Order, FCC 13-72 (May 16, 2013).

[20] *See City of Arlington, Tex. v. F.C.C.*, 133 S. Ct. 1863 (2013).

[21] *See Am. Electric Power v. F.C.C.*, 708 F.3d 183 (2013).

[22] For instance, CTIA urges the Commission to grant a request by PCIA – The Wireless Infrastructure Association, and the DAS Forum, a membership section of PCIA, to streamline the environmental and historic site approval process for small cell and distributed antenna system deployments. *Ex Parte* Letter from D. Zachary Champ, Government Affairs Counsel, PCIA, to Marlene Dortch, WC Docket No. 11-59, GN Docket No. 12-354 (filed Mar. 19, 2013).

their mobile broadband networks."[23] The past year has proved this point. Wireless carriers continue to upgrade and expand their networks with new facilities and new technologies.[24]

In the U.S., the world's most advanced LTE deployments have produced more than 50 percent of the world's 4G subscribers – ten times the rate of LTE adoption that would otherwise be expected, taking into account that the U.S. market represents only 5 percent of total worldwide wireless subscribers.[25] According to GSMA, U.S. carriers were covering the following populations with LTE networks as of the fourth quarter of 2012.[26]

**U.S. LTE NETWORK COVERAGE AND SUBSCRIBERSHIP**
AS OF Q4 2012

| OPERATOR | LAUNCH DATE | COVERED POPS | POPULATION COVERAGE | LTE CONNECTIONS AS % OF TOTAL |
|---|---|---|---|---|
| VERIZON WIRELESS | December 2010 | 273 million | 86% | 18.9% |
| AT&T MOBILITY | September 2011 | >170 million | 53% | 7.5% |
| METROPCS | September 2010 | ~100 million | ~31% | 24.8% |
| SPRINT (SPRINT NEXTEL) | July 2012 | 88 cities | n/a | 7.3% |
| US CELLULAR (TDS) | March 2012 | 57 million | 18% | 13.2% |
| CRICKET COMMUNICATIONS (LEAP WIRELESS) | December 2011 | 21 million | 7% | 1.1% |

Source: GSMA Wireless Intelligence

[23] *Sixteenth Report* ¶ 181.

[24] Although CTIA does not collect data regarding the number of connections broken down by mobile network technologies, such as EV-DO, HSPA, WiMAX, and LTE, Informa Telecoms & Media Group's Word Cellular Information Service contains statistics on this information. *See* Informa Telecoms & Media Group, Word Cellular Information Service, http://www.informatandm.com/about/wcis/ (last accessed June 12, 2013).

[25] As of March 2013, the U.S. was estimated to have 52.5% of the world's LTE subscribers, according to the Informa Telecoms & Media Group's World Cellular Information System (WCIS) database. *See* Testimony of Steve Largent, President and CEO, CTIA – The Wireless Association®, "The State of Wireless Communications," U.S. Senate Commerce, Science, and Transportation Subcommittee on Communications, Technology, and the Internet (June 4, 2013) ("Largent Testimony"), at 2, *available at* http://www.commerce.senate.gov/public/?a=Files.Serve&File_id=73d6bd9a-bd35-49d8-9ff0-8dee4bf329a4 (last accessed June 12, 2013).

[26] *2013 GSMA Report* at 19. Note that MetroPCS has merged with T-Mobile. *See id.*

Since year-end 2012, U.S. carriers have continued to deploy 4G LTE service. T-Mobile launched its own LTE network in seven cities in March (in Baltimore, Houston, Kansas City, Las Vegas, Phoenix, San Jose, and Washington, D.C.) and has announced plans to cover 100 million people with its 4G LTE network by mid-year 2013 and 200 million people by the end of the year. Sprint has announced the turn-up of additional LTE markets, and as of June 17, 2013, offered 4G LTE service in 110 markets.[27] Likewise, Verizon and AT&T have announced the introduction of 4G LTE service to new markets. Verizon now covers 287 million people in 497 markets with its LTE network – more than 90 percent of the U.S. population. AT&T now offers 4G LTE in 278 markets covering more than 200 million people, and expects to reach 300 million people by the end of 2014.[28]

Nor is 4G LTE the exclusive province of the largest carriers. Regional and rural carriers have also launched LTE-based service and are publicizing the availability and the benefits of this technology. U.S. Cellular, for example, has announced that it will provide LTE to 87 percent of

[27] *See* "4G Network Fact Sheet," T-Mobile, *available at* http://media.corporate-ir.net/media_files/IROL/25/251624/factSheets/T-Mobile's%204G%20Network%20Fact%20Sheet.pdf (last accessed June 12, 2013). *See also* Mark Sullivan, "Tested: T-Mobile's LTE is smokin' fast in seven cities," TechHive (May 29, 2013), *available at* http://www.techhive.com/article/2039793/tested-t-mobiles-lte-is-smokin-fast-in-seven-cities.html (last accessed June 17, 2013); "Sprint News Release: Sprint Announces Availability of 4G LTE in 21 New Markets," Sprint Nextel Corporation (Apr. 18, 2013), *available at* http://newsroom.sprint.com/article_display.cfm?article_id=2563 (last accessed June 12, 2013); Sprint News Release: 4G LTE Launched Markets as of June 17, 2013 (June 17, 2013), *available at* http://newsroom.sprint.com/news-releases/4glte-launchedmarkets.htm?previousArticle=11038&nextArticle=11037&gotoArt=%2Fnews-releases%2F4glte-launchedmarkets.htm (last accessed June 17, 2013).

[28] *See e.g.*, Verizon Wireless, News Center: LTE Information Center, http://news.verizonwireless.com//LTE/Overview.html (last accessed June 17, 2013); AT&T: The Nation's Fastest 4G LTE Network, http://www.att.com/Common/about_us/pdf/4g_evolution_infographic.pdf (last accessed June 17, 2013); AT&T, Inc., Archived News Releases, http://www.att.com/gen/press-room?cdvn=news&pid=4800&ending_year=2013&newsfunction=searchresults&beginning_month=2&ending_month=4&beginning_year=2013 (last accessed June 12, 2013); Verizon Wireless, Verizon Wireless News Center, http://news.verizonwireless.com/news/?type=News+Releases (last accessed June 12, 2013); Sprint Nextel Corporation, Sprint News Room, http://newsroom.sprint.com/news/ (last accessed June 12, 2013).

its customers by the end of 2013.[29] As the Commission noted in its last report on mobile competition, an impressive field of rural providers were launching or had launched LTE service.[30] Companies that have already launched LTE include Appalachian Wireless and Bluegrass Cellular (Kentucky); Cellcom (Wisconsin and Michigan) Cross Wireless (d/b/a Sprocket Wireless) and Pioneer Cellular (Oklahoma), among others.[31] Other carriers deploying LTE or other advanced technologies in rural and other markets include Carolina West Wireless (North Carolina); Immix Wireless (Pennsylvania); MidRiver Communications (Montana); Nex-Tech Wireless (Kansas); SRT Communications (North Dakota); Union Wireless (Wyoming, Northwestern Colorado and parts of Utah); Chat Mobility (Iowa); and Viaero Wireless (Colorado and Western Nebraska), among others.[32]

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[29] "U.S. Cellular Announces Next Markets to Receive 4G LTE Service in 2013" (Feb. 14, 2013), *available at* http://www.uscellular.com/about/press-room/2013/USCellular-Announces-Next-Markets-to-Receive-4GLTE-Service-in-2013.html (last accessed June 12, 2013).

[30] *See Sixteenth Report* ¶ 186 (explaining that several carriers had deployed LTE services pursuant to Verizon Wireless's LTE in Rural America Partners program).

[31] *See, e.g.*, "Say Hello to 4G LTE," Appalachian Wireless, *available at* http://www.appalachianwireless.com/4g/ (last accessed June 12, 2013); "Bluegrass Cellular Launches Second 4G LTE Network, GetSetGo(TM) Wireless Internet Service," Wall Street Journal (Apr. 18, 2013), *available at* http://online.wsj.com/article/PR-CO-20130418-910121.html (last accessed June 12, 2013); "Cellcom's 4G LTE Coverage Expands in Upper Michigan," NSight News (Dec. 20, 2012), *available at* http://www.nsightnews.com/nsight-cellcom-news/nsight-cellcom-press-releases/296-cellcoms-4g-lte-coverage-expands-in-upper-michigan- (last accessed June 12, 2013); "Pioneer Cellular Boosts LTE Coverage to Five New Markets," TeleGeography (Feb. 25, 2013), *available at* http://www.telegeography.com/products/commsupdate/articles/2013/02/25/pioneer-cellular-boosts-lte-coverage-to-five-new-markets/ (last accessed June 12, 2013); "Cross Wireless Completes its initial 4G LTE Network Launch," Cross Wireless (Nov, 9, 2012), *available at* http://www.sprocketwireless.com/cross-wireless-completes-its-initial-4g-lte-network-launch/ (last accessed June 12, 2013).

[32] *See, e.g.* "Small Operators Prep for LTE, Despite Uncertainties," Fierce Broadband Wireless (Apr. 17, 2013), *available at* http://www.fiercebroadbandwireless.com/story/small-operators-prep-lte-despite-uncertainties/2013-04-17 (last accessed June 12, 2013); "Mid-Rivers Partners with Verizon Wireless to Bring 4G LTE to Montana" (Nov. 14, 2012), *available at* http://www.fiercewireless.com/press-releases/mid-rivers-partners-verizon-wireless-bring-4g-lte-montana-0 (last accessed June 12, 2013); "Nex-Tech Seeks 700 MHz Buildout Extension, Device Interoperability" (Oct. 14, 2012), *available at* http://www.fiercebroadbandwireless.com/story/nex-tech-seeks-700-mhz-buildout-extension-device-interoperability/2012-10-14 (last accessed June 12, 2013); "SRT Communications Selects NewCore

Larger carriers are deploying advanced networks in rural areas as well.[33] These rural deployments reveal just how competitive the mobile wireless market is: carriers of all sizes are competing for revenues wherever there is opportunity, including in the harder to reach and more capital intensive rural areas.[34]

Carriers also continue to introduce network advancements, as they are in the process of rolling out the next generation in telephone call voice technology, HD Voice. HD Voice will allow telephone calls to more nearly approximate the full range of frequencies embodied in the human voice and bring the technology one step closer to replicating in-person presence. T-Mobile, for example announced earlier this year that it began offering HD Voice across its nationwide network,[35] and Sprint is in the process of rolling out the service.[36] Other carriers, including AT&T and Verizon, have announced plans to deploy HD Voice in the near future.[37]

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Wireless for LTE Hosted Switching Solution," PRWeb (Apr. 16, 2013), *available at* http://www.prweb.com/releases/2013/4/prweb10624863.htm (last accessed June 12, 2013); "Chat Mobility launches 4G LTE service," Creston News Advertiser (May 23, 2013), *available at* http://www.crestonnewsadvertiser.com/2013/05/23/chat-mobility-launches-4g-lte-service/abn7zga/ (last accessed June 12, 2013); "Latest News from Viaero: HLR Upgrade Letter," Viaero Wireless (Mar. 2, 2013), *available at* http://www.viaero.com/press/view/8 (last accessed June 12, 2013).

[33] *See, e.g.*, "More North Carolina Rural Areas Covered by Verizon's 4G LTE Network," Verizon (Apr. 11, 2013), *available at* http://finance.yahoo.com/news/more-north-carolina-rural-areas-151000483.html (last accessed June 12, 2013).

[34] For further discussion of deployment in rural areas, see Section II.C.3.

[35] Daniel Howley, "T-Mobile Announces Nationwide HD Voice, 200M LTE Users by 2013," LapTop (Jan. 8, 2013), *available at* http://blog.laptopmag.com/t-mobile-announces-nationwide-hd-voice-200m-lte-users-by-2013 (last accessed June 12, 2013).

[36] Sarah Reedy, "Sprint Delays HD Voice Launch to Q2," Light Reading (Apr. 24, 2013), *available at* http://www.lightreading.com/sprint/sprint-delays-hd-voice-launch-to-q2/240153470 (last accessed June 12, 2013).

[37] Ina Fried, "HD Voice will Start Coming to AT&T Later This Year," All Things D (Apr. 1, 2013), *available at* http://allthingsd.com/20130401/hd-voice-coming-to-att-later-this-year/ (last accessed June 12, 2013); Phil Goldstein, "HD Voice: AT&T, Sprint Promise It This Year, but Verizon Targets Late 2013, Early 2014," Fierce Wireless (Apr. 2, 2013), *available at* http://www.fiercewireless.com/story/hd-voice-att-sprint-promise-it-year-verizon-targets-late-2013-early-2014/2013-04-02 (last accessed June 12, 2013).

### C. Entry and Expansion of New Service Providers Highlight the Competitive Framework, as Carriers' Business Plans and Operations Evolve in Response to Competitive Conditions and Market Demand.

A variety of service providers, including Mobile Virtual Network Operators ("MVNOs"),[38] Mobile Satellite Service ("MSS") providers,[39] and low-powered carriers, compete vigorously with established facilities-based carriers and with each other. These recent market entrants have sought out unfulfilled demand, serve diverse customer bases and geographic areas, and enhance competition in the wireless marketplace. MVNOs now provide service to 11% of U.S. mobile telephone subscribers.[40]

#### *1. The Evolution of MVNOs Testifies to the Competitive Dynamic of the Wireless Industry.*

The role of MVNOs in the wireless marketplace has evolved over the last ten years. New MVNO business plans allow them to enter the market with low costs and serve a variety of market segments. For example, MVNOs today make up approximately 42 percent of the growing prepaid wireless industry,[41] and they have shown considerable creativity in providing services to consumers looking for budget prices and flexibility. Some MVNOs, including Simple Mobile, Red Pocket, Ting, Ultra Mobile, and Kajeet have adopted a Bring Your Own

[38] MVNOs are wireless providers who purchase wholesale access to facilities-based carriers' spectrum and network infrastructure to provide service to the public instead of obtaining their own spectrum licenses and building their own networks.

[39] MSS providers deliver telecommunication services via satellite to or from mobile users.

[40] The FCC's latest Local Telephone Competition Report reports that, as of June 2012, wireless resellers provided service to 11 percent of mobile telephone subscribers. *See* FCC, Local Telephone Competition: Status as of June 30, 2012 (June 2013), Table 18 "Mobile Telephone Facilities-based Carriers and Mobile Telephony Subscribers," *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0613/DOC-321568A1.pdf (last accessed June 17, 2013).

[41] *See* Philip Cusick, *et al.*, *Prepaid Update: MVNOs Make Up ~42% of the Prepaid Industry*, J.P. Morgan (June 6, 2013); *see also CTIA's 2012 Wireless Indices*.

Device ("BYOD") strategy.[42] Some of these MVNOs allow customers to design their own rate plans, buying as many minutes, messages, and megabytes as needed or paying for actual usage at the end of the month. Other MVNOs (*e.g.*, Solavei) provide incentives for referrals and on-time payments, and still others appeal to travelers by reducing or eliminating international roaming charges.[43]

MVNO differentiation – from each other as well as facilities-based carriers – extends well beyond pricing and rate plans. More and more MVNOs have sensed an opportunity in the marketplace and are building their brand based on ethnicity or other demographic factors, or have established themselves as cause-oriented providers. Late last year, for instance, Mexico's largest mobile provider launched an MVNO in the United States, Telcel América, offering rate plans with unlimited calling to both landline and wireless phones in Mexico,[44] and in May, the American pop-star Jennifer Lopez introduced Viva Movil, an MVNO targeting Latino customers.[45] One new MVNO, GIV Mobile, has adopted a concept already used by some credit card companies and will donate a percentage of customers' bills to selected charities.[46] The MVNO Kajeet identifies itself as a provider dedicated to kids and education, offering network-

[42] *See* Whitey Bluestein, "Watch out, wireless carriers: MVNOs are gaining momentum," GigaOM (Dec. 22, 2012) ("MVNOs are gaining momentum"), *available at* http://gigaom.com/2012/12/22/watch-out-wireless-carriers-the-future-looks-bright-for-mvnos/ (last accessed June 12, 2013).

[43] *See id.*

[44] "Enter Telcel América: A Straight Talk for Mexican nationals," GigaOM (Dec. 11, 2012), *available at* http://gigaom.com/2012/12/11/enter-telcel-america-a-straight-talk-for-mexican-nationals/ (last accessed June 12, 2013).

[45] Simone Weichselbaum, "Jennifer Lopez and Verizon open Viva Movil Boutique Shop near Barclays Center," NY Daily News (June 12, 2013), *available at* http://www.nydailynews.com/new-york/brooklyn/j-lo-open-viva-movil-shop-barclays-center-article-1.1370972 (last accessed June 17, 2013) ("Viva Movil Boutique Shop").

[46] "Carrier GIV Mobile promises 8 percent of revenue to charity," CNET (May 15, 2013), *available at* http://news.cnet.com/8301-1035_3-57584534-94/carrier-giv-mobile-promises-8-percent-of-revenue-to-charity/ (last accessed June 12, 2013).

based parental controls, web filtering, and location services on recycled handsets.[47] Through this market differentiation, MVNOs have found fertile ground for developing their consumer base by identifying and offering services to meet the needs of specific user groups.

MVNOs have typically eschewed brick and mortar retail locations to keep costs down. For the most part, MVNOs rely on websites and social media for marketing and sales purposes. Increasingly, however, MVNOs are combining physical stores with an online presence to reach more consumers.[48] Viva Movil, for example, has announced that in addition to a website and Facebook integration, its stores will feature bilingual staff, hands-on time with devices, and dedicated play areas for children.[49]

In addition to creativity in marketing and sales, MVNOs have also been behind some innovative new hybrid approaches for network deployment. Some MVNOs have chosen to keep costs down by relying on Wi-Fi technologies as much as possible. Republic Wireless customers, for instance, use primarily Wi-Fi at home and work, and mobile wireless traffic rolls onto Sprint's wireless network only when Wi-Fi is unavailable. This allows the provider to offer service to customers that do not need mobility all the time and are seeking lower prices.[50] As the density of their Wi-Fi networks increases, these operators could enter into mobile data offload or MVNO arrangements with wireless service providers, which could give rise to an exciting new

[47] *See* Bluestein, "MVNOs are gaining momentum," GigaOM (Dec. 22, 2012).

[48] As seen at CTIA 2013, TracFone, the largest MVNO, has recently started opening retail stores, which is another indicia of competition in the mobile marketplace. *See* Joseph Palenchar, "MVNO TracFone Building Retail Stores" (May 22, 2013), *available at* http://www.twice.com/articletype/news/mvno-tracfone-building-retail-stores/107116 (last accessed June 17, 2013).

[49] *See* Weichselbaum, "Viva Movil Boutique Shop," NY Daily News (May 22, 2013).

[50] *See* Bluestein, "Watch out, wireless carriers: MVNOs are gaining momentum," GigaOM (Dec. 22, 2012); Republic Wireless, http://www.republicwireless.com/whats-the-catch (last accessed June 12, 2013); "Can Republic Wireless Disrupt the Mobile Market?," Inc.com (April 9, 2013), *available at* http://www.inc.com/magazine/201304/reshma-memon-yaqub/can-republic-wireless-disrupt-the-mobile-market.html (last accessed June 12, 2013).

dynamic in the mobile wireless market once scalability and security problems are resolved, although in today's marketplace Wi-Fi cannot be used as a replacement for licensed wireless spectrum.

Facilities-based mobile providers understand the importance of MVNOs to their own businesses, and in recent years, have been actively courting companies that seek to use their networks to serve more diverse markets.[51] The relationships between MVNOs and underlying carriers can be very close, with the MVNO offering rate plans and devices from exclusively one provider, or the MVNO can be completely separate, with the MVNO merely using the carrier's airwaves to provide its distinct service offerings. In some instances, MVNOs, such as Boost Mobile and Virgin Mobile, have been acquired by the underlying network operator but retained as discretely branded units to serve a targeted consumer base. As the foregoing shows, the role of MVNOs has been changing and growing continuously since they first entered the mobile marketplace as simple resellers, reflecting the enormous transformation of the wireless ecosystem over the past decade.

### 2. *MSS Carriers Have the Potential To Provide Additional Mobile Wireless Competition.*

Although the mobile satellite service market has traditionally involved voice and narrowband data services, a number of MSS operators are now poised to provide terrestrial broadband services. For example, the Commission recently granted DISH Network Corporation ("DISH") a full, co-primary terrestrial wireless broadband license for 40 MHz of spectrum in the 2 GHz band at 2000-2020 MHz and 2180-2200 MHz.[52] The Commission's 2012 Order also

[51] *See* Kevin Fitchard, "Why are MVNOs so hot right now? Thank the carriers," GigaOM (June 25, 2012) *available at* http://gigaom.com/2012/06/25/why-are-mvnos-so-hot-right-now-thank-the-carriers/ (last accessed June 12, 2013).

[52] *See Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands;*

established an ambitious build-out deadline by which DISH must construct its terrestrial network.[53] While certain technical restrictions apply, the AWS-4 spectrum is now a full terrestrial mobile broadband band similar to the cellular, PCS, or AWS bands, introducing the prospect of a fifth nationwide terrestrial mobile broadband network in the United States.

Other MSS operators, including Globalstar, Inc. and LightSquared, have sought or renewed calls to secure authorizations that will allow them to deploy innovative new services of their own. In November 2012, Globalstar, which is licensed to provide mobile satellite service in the Big LEO band, filed a petition for rulemaking with the Commission that seeks greater flexibility to use its MSS spectrum for terrestrial mobile broadband services, including a Wi-Fi-like service that it calls Terrestrial Low Power Service ("TLPS").[54] Ultimately, Globalstar plans to deploy a traditional frequency-division duplex ("FDD") LTE wireless broadband system across 19 megahertz of its licensed MSS spectrum in the Big LEO band. Although Globalstar remains financially challenged today, its ambitious plan has been touted as a possible solution to Wi-Fi congestion in urban areas.[55]

In 2004, the Bureau modified the MSS license now held by LightSquared to allow that licensee to offer MSS and an ATC service in the 1.5 and 1.6 GHz bands, subject to the condition

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*Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz; Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands*, Report and Order and Order of Proposed Modification, 27 FCC Rcd 16102 (2012).

[53] Specifically, DISH must provide terrestrial signal coverage and offer terrestrial service to at least 40 percent of its total terrestrial license areas' population within four years and to at least 70 percent of the population in each of its license areas within seven years. *Id.* at 16111.

[54] *Globalstar, Inc. Petition for Rulemaking to Reform the Commission's Regulatory Framework for Terrestrial Use of the Big LEO MSS Band*, Docket No. PRM12WT, Petition for Rulemaking of Globalstar, Inc. (filed Nov. 13, 2012).

[55] Globalstar's petition remains pending at the FCC, but through its business partner, Jarvinian Wireless, it has sought experimental licenses to test TLPS in various locations, including Sunnyvale, CA, Cupertino, CA, and Cambridge, MA. *See Application of Jarvinian Wireless Innovation Fund*, File No. 0162-EX-PL-2013 (filed Mar. 6, 2013).

that it resolve harmful interference claims made by GPS users.[56] Before LightSquared could begin services, however, serious interference charges were raised by the GPS community. After extensive debate, the Commission concluded, "[I]t is highly unlikely that LightSquared will, in any reasonable period of time, be able to satisfy the requirements of the Conditional Waiver Order" resolving concerns about the effects of its ATC operations on GPS receivers.[57] To address these concerns and satisfy its license conditions, LightSquared recently proposed "permanently relinquishing" its "right to deploy terrestrial downlink operations at 1545-1555 MHz and relocating those terrestrial operations instead to 1670-1680 MHz."[58] If LightSquared's new plan is accepted, its significant spectrum holdings could help it become a major player in the terrestrial wireless industry.

Historically, MSS has served niche markets or remote areas where terrestrial wireless networks did not exist or were unavailable. More recent technological advances in satellite and antenna designs, however, have allowed for less costly, more sophisticated devices and substantially reduced calling plans. Accordingly, MSS operators such as Iridium and Inmarsat are poised to increase competition in the provision of mobile wireless services. Iridium, for example, has expanded into the machine-to-machine ("M2M") business, including a major multi-year contract with Caterpillar, while Inmarsat has reported strong revenue growth in the

[56] *See Mobile Satellite Ventures Subsidiary LLC Application for Minor Modification of Space Station License for AMSC-1*, File Nos. SAT-MOD-20031118-00333, SAT-MOD-20031118-00332, SES-MOD-20031118-01879, *Order and Authorization*, 19 FCC Rcd 22144 (Int'l Bur. 2004).

[57] *International Bureau Invites Comment on NTIA Letter Regarding LightSquared Conditional Waiver*, IB Docket No. 11-109, Public Notice, DA 12-214 (Feb. 15, 2012) at 4.

[58] Modification Application of LightSquared Subsidiary LLC, IBFS File Nos. SAT-MOD-20120928-00160, -00161, SES-MOD-20121001-00872 (filed Sept. 28, 2012 and Oct. 1, 2012 with identical narrative text); *see also Federal Communications Commission Invites Comment on LightSquared Request to Modify Its ATC Authorization*, IB Docket No. 12-340, Public Notice, DA 12-1863 (Nov. 16, 2012).

aviation and naval sectors.[59] As the technology improves and costs come down even more, traditional MSS carriers are prepared to compete in the provision of mobile voice, data, and safety services, especially for large corporate and government customers.

### *3. Additional Rural Providers Are Entering the Market Using New Technologies.*

As discussed below, wireless carriers have made use of new technologies, such as small cells, to fill in coverage gaps and add additional capacity to their networks in urban markets. Small cell technology, however, is increasingly being deployed by entities seeking to offer service to customers in rural corridors. The Vermont Telecommunications Authority ("VTA"), for example, has provided funding for CoverageCo to build nearly 90 miles of wholesale cell service in a number of the state-designated areas where little or no service currently exists, and CoverageCo is currently expanding its coverage areas with the plan of a commercial launch in the summer of 2013.[60] CoverageCo has announced that it intends to invest its own capital in building 125 additional service miles beyond the 90-mile VTA project, extending service into previously underserved or un-served areas.[61]

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[59] *See* Peter de Selding, "Iridium Loses Customer to Inmarsat, Nabs One from Orbcomm," Space News (May 2, 2013), *available at* http://www.spacenews.com/article/financial-report/35150iridium-loses-customer-to-inmarsat-nabs-one-from-orbcomm (last accessed June 12, 2013); "Revenue rises at Inmarsat supported by maritime business growth," Digital Look (Mar. 7, 2013), *available at* http://www.digitallook.com/news/20744306/Revenue_rises_at_Inmarsat_supported_by_maritime_business_growth.html (last accessed June 12, 2013).

[60] *See* CoverageCo, www.coverageco.com/news410.html/ (last accessed June 12, 2013).

[61] *See e.g.*, Traci Gregory, "Thanks to Small Cells, Coverage Coming to Rural Vermont," Above Ground Level Magazine (Jul 7, 2012), *available at* http://agl-mag.com/thanks-to-small-cells-coverage-coming-to-rural-vermont/ (last accessed June 12, 2013); "New Rural Vermont Cell Service Tested in Orange County," BroadbandVT.org (Apr 10, 2013), *available at* http://www.broadbandvt.org/news/Cell/OrangeCountyTest.php (last accessed June 12, 2013).

### D. Competition in the Wireless Ecosystem Fuels the Development of New and Innovative Devices by Numerous Manufacturers.

#### *1. There is robust competition in the wireless device market.*

The U.S. wireless device market offers an amazingly rich, deep environment for consumers. Fierce competition among device manufacturers has led to a staggering array of product options, cutting-edge innovation and device capabilities, and declining prices. The marketplace has also remained fluid, with dramatic swings in market share rewarding the best products.

There are currently at least 32 different device manufacturers offering over 630 different handsets and devices.[62] The original equipment manufacturers ("OEM") with the highest overall mobile device market shares in 2012 are shown below.[63] However, the relative OEM market shares over the last two years show that the current positions are precarious, reflecting widespread competition.[64]

| OEM | U.S. Market Share |
|---|---|
| Samsung | 27.1% |
| Apple | 19.5% |
| LG | 17.3% |
| Motorola | 10.0% |
| HTC | 5.6% |

[62] CTIA – The Wireless Association®, *The U.S. Wireless Industry Overview*, 18 (April 25, 2012) ("*2012 U.S. Wireless Industry Overview*"), *available at* http://files.ctia.org/pdf/042412_-_Wireless_Industry_Overview.pdf.

[63] comScore, *Mobile Future in Focus 2013*, at 21 (Feb. 22, 2013) ("*Mobile Future in Focus 2013*"), *available at* http://www.comscore.com/Insights/Presentations_and_Whitepapers/2013/2013_Mobile_Future_in_Focus (last accessed June 12, 2013).

[64] *Id.*; *see also* comScore, Press Releases, *available at* http://www.comscore.com/Insights/Press_Releases/ (last accessed June 12, 2013), for the following dates: Jan. 3, 2013; Nov. 30, 2012; Nov. 2, 2012; July 2, 2012; June 1, 2012; May 1, 2012; Dec. 29, 2011; Dec. 2, 2011; June 12, 2013; Nov. 4, 2011; July 5, 2011; June 3, 2011; and May 6, 2011.

There are an incredible 319.3 million reported wireless connections in the U.S.[65] Of those, 305.1 million are data-capable handsets (up 3.4 percent from 2011), 271.8 million are SMS-capable devices (up 2.7 percent from 2011), 247.6 million are web-capable devices (up 5.7 percent from 2011).[66] At year-end 2012, there were 152 million smartphones and PDAs (up 36.4 percent from 2011) and 22.3 million CMRS-enabled tablets, laptops, and wireless broadband modems (up 10.2 percent from 2011) active on U.S. mobile networks.[67]

Smartphones now account for more than 60 percent of all phones in the U.S.[68] By mid-2012, 78 percent of all U.S. adults owned a smartphone.[69] By the end of 2012, there were more than 125 million smartphone subscribers, up 29 percent from 2011.[70] In the first quarter of 2013, this number increased to 138.5 million smartphone users, a 7 percent increase in three months.[71] Year-to-year smartphones sales also accelerated, improving by 42 percent from the first quarter of 2012.[72] This predominance of smartphones will likely grow more pronounced, as 72 percent

[65] *CTIA's 2012 Wireless Indices* at 13.

[66] *Id.* at 11.

[67] *Id*.

[68] "Mobile Majority: U.S. Smartphone Ownership Tops 60%," Nielsen (June 6, 2013), *available at* http://www.nielsen.com/us/en/newswire/2013/mobile-majority--u-s--smartphone-ownership-tops-60-.html (last accessed June 12, 2013).

[69] Reply Comments of CTIA – The Wireless Association®, GN Docket No. 12-268, 4 (filed Mar. 12, 2013) ("CTIA March 2013 Reply Comments").

[70] *See* comScore, *Mobile Future in Focus 2013*, at 27.

[71] *See* "comScore Reports April 2013 U.S. Smartphone Subscriber Market Share," comScore (June 4, 2013), *available at* http://www.comscore.com/Insights/Press_Releases/2013/6/comScore_Reports_April_2013_U.S._Smartphone_Subscriber_Market_Share (last accessed June 12, 2013).

[72] *See* "Nearly One-Third of All Smartphones Sold in the U.S. are Pre-Paid," NPD Group (May 15, 2013), *available at* https://www.npd.com/wps/portal/npd/us/news/press-releases/the-npd-group-nearly-one-third-of-all-smartphones-sold-in-the-u-s-are-prepaid/ (last accessed June 12, 2013) ("Nearly One-Third of All Smartphones Sold in the U.S. are Pre-Paid").

of all new purchases are smartphones.[73]

This impressive sales growth was fueled by a host of major new smartphone product launches in the past year. For example, in the fall of 2012 Apple released the iPhone 5, its flagship smartphone, with a new, lighter design and upgraded performance, including support for 4G LTE.[74] Samsung released the Galaxy S3 in 2012 and the Galaxy S4 in 2013, both of which offered powerful processor speeds and, in the case of the S4, include a new feature that tracks the user's eye movements to augment device control.[75] HTC unveiled the Windows Phone 8X as well as HTC One X+ in late 2012,[76] Nokia introduced the Lumia 920 in November 2012,[77] and earlier this year BlackBerry launched the BlackBerry Z10.[78]

[73] comScore, *Mobile Future in Focus 2013*, at 27.

[74] *See* Gareth Beavis, "iPhone 5 review," Tech Radar (Sept. 27, 2012) *available at* http://www.techradar.com/us/reviews/phones/mobile-phones/iphone-5-1096004/review (last accessed June 12, 2013).

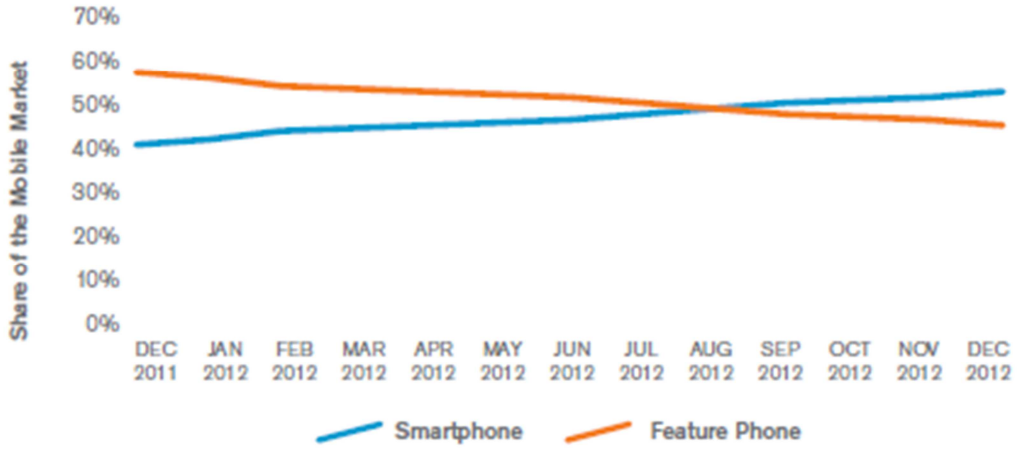
[75] *See* James Trew, "Samsung Galaxy S III is official: 4.8-inch HD Super AMOLED display, quad-core Exynos processor and gesture functions," Engadget (May 3, 2012), *available at* http://www.engadget.com/2012/05/03/samsung-galaxy-s-iii-is-official/ (last accessed June 12, 2013); "Samsung Galaxy S4 review," T3: The Gadget Website (May 24, 2013), *available at* http://www.t3.com/reviews/samsung-galaxy-s4-review/Samsung-Galaxy-S4-Features (last accessed June 12, 2013).

[76] *See* Justin Rubio, "Windows Phone 8 launches in the US with AT&T's HTC Windows Phone 8X, Nokia Lumia 920," The Verge (Nov. 9, 2012), *available at* http://www.theverge.com/2012/11/9/3622422/att-nokia-lumia-920-820-htc-windows-phone-8x-launch (last accessed June 12, 2013).

[77] *See* Matt Brian, "The 6 Best Smartphones Of 2012," TNW: The Next Web (Dec. 23, 2012), *available at* http://thenextweb.com/mobile/2012/12/23/the-6-best-smartphones-of-2012/ (last accessed June 12, 2013).

[78] *See* Matthew Miller, "BlackBerry Z10 US release week: Is there enough in BB10 to attract new buyers?," ZDNet (Mar. 26, 2013), *available at* http://www.zdnet.com/blackberry-z10-us-release-week-is-there-enough-in-bb10-to-attract-new-buyers-7000013123/ (last accessed June 12, 2013).

The following chart illustrates the changing relationship between feature phones and smartphones in the marketplace:




Source: comScore, *U.S. Digital Future in Focus 2013*, at 33 (2013), *available at* http://www.comscore.com/Insights/Presentations_and_Whitepapers/2013/2013_US_Digital_Future_in_Focus.

At present, Apple is the smartphone market leader, followed by Samsung. The top smartphone OEMs at the end of the first quarter of 2013 were:[79]

| OEM | U.S. Market Share |
|---|---|
| Apple | 39.2% |
| Samsung | 22.0% |
| HTC | 8.9% |
| Motorola | 8.3% |
| LG | 6.7% |

There are different approaches to the smartphone market, from the vertically integrated approach of Apple, to the more open approach pursued in connection with the Android operating system. Though Samsung commands the largest share of Android users, there are many OEMs competing vigorously in the space.

[79] "comScore Reports April 2013 U.S. Smartphone Subscriber Market Share," comScore (June 4, 2013), *available at* http://www.comscore.com/Insights/Press_Releases/2013/6/comScore_Reports_April_2013_U.S._Smartphone_Subscriber_Market_Share (last accessed June 12, 2013).

Prepaid smartphones are also emerging as an important segment of the smartphone market. Year-over-year prepaid smartphone sales doubled in the first quarter of 2013, continuing a string of twelve quarters of triple digit growth.[80] Prepaid smartphones now account for nearly one-third of all smartphone sales, an eleven percent increase in market share from the previous record high 22 percent of smartphone sales reached in the fourth quarter of 2012.[81] The top OEMs for this burgeoning prepaid smartphone market are:

| OEM | U.S. Market Share |
|---|---|
| Samsung | 32% |
| LG | 22% |
| Huawei | 11% |
| HTC | 8% |
| Apple | 8% |

These positions, though, are highly unstable. Apple's market share increased four-fold since the first quarter of 2012 while LG's market share doubled in that time.[82]

This instability in the device market is also evident in the retail channels used by customers to purchase prepaid smartphones. The dominant channel, national retailers, saw their sales volume share increase dramatically in the past year:[83]

| OEM | Q1 2012 | Q4 2012 | Q1 2013 |
|---|---|---|---|
| National retailers | 34% | 44% | 47% |
| Wireless carriers | 51% | 41% | 37% |
| All others | 11% | 13% | 14% |
| Wireless specialty | 4% | 2% | 3% |

[80] *See* "Nearly One-Third of All Smartphones Sold in the U.S. are Pre-Paid," NPD Group (May 15, 2013).

[81] *See id.*

[82] *See id.*

[83] *See id.*

Aware of this changing landscape, carriers are increasing their focus on prepaid phones and moving to compete more vigorously in the space. For example, AT&T recently announced a new "Aio" product branding initiative for prepaid phones.[84]

### *2. Wireless device quality is improving rapidly while prices drop.*

Fierce competition among device manufacturers is driving incredible advances in device quality at the same time prices have generally fallen. On a purely technical basis, wireless device performance has continued to improve dramatically. For example, a comparison of the LG Esteem, a smartphone released in 2011 and the Samsung Galaxy S4, released in 2013, reveals advancing product capabilities along every metric, including display resolution, battery life, processor capabilities, system memory, hard drive size, and camera quality, among others.[85]

Device manufacturers have also continued their shift to 4G-capable phones, which can realize dramatically increased broadband speeds. Indeed, the number of 4G-connected phones increased a staggering 273 percent in 2012, to 33.1 million devices or more than 10 percent of all devices.[86] This number is expected to grow substantially, with analysts predicting between approximately 60 million and 135 million 4G connections by the end of 2013.[87]

In response to these continuing improvements in device capability, consumer satisfaction with smartphones has increased 2.2 percent in 2012 and early 2013. The most important factors

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[84] "Aio Wireless™ Announces New Nationwide Voice and Data Service," AT&T (May 9, 2013), *available at* http://www.att.com/gen/press-room?pid=24185&cdvn=news&newsarticleid=36421 (last accessed June 12, 2013).

[85] *See* "LG Esteem vs Samsung Galaxy S4," Phone Arena, *available at* http://www.phonearena.com/phones/compare/LG-Esteem,Samsung-Galaxy-S4/phones/5702,7597 (last accessed June 12, 2013).

[86] comScore, *Mobile Future in Focus 2013*, at 17.

[87] *See* "Mobile Connected Devices To Exceed World's Population This Year," Mobile Future (last accessed June 17, 2013), *available at* http://mobilefuture.org/more_mobile_connected_devices_than_worlds_population_this_year/ (last accessed June 12, 2013); *see also 2013 GSMA Report* at 21.

determining satisfaction were performance (33 percent), physical design (23 percent), features (22 percent), and ease of operation (22 percent). Notable gains in satisfaction were observed in operating system reliability, processing speed, and video/camera picture quality.[88]

While these advances in both device quality and consumer satisfaction have occurred, prices for mobile devices have actually declined. The average smartphone now costs consumers $372, down from $407 in 2012 and $443 in 2011.[89] Indeed, prices have been decreasing across the board, with each major platform seeing various levels of decline.[90]

### *3. Customer selection of wireless devices is driven by a wide variety of factors.*

Confronted with the remarkable array of highly capable devices available on the market from mobile wireless device manufacturers, customers evaluate a number of factors in making their purchase decision, such as cost, operating system and application selection, brand name, and other factors.[91] The factors and the importance of any one factor also continue to evolve over time.[92]

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[88] *See* "2013 U.S. Wireless Smartphone and Traditional Mobile Phone Satisfaction Studies--Volume 1 Results," J.D. Power & Associates (Mar. 21, 2013), *available at* http://www.jdpower.com/content/press-release/5TAb5Uk/2013-u-s-wireless-smartphone-satisfaction-study-volume-1-and-2013-u-s-wireless-traditional-mobile-phone-satisfaction-study-volume-1.htm (last accessed June 12, 2013).

[89] *See* "Smartphones Expected to Grow 32.7% in 2013 Fueled By Declining Prices and Strong Emerging Market Demand, According to IDC," IDC (June 4, 2013), *available at* http://www.idc.com/getdoc.jsp?containerId=prUS24143513 (last accessed June 11, 2013).

[90] *See* Jonathan Casteleyn, "Average selling prices for mobile driven by new technology," Market Realist (Jan. 23, 2013), *available at* http://marketrealist.com/2013/01/average-selling-prices-driven-by-technological-capability/ (last accessed June 12, 2013).

[91] comScore, *Mobile Future in Focus 2013*, at 19.

[92] *See id.*

### *4. The rapidly growing tablet market is helping to drive a multi-platform experience.*

Increasingly, Americans own not just smartphones, but other mobile devices such as tablets and e-readers. By the end of 2012, nearly 40 percent of smartphone users also owned such a secondary mobile device,[93] and one in four Americans adults owned a tablet in August 2012, up from just 4 percent in 2010.[94] In total, 52.4 million Americans owned tablets in the United States by December 2012, although not all of these tablets were CMRS-enabled.[95]

By 2016, some analysts predict that more than 40 million tablets will be sold annually in the U.S.[96] Market share among tablet OEMs is divided between a number of different manufacturers, with Apple remaining the market leader.[97]

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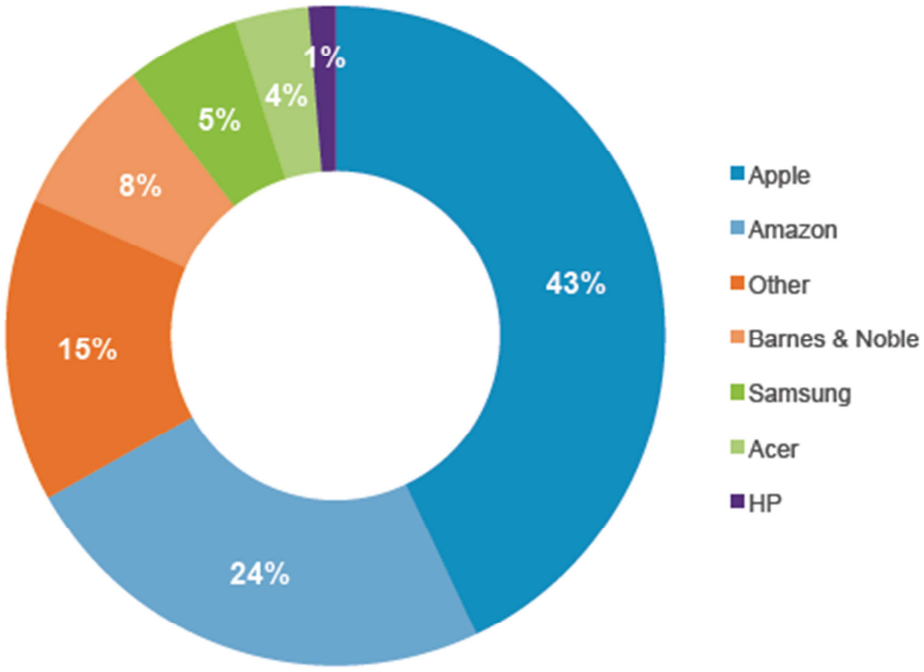
[93] *See* comScore, *U.S. Digital Future in Focus 2013*, 35 (2013) ("*U.S. Digital Future in Focus 2013*"), *available at* http://www.comscore.com/Insights/Presentations_and_Whitepapers/2013/2013_US_Digital_Future_in_Focus.

[94] "25% of American Adults Own Tablet Computers," Pew Internet & American Life Project (Oct. 4, 2012) ("*2012 Pew Tablet Study*"), *available at* http://www.pewinternet.org/~/media//Files/Reports/2012/PIP_TabletOwnership_August2012.pdf (last accessed June 12, 2013).

[95] *See* comScore, *U.S. Digital Future in Focus 2013*, at 35; *see also* Chetan Sharma, "US Wireless Market Update, Q3 2012," chetansharma.com (Nov. 12, 2012), *available at* http://www.chetansharma.com/blog/2012/11/12/us-mobile-data-market-update-q3-2012/ (last accessed June 12, 2013) ("Chetan Sharma Q3 2012 Update").

[96] *See* "Wireless & Mobile Landscape: U.S. Tablet Forecast 2011-2016," iGR, *available at* https://igr-inc.com/Advisory_And_Subscription_Services/Wireless_And_Mobile_Landscape/us_tablet_forecast_2016.asp (last accessed June 12, 2013).

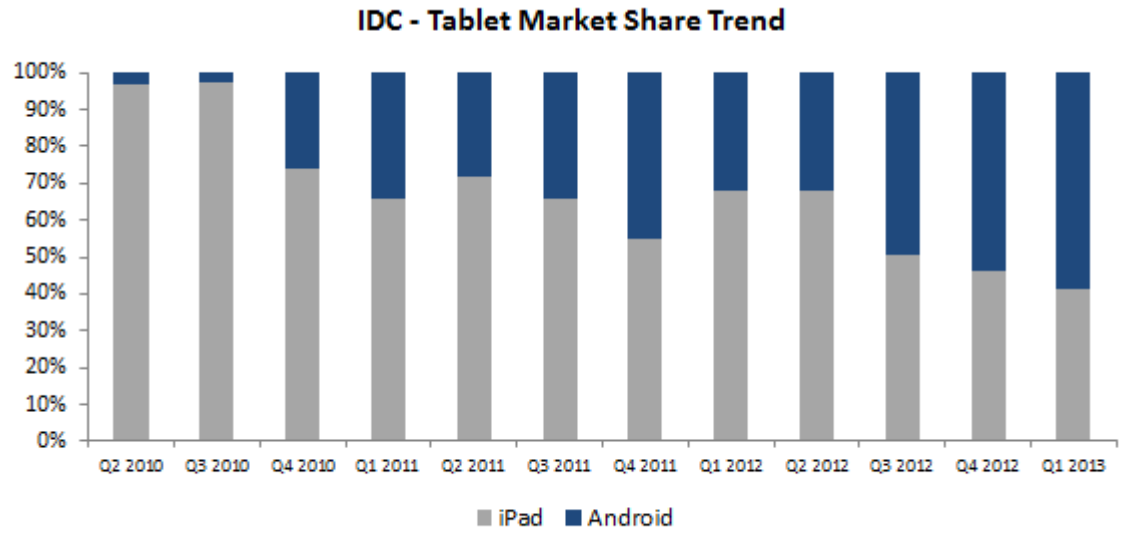
[97] *See* comScore, *Mobile Future in Focus 2013*, at 25.



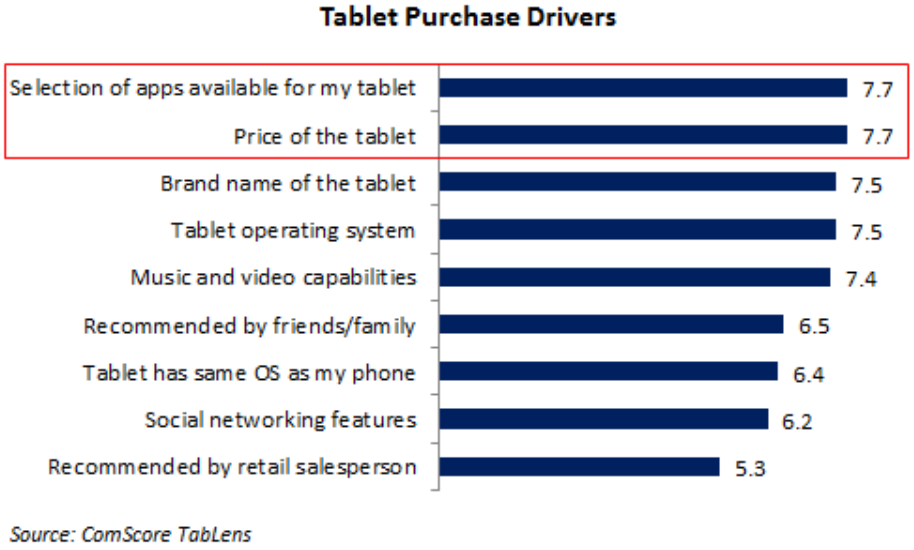

Similar to smartphones, the tablet market is also divided by operating systems, with Android, Apple, Microsoft and others competing vigorously for market share. Though Apple essentially created the market three years ago, Android has quickly gained global market share and is now the operating systems market leader.[98] Microsoft has the third largest market share with 3.3 percent.[99]

[98] Sameer Singh, "Tablet Market Share Trends: Android Leads, iPad Loses Ground, Windows Struggles," Tech-Thoughts (May 3, 2013), *available at* http://www.tech-thoughts.net/2013/05/tablet-market-share-trends-android-ipad-windows.html#.UbgnwPnBOSo (last accessed June 12, 2013).

[99] *See* "Worldwide Tablet Market Surges Ahead on Strong First Quarter Sales, Says IDC," IDC (May 1, 2013), *available at* http://www.idc.com/getdoc.jsp?containerId=prUS24093213 (last accessed June 12, 2013).




Tech-Thoughts ©




*Source: ComScore TabLens*

Tablets come in Wi-Fi-only, CMRS-only, and Wi-Fi / CMRS-capable varieties. Although the majority of tablets are designed exclusively for Wi-Fi connectivity, now that carriers have deployed higher-speed networks, a growing number of tablets are equipped with a CMRS connection as well.[100] Considerations in the purchase of tablets include a variety of factors, including operating system, application selection and price, and a number of other features.[101]

Tablet purchasers also have distinct demographic characteristics. Though broadly resembling smartphone consumers, tablet owners are older on average; 14 percent of tablet users are over the age of 65, while the same is true of only 8 percent of smartphone users.[102]

### E. Competition Among Operating System Providers Continues to Increase.

The market for mobile operating systems remains extremely competitive. There are currently more than a dozen different operating systems in the marketplace, as shown in the table on the next page.

[100] *See* Chetan Sharma Q3 2012 Update.

[101] *See* Sameer Singh, "ComScore Tablet Survey: Purchase Drivers & Income Demographics," Tech-Thoughts (Aug. 11, 2012), *available at* http://www.tech-thoughts.net/2012/08/comscore-tablet-survey-purchase-drivers.html#.Ua46CtLql8E (last accessed June 12, 2013).

[102] *See* comScore, *Mobile Future in Focus 2013*, at 25.

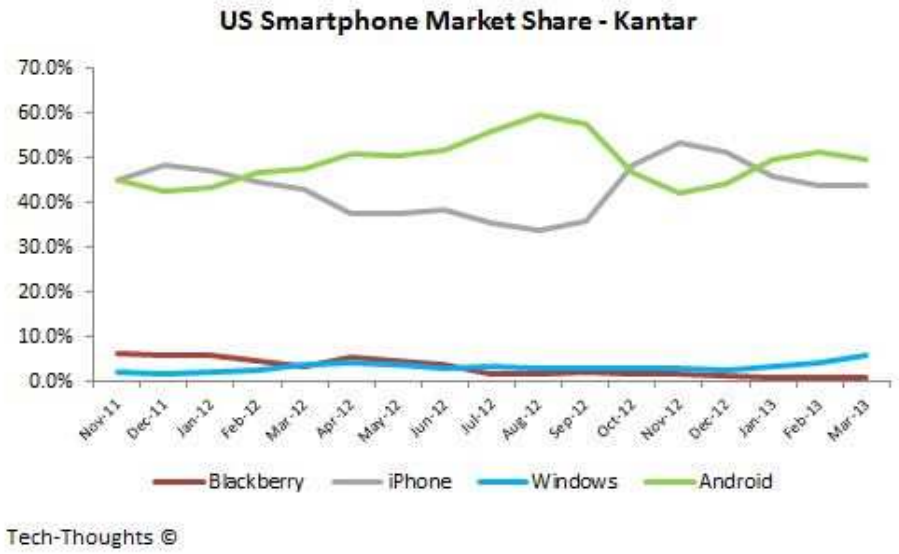
| Wireless Operating Systems[103] | |
|---|---|
| Android (Open Handset Alliance & Google) | iOS (Apple) |
| Asha OS (Nokia) | Sailfish OS (Jolla) |
| bada (Samsung) | S40 (Nokia) |
| BlackBerry OS (BlackBerry) | Symbian (Nokia) |
| BlackBerry 10 (BlackBerry) | Tizen [fka LiMo] |
| Brew (QUALCOMM) | Ubuntu for Mobile |
| Firefox OS (Mozilla) | Windows Phone (Microsoft) |

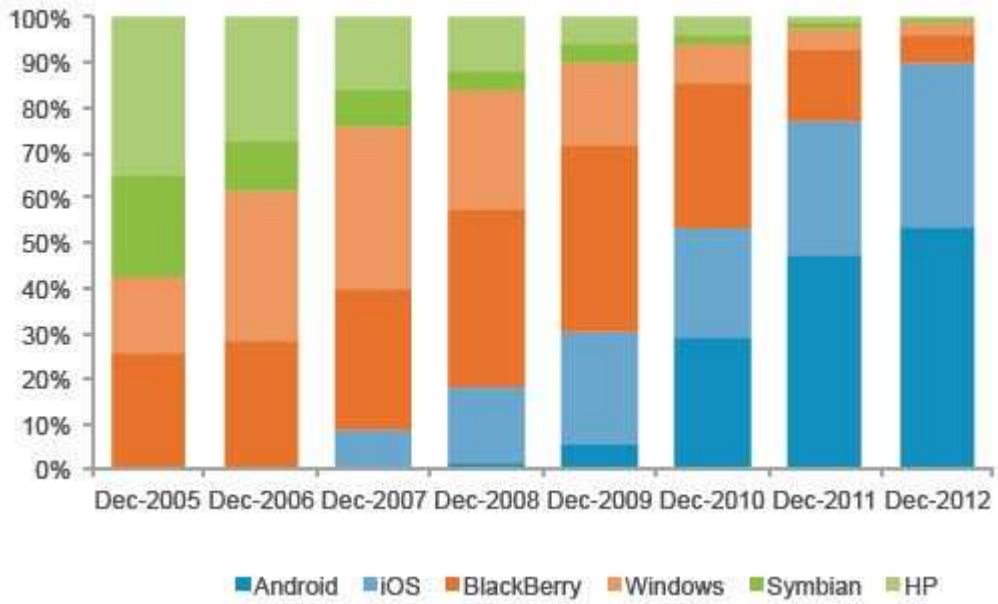
Apple's iOS and Google's Android systems compete fiercely for the largest share of the U.S. market and have traded the leading position several times since the beginning of 2012.[104]

[103] *See* CTIA, *2012 U.S. Wireless Industry Overview* at 18; Andy Boxall, "Samsung executive says world's first Tizen phone to be revealed very soon," Digital Trends (May 24, 2013), *available at* http://www.digitaltrends.com/mobile/worlds-first-tizen-phone-to-be-released-in-q3-2013 (last accessed June 12, 2013); Prashant Chaudhary, "Top Mobile Phone Operating Systems," EarthAndroid.com (Aug. 27, 2012), *available at* http://www.earthandroid.com/top-mobile-phones-operating-systems/ (last accessed June 12, 2013); Boc Ly, "Nokia Asha Platform: evolution of an operating system," Nokia (May 10, 2013), *available at* http://conversations.nokia.com/2013/05/10/nokia-asha-platform-evolution-of-an-operating-system/ (last accessed June 12, 2013); Andy Boxall, "War for your pocket: These 5 new operating systems plan to battle Android and iOS in 2013," Digital Trends (Jan. 6, 2013), *available at* http://www.digitaltrends.com/mobile/five-new-mobile-operating-systems-ready-for-launch-in-2013/#ixzz2WWUHbE9L (last accessed June 17, 2013) (listing Blackberry 10, Firefox OS, Jolla, Ubuntu for Mobile, and Tizen); IDC Press Release: "Android and iOS Combine for 92.3% of All Smartphone Operating System Shipments in the First Quarter While Windows Phone Leapfrogs BlackBerry, According to IDC," IDC (May 16, 2013), *available at* http://www.idc.com/getdoc.jsp?containerId=prUS24108913 (last accessed June 17, 2013) (listing Android, iOS, Windows Phone, BlackBerry OS, and Symbian).

[104] *See* Sameer Singh, "Global Smartphone Market Share Trends - Q1 2013: Android Extends Lead Over iPhone, Windows Phone Performance Mixed," Tech-Thoughts (May 17, 2013), *available at* http://www.tech-thoughts.net/2013/05/global-smartphone-market-share-trends-android-iphone-windows-phone.html#.Ubetn-fql8F (last accessed June 12, 2013).

In addition to the fluctuations between iOS and Android in the past year, a slightly longer historical view demonstrates how dramatically market share can shift in response to highly competitive offerings.




Source: comScore, *Mobile Future in Focus 2013*, 21 (2013), *available at* http://www.comscore.com/Insights/Presentations_and_Whitepapers/2013/2013_Mobile_Future_in_Focus.

As recently as December 2010, BlackBerry had the largest share of the operating systems market.[105] Before BlackBerry, Microsoft was the largest provider of operating systems in 2006, having gained that position from Palm one year earlier.[106] Indeed, the smartphone market has been one of near continual disruption, with compelling new products rapidly gaining market share and forcing other providers to adapt and innovate.

New operating systems again threaten to disrupt the operating system market. The Windows Phone operating system was launched in October 2012 and was immediately available on devices made by Nokia, HTC, Samsung, and Huawei.[107] The new operating system was released with a global marketing push across more than 180 countries and in 50 languages.[108] BlackBerry also introduced its completely re-built BlackBerry OS in early 2013, featuring an entirely new user interface.[109] Debuting on the BlackBerry Z10 device and the Q10 shortly thereafter, BlackBerry plans to include the new operating system in six devices by the end of 2013 and is increasing its marketing budget substantially.[110] Moreover, several potentially

[105] *See* comScore, *Mobile Future in Focus 2013*, at 21.

[106] *See id. See also* "Smartphone Platform Wars Intensify as Android and Apple Take the Lead in Most Markets," comScore (Feb. 27, 2012), *available at* http://www.comscoredatamine.com/2012/02/smartphone-platform-wars-intensify-as-android-and-apple-take-the-lead-in-most-markets/ (last accessed June 12, 2013).

[107] Nathan Ingraham, "Nokia, Samsung, HTC, and Huawei will have first Windows Phone 8 devices," The Verge (June 20, 2012), *available at* http://www.theverge.com/2012/6/20/3101742/nokia-samsung-htc-and-huawei-will-have-first-windows-phone-8-devices (last accessed June 12, 2013).

[108] *See id.*

[109] *See* John McCann, "BlackBerry 10 review," Techradar.com (May 16, 2013), *available at* http://www.techradar.com/us/reviews/pc-mac/software/operating-systems/blackberry-10-1090522/review/1#articleContent (last accessed June 12, 2013).

[110] *See* Juro Osawa, "Q&A: BlackBerry Seeks Momentum," Wall Street Journal (Apr. 12, 2013), *available at* http://blogs.wsj.com/digits/2013/04/12/qa-blackberry-seeks-to-regain-momentum/ (last accessed June 12, 2013).

powerful new competing operating systems are expected in 2013, including Sailfish OS from Jolla, Ubuntu for Mobile, and Tizen from Samsung.[111]

Increasingly, mobile operating systems must compete beyond just the smartphone market and instead unify multiple platforms. For example, Apple iOS is designed to work with both the iPad and the iPhone, providing users with a single, seamless experience across multiple devices. Similarly, the Windows Phone 8 operating system shares many components with the Windows 8 operating system, allowing developers to easily port applications between the different platforms.

### F. Competition in the Wireless Marketplace Fuels the Development of Applications, and Application Stores.

The market for wireless applications continues to outperform expectations. Today, there are more than 2 million mobile applications available to consumers,[112] compared with 240,000 applications just three years ago.[113] Apple's application store alone hosts more than 900,000 applications, while Android's application store holds at least another 800,000 applications and is expected to reach 1 million applications by June 2013.[114] Newly launched application stores such as those for the Windows Phone (more than 145,000 applications)[115] and BlackBerry (more

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[111] *See* Andy Boxall, "War for your pocket: These 5 new operating systems plan to battle Android and iOS in 2013," Digital Trends (Jan. 6, 2013), *available at* http://www.digitaltrends.com/mobile/five-new-mobile-operating-systems-ready-for-launch-in-2013/ (last accessed June 12, 2013).

[112] *See* "Top iOS and Android apps largely absent on Windows Phone and BlackBerry 10," Canalys (May 23, 2013), *available at* http://www.canalys.com/newsroom/top-ios-and-android-apps-largely-absent-windows-phone-and-blackberry-10 (last accessed June12, 2013).

[113] *See* CTIA, *2012 U.S. Wireless Industry Overview*, at 14.

[114] Lance Whitney, "Apple now hosts 900,000 apps in App Store," CNet (June 10, 2013), *available at* http://news.cnet.com/8301-13579_3-57588534-37/apple-now-hosts-900000-apps-in-app-store/ (last accessed June 12, 2013); Darren McCarra, "Google Play will hit one million apps this June," The Sociable (Jan. 4, 2013), *available at* http://sociable.co/mobile/google-play-will-hit-one-billion-apps-this-june/ (last accessed June 12, 2013).

[115] Zack Whittaker, "Windows Phone hits 145,000 apps: All eyes on the ecosystem," ZDNet (May 13, 2013), *available at* http://www.zdnet.com/windows-phone-hits-145000-apps-all-eyes-on-the-ecosystem-

than 120,000 applications)[116] are aggressively expanding to challenge the Android and Apple application stores. In addition to these supplier-identified application stores, consumers can download applications from dozens of other non-operator application stores.[117]

On average, each smartphone has 41 applications installed, up from 32 applications from a year earlier.[118] Analysts estimate users around the world will download up to 82 billion applications in 2013.[119] That figure could rise to more than 200 billion worldwide in 2017.[120] Smartphone users have also increased the amount of time they spend on applications to 39 minutes per day, up from 37 in 2011.[121]

Applications stores are expected to generate $20-25 billion in revenues worldwide this year, even though "paid-for" application revenue will be decreasing, while the money made from "in-app" purchases increases.[122] Both carrier and non-carrier application stores have begun to

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7000015155/ (last accessed June 12, 2013).

[116] Roger Cheng, "BlackBerry Live by the numbers: 120,000 apps available," CNet (May 14, 2013), *available at* http://news.cnet.com/8301-1035_3-57584346-94/blackberry-live-by-the-numbers-120000-apps-available/ (last accessed June 12, 2013).

[117] *See* "A List of Mobile Appstores," MobyAffiliates, *available at* http://www.mobyaffiliates.com/blog/mobile-app-stores-list/ (last accessed June 12, 2013).

[118] *See* Ingrid Lunden, "Nielsen: U.S. Consumers Avg App Downloads Up 28% To 41; 4 Of 5 Most Popular Belong To Google" ("U.S. Consumers Avg App Downloads"), TechCrunch (May 16, 2012), *available at* http://techcrunch.com/2012/05/16/nielsen-u-s-consumers-app-downloads-up-28-to-41-4-of-the-5-most-popular-still-belong-to-google/ (last accessed June 12, 2013).

[119] *See* "Mobile Applications Futures 2013-2017," Portio Research, *available at* http://www.portioresearch.com/en/major-reports/current-portfolio/mobile-applications-futures-2013-2017.aspx (last accessed June 12, 2013).

[120] *See id.*

[121] *See* Lunden, "U.S. Consumers Avg App Downloads," TechCrunch (May 16, 2012).

[122] *See* "Tablets Will Generate 35% of This Year's $25 Billion App Revenue; Expected to Surpass Smartphones by 2018," ABI Research (Mar. 12, 2013), *available at* http://www.abiresearch.com/press/tablets-will-generate-35-of-this-years-25-billion- (last accessed June 12, 2013); Karl Whitfield, "Revenue growth in the apps market. Where is the money coming from over the next 5 years?," Portio Research (Mar. 26, 2013), *available at* http://www.portioresearch.com/en/blog/revenue-growth-in-the-apps-market-where-is-the-money-coming-from-over-the-next-5-years.aspx (last accessed June 12, 2013).

compete on new fronts to gain customers and maintain loyalty. For example, rather than relying solely on large inventories or exclusivity, some application stores are using customer-friendly ways to present applications to the public, such as ranking them based on customer satisfaction, the number of active users, and other factors. Similarly, stores are competing to offer "cross-platform" applications, which can be installed and synched across smartphones, tablets, and other devices.[123] A variety of new enterprise application stores have been launched in response to business concerns about IT security, software expenditures, employee flexibility, and customer engagement.[124]

Spurred by competition, many wireless carriers and equipment manufacturers have embraced "developer communities." Indeed, rather than expect developers to create in a vacuum, carriers are providing exclusive websites with APIs, software kits, and other tools needed by developers to understand in advance what their customers are seeking.[125] Numerous web forums, conferences, workshops, and "labs" also present opportunities for mobile application developers and service providers to work cooperatively. Some carriers even sponsor

[123] *See* Jason Ankeny, "Verizon challenges OTT rivals with cross-platform messaging," FierceMobile Content (Mar. 22, 2013), *available at* http://www.fiercemobilecontent.com/story/verizon-challenges-ott-rivals-cross-platform-messaging/2013-03-22 (last accessed June 12, 2013); Victoria Ivey, "10 stars of 'cross-platformity,'" Computerworld (June 11, 2013), *available at* http://www.computerworld.com/s/article/9239961/10_stars_of_cross_platformity_?taxonomyId=86 (last accessed June 12, 2013).

[124] *See* Joe McKendrick, "More enterprise app stores on the horizon: Garner," ZDNet (Feb. 28, 2013), *available at* http://www.zdnet.com/more-enterprise-app-stores-on-the-horizon-gartner-says-7000011978/ (last accessed June 12, 2013).

[125] *See, e.g.*, "AT&T Developer Program," AT&T, *available at* http://developer.att.com/developer/forward.jsp?passedItemId=100006 (last accessed June 12, 2013); "Verizon Developer Community," Verizon Wireless, *available at* http://developer.verizon.com/ (last accessed June 12, 2013); "T-Mobile Partner Network," T-Mobile, *available at* http://developer.t-mobile.com/site/global/home/p_home.jsp (last accessed June 12, 2013).

contests; Sprint and AT&T both sponsor application developer "Hackathons," while AT&T is currently sponsoring a "Level Up Your App" contest.[126]

### G. Advertising Trends Show that Wireless Providers Continue to Compete Vigorously for Consumers.

Wireless companies and mobile device manufacturers compete vigorously for consumers through advertising, and are among the largest spending firms on U.S. advertising. According to Advertising Age, wireless service providers Verizon, AT&T, and Sprint were three of only thirty-six firms to spend over $1 billion in advertising in 2011, spending $2.52 billion, $2.36 billion, and $1.4 billion, respectively.[127] Kantar Media reports that in 2012 AT&T and Verizon were both among the top ten spenders of all U.S. companies on advertising.[128] Wireless companies continue to be some of the most aggressive U.S. firms in competing for consumers through advertising, even as some companies have shifted to new forms of outreach and more targeted online and direct marketing channels that do not show up as traditional media spending.

At the same time, device manufacturers are ramping up their overall advertising spending. Companies such as Apple and Samsung have aggressively stepped up their spending on advertising for their mobile devices. From 2011 to 2012 Samsung increased advertising for

[126] "Sprint Hackathon," Sprint, *available at* http://developer.sprint.com/dynamicContent/devcon2012/overview/4 (last accessed June 12, 2013); "AT&T Mobile App Hackathon," AT&T, *available at* http://developer.att.com/developer/basicTemplate.jsp?passedItemId=13400788 (last accessed June 12, 2013); "AT&T's Level Up Your App Contest," AT&T, *available at* http://levelupyourapp.com/ (last accessed June 12, 2013).

[127] *See* Christina Austin, "The Billionaires' Club: Only 36 Companies Have $1,000 Million-Plus Ad Budgets," Business Insider (Nov. 11, 2012), *available at* http://www.businessinsider.com/the-35-companies-that-spent-1-billion-on-ads-in-2011-2012-11?op=1 (last accessed June 12, 2013).

[128] *See* "Kantar Media Reports U.S. Advertising Expenditures Increased 3 Percent in 2012," Kantar Media (Mar. 11, 2013) ("Kantar 2012 Media Report"), *available at* http://kantarmediana.com/intelligence/press/us-advertising-expenditures-increased-3-percent-2012 (last accessed June 12, 2013).

its mobile devices from $78 million to over $400 million, while Apple increased advertising for its iPhone from $253 million to $333 million.[129]

Finally, the data show that advertising spending in the telecommunications sector continues to rise. According to Kantar Media, the telecommunications sector ranked as the fourth largest category for advertising spending in 2012, rising 4 percent from 2011 spending levels.[130]

## III. WIRELESS COMPETITION HAS GENERATED TREMENDOUS BENEFITS FOR CONSUMERS

### A. Wireless Providers Have Developed Innovative Calling Plans to Meet Consumer Demands.

#### *1. Competition has driven carriers to develop a variety of voice and data plans to satisfy diverse consumer needs.*

To satisfy consumer needs, wireless carriers have developed a variety of voice and data plans. Voice plans offered by wireless carriers include: contract and no-contract plans; unlimited minute, anytime minute, night and weekend minute, rollover minute, and mobile-to-mobile minute plans; free long distance plans; national calling and local calling plans; and international plans. The array of data plan offerings is similarly vast, and includes: text messaging, limited and unlimited data plans (*e.g.*, Sprint's Simply Everything® plans),[131] individual and shared data plans, rollover data plans, and international data and messaging plans.

Wireless carriers are actively competing on voice and data plan pricing, as well as other plan features, such as allowing consumers to bring their own devices, rollover unused voice

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[129] *See* Spencer Ante & Will Connors, "In the Smartphone Race, Money Talks for Samsung," The Wall Street Journal (Mar. 12, 2013), *available at* http://online.wsj.com/article/SB10001424127887324096404578356651577771618.html.

[130] *See* Kantar 2012 Media Report.

[131] *See, e.g.*, Sprint's Simply Everything® plans. Sprint, http://shop.sprint.com/mysprint/shop/plan/plan_wall.jsp?audience=INDIVIDUAL (last accessed June 17, 2013).

minutes, and share data across devices and users. This is illustrated by the wide variety of options available to consumers. For instance, TracFone offers consumers individual voice plans starting at $9.99 per month for 50 minutes of airtime with no contract.[132] Sprint's Boost Mobile operation offers consumers "Pay As You Go" plans that allow consumers to pay for precisely the services they use, with voice and messaging services starting at $0.20 per minute and per text.[133] AT&T offers consumers the option of rollover minutes on some limited minute voice plans, allowing unused minutes to rollover to the next month.[134]

### *2. Voice Plan Innovations*

The latest voice plan trend is for carriers to provide unlimited minutes to consumers that also purchase data service. Examples of this trend include Verizon Wireless's "Share Everything" plan and AT&T's "Mobile Share" plan, in which unlimited voice service is included with the purchase of a data plan,[135] and T-Mobile's "Simple Choice" plan, which includes unlimited voice service and texting and up to 500 MB of data service for $50 per month.[136]

Earlier this year, T-Mobile became the first of the four nationwide carriers to move to an exclusively no-contract service model for both its voice and data plans, allowing customers to

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[132] TracFone, Value Plans, https://www.tracfone.com/direct/ValuePlans (last accessed June 12, 2013).

[133] Boost Mobile, Pay As You Go, http://www.boostmobile.com/shop/plans/pay-as-you-go/ (last accessed June 12, 2013).

[134] AT&T, Nation 450 w/Rollover Minutes, http://www.att.com/shop/wireless/plans/voice/sku3830290.html#fbid=KGhzwpWk54h (last accessed June 12, 2013).

[135] *See* Press Release, Verizon Wireless, "Verizon Wireless Unveils New Share Everything Plans For Basic Phones, Smartphones, Tablets And More" (June 12, 2012), *available at* http://news.verizonwireless.com/news/2012/06/pr2012-06-11e.html (last accessed June 12, 2013); Press Release, "AT&T Gives Customers More Choice With New Shared Wireless Data Plans" (July 18, 2012), *available at* http://www.att.com/gen/press-room?pid=23084&cdvn=news&newsarticleid=34855 (last accessed June 12, 2013).

[136] *See* Press Release, "T-Mobile USA, T-Mobile Makes Bold 'Un-Carrier' Moves" (Mar. 26, 2013), *available at http://newsroom.t-mobile.com/phoenix.zhtml?c=251624&p=irol-newsArticle&ID=1802239&highlight=* (last accessed June 12, 2013).

purchase unsubsidized devices either outright or with monthly payments and upgrade at any time, without the commitment of a two year contract.[137]

### *3. Data Plan Innovations*

In the last year wireless carriers have begun offering shared data plans that allow consumers to share a single data plan across multiple users and devices. Carriers that have begun offering such plans include the four nationwide carriers, as well Bluegrass Cellular, CellCom, and others.[138] As previously noted, in 2013 T-Mobile became the first of the nation's four largest carriers to move to a "no contract" data service plan model. At the lower-priced segment of the wireless market, Virgin Mobile offers plans that allow consumers to pay for data service at the granular level of $1.50 per MB.[139]

This proliferation of voice and data plans that offer a variety of services at a vast range of price points greatly benefits U.S. consumers. Further, these offerings show that there is significant competition among carriers for all types of consumers, leading to innovative carrier service offerings across the wireless marketplace for voice and data services.

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[137] *See id.*

[138] *See* Press Release, Bluegrass Cellular, "Bluegrass Cellular Announces New 'Share and Save' Data Plans," *available at* https://bluegrasscellular.com/about/news/bluegrass_cellular_announces_new_share_and_save_data_plans (last accessed June 12, 2013); *see also* Dan Meyer, "Cellcom, Bluegrass get in on shared data," RCR Wireless (Feb. 1, 2013), *available at* http://www.rcrwireless.com/article/20130201/carriers/cellcom-bluegrass-get-shared-data/.

[139] *See* Virgin Mobile, PayLo, http://www.virginmobileusa.com/cell-phone-plans/paylo-plans/overview/ (last accessed June 12, 2013).

### B. Wireless Providers and Other Members of the Wireless Ecosystem Provide Consumers with Detailed Information Regarding Network Coverage, Service Plans, and Devices.

#### *1. There are a multitude of resources available to help consumers understand their wireless options.*

There are numerous resources that provide consumers with information about the wireless options available to them in the mobile wireless marketplace. Sources of information for consumers include the wireless carriers and device manufacturers themselves, through their websites and, increasingly, through social networking websites, as well as a host of third-party resources. These information sources provide consumers with valuable resources on issues ranging from mobile plans and devices to network coverage and customer service and ensure the wireless market remains innovative and competitive.

a) Wireless provider websites

Carrier websites include information on the services and products offered by each carrier. Included in the wealth of information available on carrier websites are maps of networks and coverage areas, as well as tools that allow consumers to determine the carriers' coverage in specific locations.[140] Carrier websites also offer useful information regarding the locations of their physical retail stores;[141] the mobile devices and accessories available for purchase, including device features and capabilities;[142] details of the carrier's voice, data, and messaging

[140] *See, e.g.*, Cricket Wireless, Cricket's Nationwide Cell Coverage Map, http://www.mycricket.com/coverage/maps/broadband?z=14&clat=38.89537505644732&clng=-77.12385177612305&addr=&city=Arlington&state=VA&zip=22203&persist=1 (last accessed June 12, 2013); U.S. Cellular, Coverage Locator, http://www.uscellular.com/coverage-map/coverage-indicator.html (last accessed June 12, 2013).

[141] *See, e.g.*, Union Wireless, Find a Store, http://www.unionwireless.com/FindAStore.aspx?FINDASTOREMODE=STORE (last accessed June 12, 2013).

[142] *See, e.g.*, Bluegrass Cellular, Phones & Devices, https://store.bluegrasscellular.com/devices/list/all (last accessed June 12, 2013).

plans;[143] applications and games available for download;[144] and customer service offerings, such as technical support[145] and wireless tools that allow customers to check their data usage.[146]

b) Device manufacturer websites

Device manufacturers provide information on their websites and in their advertising materials regarding the features and capabilities of the devices that they make available in the marketplace.[147] Device manufacturer websites typically include information on features such as handset technical specifications, including screen size and speaker and camera quality; operating system; device capabilities, such as download speeds; and available applications.

c) Social networking websites

Carriers and device manufacturers increasingly provide consumers with information on their products and services via social networking websites, including Facebook,[148] Twitter,[149] and Pinterest.[150] Carriers utilize social networking platforms to showcase the devices they offer,

[143] *See, e.g.*, Sprint-Nextel, Plans, http://shop.sprint.com/mysprint/shop/plan/plan_wall.jsp?INTNAV=ATG:HE:Plans (last accessed June 12, 2013); Cricket unlimited cell phone plan guide, http://www.mycricket.com/cell-phone-plans/unlimited-mobile-plan-guide (last accessed June 17, 2013).

[144] *See, e.g.*, U.S. Cellular, Apps & Entertainment, http://www.uscellular.com/apps/index.html (last accessed June 12, 2013).

[145] *See, e.g.*, Solavei, LLC, Device Support, http://solavei-selfcare.wds.co/ (last accessed June 12, 2013).

[146] *See, e.g.*, MTA Wireless, Check Data Usage, https://usageinfo.mtaonline.net/Account/LogOn?ReturnUrl=%2f (last accessed June 12, 2013).

[147] *See, e.g.*, Apple, iPhone, http://www.apple.com/iphone/ (last accessed June 12, 2013); Samsung, Our Galaxy Smartphones, http://www.samsung.com/us/topic/our-galaxy-smartphones (last accessed June 12, 2013); BlackBerry, Meet the BlackBerry Z10, http://us.blackberry.com/smartphones/blackberry-z10.html (last accessed June 12, 2013).

[148] *See, e.g.*, Facebook, Verizon Wireless, https://www.facebook.com/verizon (last accessed June 12, 2013).

[149] *See, e.g.*, Twitter, T-Mobile, https://twitter.com/TMobile (last accessed June 12, 2013).

[150] *See, e.g.*, Pinterest, AT&T, http://pinterest.com/attinc/ (last accessed June 12, 2013).

offer special deals and promotions, provide customer support services, and interact with consumers online.

d) Third-party resources

Third-party resources provide consumers with a wealth of information regarding carrier networks, service plans, customer service, and mobile devices. These resources are offered by organizations such as Consumer Reports and J.D. Power and Associates, online comparison websites such as myrateplan.com and whistleout.com, and online reviews and rankings by CNet.com and PCMag.com, as well as non-carrier affiliated retailers (both online and brick-and-mortar).

### *2. Numerous resources provide consumers with information regarding carrier coverage areas.*

a) Carrier-provided information

Consumers can find information regarding coverage areas readily available on carrier websites. Both national and regional carriers routinely make coverage maps available on their websites,[151] and some carriers provide tools to allow consumers to determine the type of coverage a carrier offers in their area (*e.g.*, 4G LTE, 3G data, voice service, roaming, etc.).[152] These coverage maps and tools allow consumers to make an informed decision about the carrier and plan they are choosing. For instance, U.S. Cellular offers consumers both a national map that shows locations where U.S. Cellular offers voice and data coverage, as well as a coverage locator that allows a consumer to input an address or zip code and search to determine whether

[151] *See, e.g.*, T-Mobile, Personal Coverage Check, http://www.t-mobile.com/coverage/pcc.aspx/ (last accessed June 12, 2013); MetroPCS, Coverage map, http://www.metropcs.com/metro/maps/coverage-map.jsp (last accessed June 17, 2013).

[152] *See, e.g.*, Cricket Wireless, Cell Phone Coverage, http://www.mycricket.com/coverage/maps/wireless?z=14&clat=38.8716687&clng=-77.1168753&addr=&city=Arlington&state=VA&zip=22203&persist=1 (last accessed June 12, 2013).

the carrier's voice and data coverage, including type of data coverage (4G LTE, 3G, or Standard) meets her needs.[153] CellularOne of N.E. Arizona also provides a coverage map on its website for consumers, and includes separate maps for its national, regional, and local service plans that indicate whether coverage is provided through CellularOne of N.E. Arizona's network or through a partner network.[154]

CTIA and wireless carriers that are signatories to the "Consumer Code for Wireless Service" have committed to help consumers make informed choices when selecting a wireless service provider. One of the commitments to which signatories to the "Consumer Code for Wireless Service" adhere is making maps available at both physical points of sale and on the carrier's website that show where the carrier provides coverage.[155] Many carrier websites provide additional coverage information, such as the locations of carrier-deployed Wi-Fi hotspots. For instance, Verizon Wireless's website includes a tool that allows consumers to search for Verizon's Wi-Fi hotspots.[156] These carrier-provided resources ensure that consumers can find relevant information and compare wireless plans and services, which stimulates competition among carriers to provide faster and stronger coverage over more locations.

b) Independent sources for network coverage information

There are also many independent sources available to consumers to find information about the coverage available on wireless carrier networks. MyRatePlan.com is one such source,

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[153] *See* U.S. Cellular, Maps & Coverage Locator, http://www.uscellular.com/coverage-map/index.html (last accessed June 12, 2013).

[154] *See* CellularOne, Network/Coverage Information, http://www.cellularoneonline.com/network.php (last accessed June 12, 2013).

[155] *See* CTIA, CTIA Consumer Code, http://www.ctia.org/consumer_info/index.cfm/AID/10352 (last accessed June 12, 2013). A list of signatories to CTIA's Consumer Code can be found at http://www.ctia.org/consumer_info/index.cfm/AID/10623.

[156] *See* Verizon Wireless, Wi-Fi Access HotSpot Directory, http://my.verizon.com/central/portlets/broadbandWiFi/hotSpotSearch.jsp (last accessed June 12, 2013).

and allows consumers to compare carrier coverage maps for the four largest carriers by state, city, zip code, or even at a specific address, and users can filter their search by the type of coverage they need (*e.g.*, 4G LTE data, prepaid roaming, etc.).[157] OpenSignal.com is another online source that allows consumers to compare wireless carrier coverage in a given location, but does so via crowd-sourcing. OpenSignal's search tool allows a consumer to search for a given location and ranks the carriers based on their coverage in that location; the application also ranks the coverage in that location as better or worse than the U.S. average, and better or worse than the worldwide average for coverage.[158]

In addition to carrier coverage comparison websites, mobile applications are another source for consumers seeking information on the coverage provided by wireless carrier networks. Mosaik Solutions' CellMaps Mobile Coverage application for Android is one such application, allowing Android phone users to see the 4G (as well as 2G and 3G) footprints of the nation's four largest wireless carriers, as well as giving consumers the ability to view the coverage area in a specific location.[159] RootMetrics has developed an application called CoverageMap, which lets users see the wireless coverage in their location also based upon crowd-sourcing. The CoverageMap app allows iPhone users to compare the coverage of carriers that offer the iPhone by aggregating data from other users of the application to paint a picture of the coverage as measured by the users of the carriers' networks.[160] These applications have

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[157] *See* MyRatePlan.com, Compare Carrier Coverage Maps, http://www.myrateplan.com/cell_phone_coverage_maps/ (last accessed June 12, 2013).

[158] *See* OpenSignal.com, http://opensignal.com/ (last accessed June 12, 2013).

[159] *See* Brian Bennett, "New Android app checks 4G coverage," CNet.com (May 21, 2013), *available at* http://reviews.cnet.com/8301-6452_7-57585447/new-android-app-checks-4g-coverage/ (last accessed June 12, 2013).

[160] *See* Trevor Sheridan, "App of the Day: Cell Phone Coverage Map By RootMetrics," Apple'N'Apps, *available at* http://applenapps.com/app-pick/app-of-the-day-cell-phone-coverage-map-by-rootmetrics.html (last accessed June 12, 2013).

proven to be popular with consumers; a coverage application by OpenSignal for Android had over 2.5 million downloads globally as of January 2013.[161]

### C. Wireless Providers Have Adopted a Number of Consumer-Friendly Practices.

Competition is the best motivator for carriers to adapt their practices to meet consumer demand. Today, usage alerts, theft avoidance, and many other consumer-friendly mechanisms have been adopted, not through regulatory fiat, but because consumers have shown that they value this information when provided by their carrier.

#### *1. Voluntary Free Usage Notifications*

On October 17, 2011, CTIA and wireless providers announced a voluntary initiative that would provide consumers with free usage alerts to help them avoid unexpected overage charges.[162] The four alerts were for voice, data, messaging, and international service and were added to CTIA's "Consumer Code for Wireless Service." Participating providers agreed to implement two out of the four alerts by October 17, 2012. On April 17, 2013, all the wireless carriers participating in the initiative – covering approximately 97 percent of all U.S. subscribers – met the deadline to implement all the applicable alerts for their customers.[163]

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[161] *See* Paul Sawers, "OpenSignal now features crowdsourced mobile coverage maps to compare the quality of networks in your area," TheNextWeb.com (Jan. 24, 2013), *available at* http://thenextweb.com/apps/2013/01/24/opensignals-crowdsrouced-network-coverage-app-gets-a-big-update/ (last accessed June 12, 2013).

[162] "CTIA – The Wireless Association®, Federal Communications Commission, and Consumers Union Announce Free Alerts to Help Consumers Avoid Unexpected Overage Charges," CTIA – The Wireless Association® (Oct. 17, 2011), *available at* http://www.ctia.org/media/press/body.cfm/prid/2137 (last accessed June 12, 2013).

[163] "CTIA Announces Participating Wireless Providers Met Consumer Usage Alerts Deadline," CTIA – The Wireless Association® (April 17, 2013), *available at* http://blog.ctia.org/2013/04/17/usage-alerts/ (last accessed June 12, 2013); Federal Communications Commission, "FCC Marks Milestone in Effort to Eliminate 'Bill Shock,'" Press Release (April 18, 2013), *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0418/DOC-320285A1.pdf (last accessed June 12, 2013).

### *2. Smartphone Theft and Data Security Efforts*

CTIA and a number of wireless companies have worked closely with the federal government and law enforcement to develop ways to help deter smartphone thefts and protect consumer data. CTIA and its participating members made four voluntary industry commitments in 2012, which will continue to evolve as new wireless products and services become available.[164] CTIA publishes quarterly updates of these protections and preventative measures on its website and submits a copy to the Commission, detailing progress, benchmarking milestones, and indicating completion by industry of these four steps:

1. *Implement databases to prevent reactivation of stolen smartphones.* Wireless providers will work to initiate, implement and deploy database solutions, using unique smartphone identifying numbers, designed to prevent smartphones reported by their customers as stolen from being activated and/or provided service on their own networks. Using unique GSM smartphone identifying numbers, GSM providers deployed a database in 2012 to prevent GSM smartphones reported as stolen from being activated or providing service. U.S. providers are currently creating a common database for LTE smartphones, to be completed by November 30, 2013, designed to prevent smartphones that are reported stolen by consumers from being activated or providing service on any LTE network in the U.S. and on appropriate international LTE stolen mobile smartphone databases.

2. *Outreach on secure/lock features.*
    (a) Smartphone makers have implemented a system to notify/inform users via new smartphones upon activation or soon after of its capability of being locked and secured from unauthorized access by setting a password.
    (b) Smartphone makers also now include information on how to secure/lock new smartphones in-box and/or through online "Quick Start" or user guides.

3. *Educate consumers about applications to remotely lock/locate/erase data from smartphones.* Wireless providers now inform consumers about the existence of – and access to – applications that can lock/locate/erase data from smartphones. Providers also educate consumers on how to access these applications, including those that are easy-to-find and preloaded onto smartphones.

[164] "U.S. Wireless Industry Announces Steps to Help Deter Smartphone Thefts and Protect Consumer Data," CTIA – The Wireless Association® (April 10, 2012), *available at* http://www.ctia.org/media/press/body.cfm/prid/2170 (last accessed June 12, 2013).

4. *Educate consumers about smartphone theft, protections and preventative measures.* The wireless industry launched an education campaign for consumers on the safe use of smartphones using a range of resources, including a public service announcement and online tools such as websites and social media.

CTIA has developed its own education campaigns designed to help consumers secure personal and financial information stored on their phones. This is especially important as consumers increasingly use their mobile devices as "wallets" to do everything from paying for goods and services to banking. In its online pamphlet, "Using Mobile Wallet?" CTIA provides eight simple tips for protecting information while using these applications and services, including using trusted sources, passwords, and manufacturer-provided security software. CTIA also advises customers to keep their personally identifiable information, such as name, address, birthdate, login credentials, and social security numbers private.[165] Another CTIA pamphlet offers easy-to-follow tips on how to erase information before donating or recycling your device.[166] In addition, CTIA provides suggestions on how to avoid mistakenly downloading harmful software.[167]

Consumers are purchasing more sophisticated mobile devices than ever before, and they are using them in ways never conceived of even five years ago. This revolution in the wireless marketplace has many positive effects for consumers in all areas of their lives. Unfortunately, the increased integration of cell phones and everyday life also attracts device and identity thieves. The wireless industry's collective and individual efforts to dry up the aftermarket for stolen phones and to let consumers know what to do and whom to contact in the event their

[165] "Using Mobile Wallet? Tips on How to Protect Your Information," CTIA – The Wireless Association®, *available at* http://files.ctia.org/pdf/CTIA_MobileWallet.pdf (last accessed June 12, 2013).

[166] "How to Erase Your Info Before You Donate or Recycle Your Cellphone," CTIA – The Wireless Association®, *available at* http://files.ctia.org/pdf/CTIA_DataErase.pdf (last accessed June 12, 2013).

[167] "Infected Apps: How the U.S. Wireless Industry Helps You from Catching a 'Bug,'" CTIA – The Wireless Association®, *available* at http://files.ctia.org/pdf/Cybersecurity_Apps_FINAL.pdf (last accessed June 12, 2013).

phones are stolen is a direct response to law enforcement, the FCC and consumers to help make them more secure.[168]

### *3. Emergency Alerts and Voluntary Text-to-911 Services*

Starting in 2012, CTIA and the wireless industry joined the FCC and Federal Emergency Management Agency (FEMA) to offer Americans a robust and reliable wireless emergency alert ("WEA") system to send concise, text-like messages to users' WEA-capable mobile devices. Today, wireless providers representing nearly 97 percent of subscribers are participating in distributing three different kinds of alerts: Presidential, Imminent Threat Alerts (severe man-made or natural disasters), and Amber Alerts (missing and abducted children). These alerts use technology different from standard text messages to ensure they are delivered immediately and are not subjected to potential congestion or delays on wireless networks and, unlike texts, can be sent to targeted areas.[169]

In addition, the four largest U.S. wireless carriers, AT&T, Verizon, Sprint, and T-Mobile, have agreed to accelerate the availability of "text-to-911" service, with major developments expected in 2013 and a commitment to nationwide availability by May 15, 2014.[170] While significant technical hurdles remain, this voluntary commitment "accelerates the goal of bridging a diverse and innovative wireless communications system used every day by millions of

[168] "Before It's Gone: Steps to Deter Smartphone Thefts & Protect Personal Info," CTIA – The Wireless Association®, *available at* http://www.ctia.org/consumer_info/safety/index.cfm/aid/12084 (last accessed June 12, 2013).

[169] "Wireless Emergency Alerts on Your Mobile Device," CTIA – The Wireless Association®, *available at* http://www.ctia.org/consumer_info/safety/index.cfm/AID/12082 (last accessed June 12, 2013).

[170] *See* "CTIA Statement on the FCC's Adoption of the Delivery of Text-to-911 FNPRM," CTIA – The Wireless Association® (Dec. 12, 2012), *available at* http://blog.ctia.org/2012/12/12/fcc-text-to-911-fnprm/ (last accessed June 12, 2013).

Americans, including individuals with disabilities, with our nation's emergency communications system."[171]

## IV. COMPETITION HAS INCREASED WIRELESS ADOPTION, USAGE, AND FUNCTIONALITY

The virtuous cycle phenomenon is seen clearly in the U.S. wireless market, where the world's most advanced LTE deployments have produced more than 50 percent of the world's 4G subscribers.[172] These consumers use sophisticated devices that run on chips and operating systems developed by U.S. companies like Qualcomm, Apple, Google, and Microsoft. Wireless adoption is surging, wireless data usage is skyrocketing, and industry innovation knows no bounds.

### A. Adoption

Wireless subscribership continues the strong growth trend seen in recent years. As of December 2012, there were approximately 326.4 million active wireless subscriber connections in the United States, an increase of 10.5 million from the end of 2011.[173] Smartphone use continues to be a significant driver of this increase.[174] Total active wireless subscriber connections now equal 102 percent of the U.S. population, increasing from 99.7 percent in 2011.[175] Wireless connections continue to exceed U.S. population growth.

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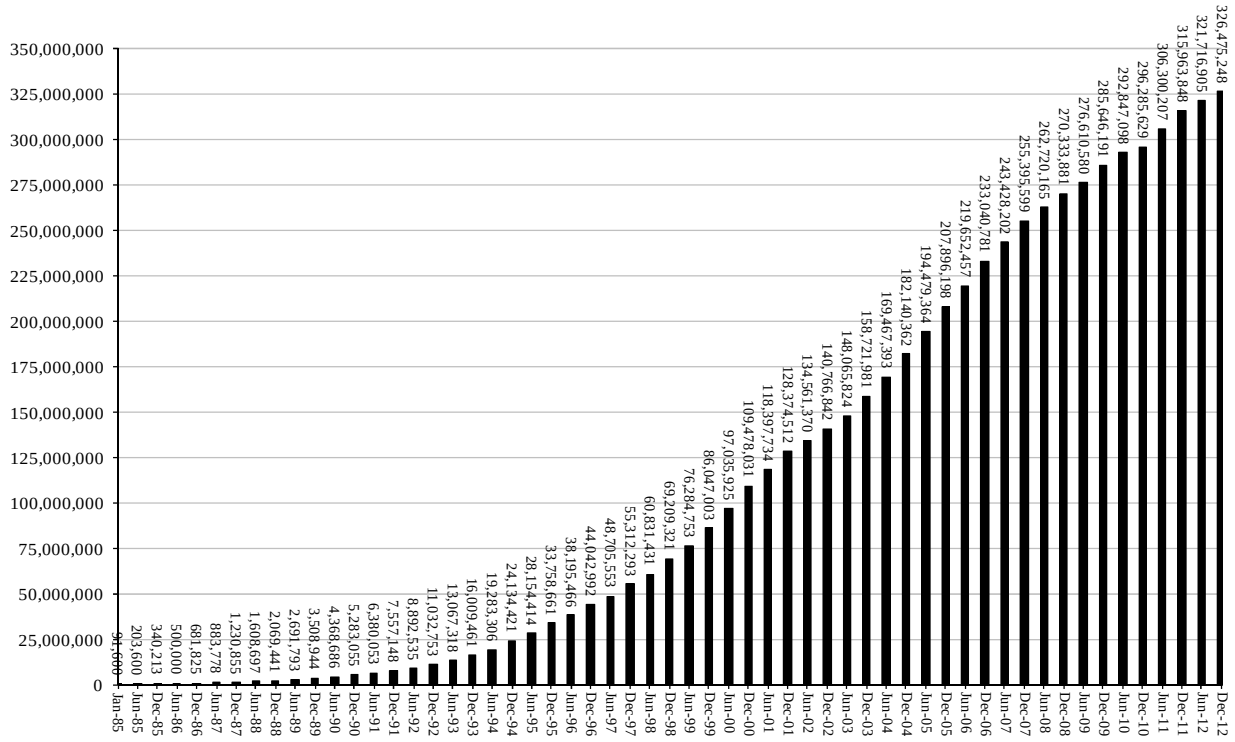
[171] *See id.*; *see also* Lynn Walford, "Marlee Matlin Advocates for Text to 911 for Deaf & Hard of Hearing @ CTIA 2013," *available at* http://wirelessandmobilenews.com/2013/05/marlee-matlin-advocates-text-911-deaf-hearing-impaired.html (last accessed June 12, 2013).

[172] As of May 2013, the U.S. and Canada were estimated to have 57% of the world's LTE connections, according to Informa Telecoms & Media estimates. *See* "4G Americas Reports 100 Million LTE Connections Worldwide – 57 Million LTE Connections in the U.S. and Canada," 4G Americas (May 16, 2013), *available at* http://www.4gamericas.org/index.cfm?fuseaction=pressreleasedisplay&pressreleaseid=4542 (last accessed June 12, 2013).

[173] *CTIA's 2012 Wireless Indices at 22.*

[174] *Id.*

[175] *Id. at 8, 30.*




Source: *CTIA's 2012 Wireless Indices, at 24.*

On June 5, 2013, the Pew Research Center found that, for the first time since it began tracking cell phone adoption, a majority of Americans own smartphones. In particular, Pew states that 91 percent of adults in the U.S. have some type of cell phone, and 56 percent have phones that operate on a smartphone platform.[176] Another recent Pew study finds that the percentage of Americans who own smartphones has increased from 35 percent in May 2011, to 46 percent in February 2012, to 56 percent in May 2013. The next generation has nearly caught up with their parents, as 78 percent of teenagers (age 12-17) have a cell phone, and almost half of

[176] *See* Aaron Smith, "Smartphone Ownership 2013," Pew Internet & American Life Project (June 5, 2013), *available at* http://www.pewinternet.org/Reports/2013/Smartphone-Ownership-2013/Findings.aspx (last accessed June 12, 2013) ("Smartphone Ownership 2013").

those cell-owning teens own smartphones.[177] A majority of Americans in their mid-forties through mid-fifties are smartphone adopters, and every major demographic group—by age, gender, and ethnicity—experienced a significant year-to-year growth in smartphone ownership between 2012 and 2013.[178] And, even among older Americans, smartphone adoption is growing—18 percent of Americans age 65 or older own smartphones in 2013, compared to 13 percent in February 2012.[179]

Wireless-only households are also on the increase. The National Center for Health Statistics ("NCHS") reported that in June 2012, nearly 36 percent of American households were wireless only, compared to approximately 30 percent at the end of 2010.[180] Another 16 percent of homes receive all or almost all calls on wireless phones even though they have landline phones.[181] In addition, NCHS estimates that only 9.4 percent of households were landline-only in the first half of 2012, while approximately 88 percent of households have at least one wireless phone. Encouragingly, only two percent of U.S. households have no phone service at all today, an indication of the competitiveness of the telecommunications marketplace.[182]

### B. Usage Levels

As of December 2012, there were 305.1 million data-capable devices and 247.6 million web-capable handsets on U.S. wireless carriers' networks, while there were 271.8 million SMS-

[177] *See* Mary Madden, Amanda Lenhart, Maeve Duggan, Sandra Cortesti & Urs Gasser, "Teens and Technology 2013," Pew Internet & American Life Project, 2 (Mar. 13, 2013), *available at* http://www.pewinternet.org/Reports/2013/Teens-and-Tech.aspx (last accessed June 12, 2013).

[178] *See* Smith, "Smartphone Ownership 2013," Pew Internet & American Life Project (June 5, 2013).

[179] *See id.*

[180] *CTIA's 2012 Wireless Indices* at 33. In some states, including Arkansas and Mississippi, more than 40 percent of population has only a wireless phone. *See* Largent Testimony at 3.

[181] *CTIA's 2012 Wireless Indices* at 33.

[182] *Id.* at 33.

capable devices. The presence of 152 million smartphones and wireless-enabled PDAs on carriers' networks at year-end 2012 represents a 36.4 percent increase from the 111.5 million reported the previous year.[183] There was also an increase of 10.2 percent in wireless-enabled tablets, laptops, netbooks, and wireless broadband modems from December 2011 to a year later, from 20.2 million to 22.3 million.[184]

The plethora of wireless devices in the U.S. reflects an enormous growth in mobile data usage. Wireless operators delivered 834.6 billion MB of data traffic in the last six months of 2012, up 58.8 percent from 525.7 billion MB for the six months ending December 2011.[185] The annual MB of data traffic was up 69 percent, from 866.9 billion MB in 2011, to 1.468 trillion MB in 2012.[186] According to the Cisco Visual Networking Index, traffic from wireless and mobile devices is expected to exceed that from fixed devices by 2016, up from the current rate of 59 percent.[187] Moreover, Cisco's estimate of the monthly volume of U.S. mobile data traffic for 2017 is more than the total annual volume of U.S. mobile data traffic in 2012.[188]

American consumers have good reason to access the Internet through their mobile devices. U.S. mobile data connection speeds are 75 percent faster than the average in the

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[183] *CTIA's 2012 Wireless Indices* at 11.

[184] *Id.*

[185] *Id.*

[186] *Id.* at 3. A 2012 Report by Pew Research Center found that 55 percent of cell phone owners used their devices to go online as of April 2012, an increase of 31 percent from April 2009. Aaron Smith, "Cell Internet Use 2012," Pew Internet & American Life Project (June 26, 2013), *available at* http://www.pewinternet.org/Reports/2012/Cell-Internet-Use-2012.aspx ,at 2 (last accessed June 12, 2013).

[187] Cisco Systems, Inc., *Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2012-2017* (2013), at 2 ("*Cisco Visual Networking Index 2012-2017*"), *available at* http://www.cisco.com.en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.pdf (last accessed June 12, 2013).

[188] Cisco Systems, Inc., *Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast Update, United States Highlights* (Feb. 2013).

European Union.[189] In 2012, for instance U.S. speeds averaged 2.6 Mbps versus 1.5 Mbps in Europe,[190] and partially as a result of the speed of their connections, in 2013, U.S. customers will use almost two times as much data per connection as consumers in the EU.[191] Projections suggest that by 2014, mobile broadband speeds in the U.S. will be in excess of 14 Mbps, while speeds in the E.U. are projected to reach only 7 Mbps.[192]

### C. Functionality

Just as competition in the marketplace fuels broadband availability and adoption, consumers' steadily increasing use of broadband requires carriers to be more flexible and innovative in their offerings. For example, many smartphone owners today use some form of third-party provided instant messaging or Over-the -Top ("OTT") application in addition to or instead of traditional SMS.[193] Similarly, a number of consumers have chosen to replace conventional wireless voice services with VoIP applications.[194] These changing consumer preferences have generated competitive responses from the wireless industry, such as Verizon Wireless's newly-introduced cross-platform messaging service.[195]

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[189] *2013 GSMA* Report at 2.

[190] *Id.* at 14.

[191] *Id.* at 7.

[192] *Id.* at 14.

[193] *See* Chantal Tode, "45 PC of Smartphone Owners Use OTT Messaging Apps: Report," Mobile Marketer (Oct. 9, 2012), *available at* http://www.mobilemarketer.com/cms/news/research/13950.html (last accessed June 12, 2013) (citing 2012 survey by Analyses Mason).

[194] Juniper Research reports that mobile VoIP users will reach 1 billion by 2017 worldwide, equivalent to 1 in 7 mobile subscribers, giving rise to additional competition in the wireless marketplace. *See* "Mobile VoIP users to reach 1 Billion by 2017 or one in seven mobile subscribers," Juniper Research, *available at* http://www.juniperresearch.com/viewpressrelease.php?pr=355 (last accessed June 12, 2013).

[195] *See* Jason Ankeny, "Verizon challenges OTT rivals with cross-platform messaging," Fierce Mobile Content (Mar. 22, 2013), *available at* http://www.fiercemobilecontent.com/story/verizon-challenges-ott-rivals-cross-platform-messaging/2013-03-22 (last accessed June 12, 2013) ("Any message sent to a Verizon mobile number will now appear simultaneously across the customer's Android smartphone, iPad or Android tablet and PC.").

Video is also driving mobile consumption, requiring carriers to ensure their networks are capable of performing in the way users expect. One recent study finds that streaming video and audio accounted for the largest share of traffic over virtually every network, and more than 20 percent of traffic on North American fixed networks is offloaded from mobile smartphones and tablets.[196] Analysts predict that by 2018, video will make up approximately half of all mobile data traffic worldwide.[197] As noted previously, U.S. wireless carriers invested $30 billion in their networks in 2012 to accommodate this growing and evolving consumer use of mobile broadband services, and even as one generation of technology is deployed, another is being developed. In this competitive market, consumers get what they demand.

## V. THE VIRTUOUS CYCLE HAS PRODUCED FAR-REACHING ECONOMIC AND SOCIETAL BENEFITS FOR CONSUMERS

The continued, aggressive deployment of high-speed wireless networks has produced tremendous benefits across the entire U.S. economy, including for healthcare, education, transportation, finance, energy, agricultural, and accessibility.

### A. Healthcare

The high penetration levels of wireless technology in both metropolitan and remote areas make mobile devices "one of the most effective conduits for the delivery of health care solutions."[198] The mobile health market is projected to be worth between $30-60 billion by

[196] Andrew Burger, "Sandvine: 20% of Fixed Data Traffic Is Mobile," Telecompetitor.com (May 15, 2013), *available at* http://www.telecompetitor.com/sandvine-20-of-fixed-data-traffic-is-mobile-offload/ (last accessed June 12, 2013).

[197] *See* Joan Engebretson, "Ericsson: 31% of Mobile Data Traffic Is Video, But More Time Spent Social Networking," Telecompetitor.com (June 3, 2013), *available at* http://www.telecompetitor.com/ericsson-31-of-mobile-data-traffic-is-video-but-more-time-spent-social-networking/ (last accessed June 12, 2013).

[198] *See* GSMA & A.T. Kearney, *The Mobile Economy 2013*, 35 (2013) ("*The Mobile Economy 2013*"), *available at* http://www.gsmamobileeconomy.com/GSMA%20Mobile%20Economy%202013.pdf.

2015,[199] and more than 40,000 health-related mobile applications are available today. Below are a few examples of the revolutionary changes taking place in the way healthcare is being delivered via mobile technology:

- AT&T Personal Health Gateway[200]
- AT&T Asthma Triggers[201]
- T-Mobile Sleep Monitoring Devices and Apps[202]
- Verizon Wireless's Vaccination Scheduler App[203]

### B. Education

The mobile industry already plays a significant role in improving and extending the education of millions of people.[204] Ground-breaking ways in which wireless is now fostering innovation in education include:

- Sprint Wireless Campus Manager[205]
- T-Mobile Monterey Ridge Learning Initiative[206]
- Qualcomm Project K-Nect[207]

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[199] *See id.*

[200] "AT&T and Numera Combine Personal Safety and Home Health Management with New Personal Health Gateway," (Feb. 21, 2013), *available a*t http://www.att.com/gen/press-room?pid=23809&cdvn=news&newsarticleid=36052&mapco (last accessed June 12, 2013).

[201] "Asthma Triggers," *available at* http://www.att.com/gen/press-room?pid=23975 (last accessed June 12, 2013).

[202] "Meredian Health and iMPak Health Tap T-Mobile to Deploy Near Field Communication Technology for Mobile Health Application," (Oct. 3, 2011), *available at* http://newsroom.t-mobile.com/phoenix.zhtml?c=251624&p=irol-newsArticle&ID=1805883 (last accessed June 12, 2013).

[203] *See* Sharon Oddy, "Smart Medicine for Busy Parents," (May 3, 2013), *available at* http://news.verizonwireless.com/news/2013/05/smart-medicine-busy-parents.html (last accessed June 12, 2013).

[204] *See* GSMA & A.T. Kearney, *The Mobile Economy 2013* at 36.

[205] "Sprint and Manage Mobility Announce Joint Offering for K-12 Schools," (Mar. 7, 2013), *available at* http://newsroom.sprint.com/news-releases/sprint-and-manage-mobility-announce-joint-offering-for-k-12-schools.htm (last accessed June 12, 2013).

[206] "T-Mobile Helping to Advance Mobile Learning and Digital Education," (Mar. 29, 2012), *available at* http://newsroom.t-mobile.com/phoenix.zhtml?c=251624&p=irol-newsArticle&ID=1805862 (last accessed June 12, 2013).

[207] *See* Global Citizenship-Education, Qualcomm, *available at*

- University of Texas at Austin College of Education Mobile Learning Initiative[208]

### C. Transportation

The emergence of ubiquitous high-speed wireless networks has created tremendous opportunity for innovation in the transportation sector. A wide range of transportation-related services and applications are currently being provided over these wireless networks, including connected vehicle telematics, safety and entertainment services, traffic management and alert services, ticketing services, mobile parking management applications, roadside assistance services, and many more. In just the automobile sector alone, analysts predict that more than 80 percent of U.S. cars will have wireless connections by 2017.[209] The following are just a few of the advances in the transportation sector taking advantage of wireless networks:

- GM Infotainment API[210]
- Ford Sync Mobile Apps[211]
- GlobeSherpa and TriMet Oregon Mobile Public Transportation Ticketing Service[212]
- ParkMobile[213]

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http://www.qualcomm.com/about/citizenship/wireless-reach/projects/education (last accessed June 12, 2013).

[208] *See* Mobile Learning Initiative, The University of Texas at Austin, *available at* http://mobilelearningportal.org/node/2202 (last accessed June 12, 2013).

[209] *See* GSMA & A.T. Kearney, *The Mobile Economy 2013*, at 34.

[210] *See* "Innovation: Design & Technology," General Motors, *available at* http://www.gm.com/vision/design_technology/in-vehicle_infotainment.html (last accessed June 12, 2013).

[211] *See* "Sync: Say the Word," Ford Motor Company, http://www.ford.com/technology/sync/ (last accessed June 12, 2013).

[212] "GlobeSherpa and TriMet Launch Mobile Ticketing Beta Test," PR Newswire (May 16, 2013), *available at* http://www.prnewswire.com/news-releases/globesherpa-and-trimet-launch-mobile-ticketing-beta-test-technology-designed-to-save-agency-millions-207694281.html (last accessed June 12, 2013).

[213] Parkmobile: Parking Made Simple, http://www.ford.com/technology/sync/ (last accessed June 12, 2013).

### D. Banking and Finance

The emergence of high-speed wireless networks has fostered the development of a wide range of mobile banking and financial services. Experts predict that mobile commerce in the U.S. alone could reach $31 billion by 2015, while over 80 percent of the top 100 U.S. retailers have developed some sort of mobile commerce application.[214] New business models and innovations made possible by ubiquitous, high-speed wireless networks include:

- Visa Ready Program[215]
- Zillow Mortgage Marketplace App[216]
- BBVA Compass Picture Bill Pay App[217]
- Refundo Mobile Banking App[218]
- C&F Bank Mobile Banking App[219]

### E. Energy

The emergence of ubiquitous, high-speed wireless networks has ushered in a wide array of applications and services focused on the energy sector. For example, as the Commission knows, smart grids (electrical grids that incorporate communications technology) are an

[214] Comments of CTIA – The Wireless Association®, WT Docket 11-186, at 5 (filed Sept. 18, 2012).

[215] *See* "Visa Signs Agreements with Leading mPOS Providers; Drives Adoption of Mobile Commerce Globally," Benzinga (June 5, 2013), *available at* http://pressreleases.visa.com/phoenix.zhtml?c=215693&p=irol-newsarticlePR&ID=1827175&highlight= (last accessed June 12, 2013).

[216] *See* "Zillow Redesigns Zillow Mortgage Marketplace App for iPhone; Now First Mobile App to Quote Government-Backed Refis for Underwater Borrowers; Easier-to-use App Provides HARP and FHA Streamline Mortgage Quotes," (May 30, 2013), *available at* http://investors.zillow.com/releasedetail.cfm?ReleaseID=768160 (last accessed June 12, 2013).

[217] *See* "BBVA Compass adds picture bill pay capabilities to its iPhone mobile banking app – Innovation in mobile banking," (June 3, 2013), *available at* http://www.prnewswire.com/news-releases/bbva-compass-adds-picture-bill-pay-capabilities-to-its-iphone-mobile-banking-app-209939431.html (last accessed June 12, 2013).

[218] *See* "Refundo Launches Mobile Banking App at Finovate Spring 2013; Refundo's mobile banking app designed to meet specific needs of the underbanked and unbanked," (May 15, 2013), *available at* http://www.reuters.com/article/2013/05/15/nj-refundo-app-idUSnPNNY11390+1e0+PRN20130515 (last accessed June 12, 2013).

[219] *See* "C&F Bank Announces C&F Mobile Banking with I-Deposit24," (April 1, 2013), *available at* http://finance.yahoo.com/news/c-f-bank-announces-c-143800614.html (last accessed June 12, 2013).

important development that will help improve our nation's energy efficiency. In the U.S., penetration of smart meters, the first phase in the deployment of a nation-wide smart electrical grid system, was already close to 25 percent by the end of 2011, and is expected to increase significantly in the coming years. New groundbreaking energy-related applications and services enabled by the ubiquitous deployment of high-speed wireless networks include:

- AT&T PayGo Smart Grid App[220]
- Verizon Wireless-serviced "ThinkEco" modlet smartAC kit for connecting window air conditioners to the Internet[221]
- Sprint Metrum and Tollgrade Smart Grid Operations[222]
- T-Mobile M2M SIM[223]

### F. Agriculture

The wireless industry is revolutionizing farming and food distribution. Wireless technology allows today's farmers to till soil, and plant and harvest crops with incredible precision. Nutrient and water application is now a science based on constant streams of data mined from mobile sensors detecting field and environmental conditions. On-board wireless telematics diagnose and communicate problems-in-the making with machinery, allowing farmers to preempt breakdowns and to save valuable time and money. Set forth below are a few of the

[220] "AT&T Amps Smart Grid Offering Through Exclusive Relationship with PayGo," (May 29, 2013), *available at* http://www.att.com/gen/press-room?pid=24272&cdvn=news&newsarticleid=36514&mapcode=enterprise/mk-mobility-solutions (last accessed June 12, 2013).

[221] Luca Cozza, "Smarter Control for Window Air Conditioners," (Jan. 3, 2013), *available at* http://news.verizonwireless.com/news/2013/01/think-eco-air-conditioning.html (last accessed June 12, 2013).

[222] "Metrum, Tollgrade and Sprint Make the Smart Grid Smarter," (May 21, 2012), *available at* http://newsroom.sprint.com/news-releases/metrum-tollgrade-and-sprint-make-the-smart-grid-smarter.htm (last accessed June 12, 2013).

[223] "T-Mobile Announces First-of-Its-Kind 'Embedded SIM' for Machine-to-Machine Solutions," (April 23 2009), *available at* http://www.t-mobile.com/company/PressReleases_Article.aspx?assetName=Prs_Prs_20090423&title=T-Mobile%20Announces%20First-of-its-Kind%20'Embedded%20SIM'%20for%20Machine-to-Machine%20Solutions (last accessed June 12, 2013).

many wireless solutions helping the American agriculture industry to reduce costs, cut waste, and ultimately improve their yields:

- SmartField[224]
- Precision Steering[225]
- John Deere Farm Manager App[226]

**G. Accessibility**

In the U.S., the wireless industry has led the evolution of an ever-growing range of wireless choices and opportunities for persons with disabilities. Today, the wireless industry is uniquely positioned to meet the needs of persons with disabilities as part of a flexible federal policy framework that encourages the wireless industry to respond to market demand for innovative and accessible wireless devices and services. Through AccessWireless.org,[227] CTIA and its member companies collaborate closely with consumer organizations representing persons with disabilities and directly engage with consumers to continue progress towards even more accessible wireless products and solutions. Listed below are some recent examples of how wireless technology is being used to make life better for persons with disabilities:

- Purple Communications SmartVP Videophone[228]
- Odin Mobile service/devices for the blind[229]

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[224] *See* "Farming Goes Wireless: WOW Wireless at Work," (Mar. 4, 2013), *available at* http://blog.ctia.org/2013/03/04/wow-farming-goes-wireless/ (last accessed June 12, 2013).

[225] *See* "Mobile Enterprise—Farming with Wireless," (April 19, 2011), *available at* http://blog.ctia.org/2011/04/19/mobile-enterprise-farming-with-wireless/ (last accessed June 12, 2013).

[226] "John Deere Introduces Mobile Farm Manager Application," *available at* https://www.deere.com/wps/dcom/en_US/corporate/our_company/news_and_media/press_releases/2012/agriculture/2012nov19_mobile_farm_manager.page (last accessed June 12, 2013).

[227] *See* AccessWireless.org, http://www.accesswireless.org/Home.aspx (last accessed June 12, 2013).

[228] "Purple Communications Unveils SmartVP, Game-Changing Communications Platform for Deaf and Hard-of-Hearing Individuals," (April 2, 2013), *available at* http://www.marketwire.com/press-release/purple-communications-unveils-smartvp-game-changing-communications-platform-deaf-hard-nasdaq-cmcsa-1774184.htm (last accessed June 12, 2013).

[229] T-Mobile MVNO, Odin Mobile, will launch in July 2013 with specialized handsets featuring voice readouts and voice-to-text. *See* "Newly minted Odin Mobile sells phones for the blind," CNET (June 5, 2013), *available at* http://reviews.cnet.com/8301-6452_7-57587793/newly-minted-odin-mobile-sells-

- iPhone Tap to Talk app[230]
- Remote prosthesis adjustment[231]

The applications and services listed above do not begin to illustrate how wireless creates jobs and helps people find jobs, how it helps us stay healthy and obtain healthcare, and how it assists in the production of food and alleviating hunger. Wireless impacts all areas of the global economy and plays a crucial role in bettering our society.[232]

## VI. TO ENSURE CONTINUED ROBUST COMPETITION, THE COMMISSION MUST PROVIDE ADDITIONAL SPECTRUM FOR MOBILE BROADBAND

### A. The Commission Should Focus on Bringing Additional Licensed Spectrum to Market.

At the same time that the mobile wireless market is expanding rapidly, the U.S. is facing an imminent and significant shortfall of usable licensed mobile spectrum. The Commission has projected (using conservative estimates) that there will be a spectrum deficit of 275 MHz by 2014.[233] The need for additional spectrum will remain urgent despite extensive industry efforts to optimize existing allocations, and the shortage will degrade wireless broadband services, resulting in more failed attempts to connect, more dropped calls or frozen services, and

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phones-for-the-blind/ (last accessed June 12, 2013).

[230] Tap to Talk is an app for children and adults who are unable to speak because of autism, cerebral palsy or other speech defects. *See* "5 iPhone Apps for Students with Disabilities," (Dec. 16, 2012), *available at* http://www.edudemic.com/2012/12/iphone-apps-for-students-with-disabilities/ (last accessed June 12, 2013).

[231] "Wireless Prostheses," (May 28, 2013), *available at* http://blog.ctia.org/2013/05/28/wireless-prostheses/ (last accessed June 12, 2013).

[232] The Hearing Loss Association of America ("HLAA") recently announced that CTIA has been selected to receive its National Access Award, which is given to an organization or individual who has provided improved communication access for people with hearing loss. "CTIA – The Wireless Association® to Receive National Access Award" (June 4, 2013), *available at* http://www.shhh.org/content/ctia-wireless-association-national-access-award (last accessed June 12, 2013).

[233] Federal Communications Commission, *Mobile Broadband Spectrum: The Benefits of Additional Spectrum*, 6 (Oct. 2010), *available at* http://download.broadband.gov/plan/fcc-staff-technical-paper-mobile-broadband-benefits-of-additional-spectrum.pdf.

significantly lower speeds. It will also limit wireless providers' ability to expand their services nationwide and meet the ever-increasing public demand for mobile broadband services.

Making additional, exclusive-use spectrum available for mobile services represents the most efficient and effective means of alleviating the spectrum crunch. CTIA urges the Commission to allocate and auction spectrum licenses at the earliest possible date.[234] Because relocating incumbents from certain bands will not be immediately possible in some instances, CTIA also supports limited spectrum sharing as an interim measure.[235]

#### *1. The Wireless Industry is Using its Best Efforts to Get the Most Out of Existing Spectrum Allocations, But More Spectrum is Critically Needed.*

Wireless manufacturers and carriers have devised the most advanced technologies and deployed the most innovative architectures available in an attempt to squeeze the most bandwidth possible out of existing spectrum allocations. These methods include installing additional macro cell sites, building out small cells, and deploying 4G service. While these technologies will all increase the capacity of the available spectrum, they will be insufficient to meet the rising demand for wireless data. For example, subscriber growth has kept pace with the construction of new macro cells, and it is difficult to achieve optimal placement for large base stations and antennas in urban areas. Small cells, encompassing femto-, pico-, and micro-cells, have much more limited coverage areas than macro cells and face a number of technical issues (*e.g.*, providing backhaul capacity for distributed networks of small cells).

LTE technology has boosted the spectral efficiency of voice and data traffic by approximately 50 percent from UMTS/HSPA, and work is progressing rapidly on the next

[234] Comments of CTIA – The Wireless Association®, WT Docket No. 11-186, 71 (filed Dec. 5, 2011) ("CTIA December 2011 Comments").

[235] *Id.*; Comments of CTIA – The Wireless Association®, GN Docket No. 12-354, 10 (filed Feb. 20, 2013) ("CTIA February 2013 Comments").

improvement, LTE Advanced, which is expected to double yet again LTE's spectral efficiency.[236] However, the development cycle for new technologies underscores the need for additional spectrum. For example, it took seven years to develop LTE technology, and although LTE is sixteen times more efficient than 3G, during the period that the technology was being readied for market, wireless traffic increased thirty-fold.[237] Thus, even as the wireless industry pursues more spectrally efficient technologies and drives adoption of 4G technology as quickly as possible, additional spectrum is needed.[238]

### *2. The Commission Has Taken Positive Steps To Make Additional Licensed Spectrum Available and Should Continue To Move Forward With All Possible Speed.*

On March 16, 2010, Chairman Genachowski presented the National Broadband Plan to Congress, which called for making 500 MHz of spectrum available for wireless broadband use over the next ten years, 300 MHz of which was to be released within five years for mobile broadband use.[239] On June 14, 2013, the President issued a memorandum reaffirming the administration's commitment to making 500 MHz of spectrum available and outlining additional actions for federal agencies to take in support of this goal.[240] Although the Commission has

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[236] Deloitte, *The Looming Spectrum Shortage: Worse Before It Gets Better*, 1 (2013), *available at* http://www.deloitte.com/view/en_GX/global/industries/technology-media-telecommunications/tmt-predictions-2013/tmt-predictions-2013-telecommunications/2e6556e5dd1eb310VgnVCM2000003356f70aRCRD.htm#.UbZNz9Lql8E (last accessed June 12, 2013).

[237] *Id.*

[238] Moreover, there is an inherent lag between the time when a new technology is developed and the moment it is deployed for commercial use. Less spectrally efficient legacy systems will continue to be used by customers for years after a new technology's release. For example, consumers replace wireless devices, on average, only every 21.7 months. *See* Entner, "Handset replacement cycles," FierceWireless.com (Mar. 18, 2013).

[239] Federal Communications Commission, *Connecting America: The National Broadband Plan*, 84 (2010) ("*National Broadband Plan*"), *available at* http://download.broadband.gov/plan/national-broadband-plan.pdf, at 84.

[240] *Expanding America's Leadership in Wireless Innovation*, Presidential Memorandum (June 14, 2013),

already taken concrete steps in this area, CTIA encourages the Commission to redouble its efforts to provide a broad range of both lower- and higher-band spectrum. The Commission should continue its efforts to bring large blocks of both spectrum assets to market so that carriers can integrate both, to the extent that they desire, into their networks. As described in the following paragraph, higher and lower bands have been identified by the Commission.

The Commission has begun the process needed to conduct an incentive auction of the 600 MHz band. The auction is designed to repurpose spectrum currently allocated to broadcast television stations to mobile broadband use. The 600 MHz band has excellent propagation properties and consequently is particularly well-suited for mobile broadband services. The Commission should continue to move forward without delay in this proceeding.

The Commission is also planning to auction the H Block licenses later this year. This auction will make available 10 MHz of paired spectrum at 1915-1920 MHz (uplink) and 1995-2000 MHz (downlink) and the allocation is a natural extension of the current PCS band.[241]

In addition, the Commission is expected to auction the AWS-3 spectrum and the J Block within the next few years. Maximizing the utility of the AWS-3 spectrum and J Block (which consists of 25 MHz of unpaired spectrum at 2155-2180 MHz that rests immediately above the AWS-1 downlink band) would involve: (1) designating the current AWS-3 spectrum as a continuation of this downlink band; and then (2) working to secure additional spectrum for an

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*available at* http://www.whitehouse.gov/the-press-office/2013/06/14/presidential-memorandum-expanding-americas-leadership-wireless-innovatio.

[241] *See* Federal Communications Commission, *The Mobile Broadband Spectrum Challenge: International Comparisons*, 12 (Feb. 26, 2013), *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0227/DOC-318485A1.pdf.

extension of the AWS-1 uplink band to complete a paired configuration suitable for FDD LTE deployment at 1755-1780 MHz.[242]

CTIA also encourages the Commission to begin implementation of Section 6401(b)(2)(E) of the Middle Class Tax Relief and Job Creation Act of 2012 ("Spectrum Act"), which directs the Commission to identify, allocate, auction, and assign 15 MHz of contiguous spectrum for commercial mobile broadband use. CTIA has previously explained that the ideal spectrum would be located below 3GHz, available in a contiguous block, adjacent to existing bands, and readily available for pairing with other spectrum. [243] Based on those criteria, CTIA believes that the Commission should consider spectrum from the Broadcast Auxiliary Service ("BAS"), particularly the 2095-2110 MHz band, as the most effective candidate band for reallocation.

CTIA urges that the most logical outcome would be to assure that the 15 megahertz of spectrum identified by the FCC pursuant to Section 6401(b)(2)(E) would be capable of being paired with spectrum to be identified by NTIA as part of the Spectrum Act (*i.e.*, the 1695-1710 MHz band). CTIA is not aware of any other spectrum bands as well-positioned to meet all the key principles for mobile broadband spectrum that could be paired with the specific 15 MHz identified by NTIA, and that could be put to timely use and generate significant revenues through a competitive bidding process. As the Spectrum Act dictates that this new 15 megahertz of spectrum must be identified, allocated and licensed by February 2015, there is very little time

[242] Comments of CTIA – The Wireless Association®, ET Docket No. 10-142, WT Docket No. 04-356, WT Docket No. 07-195 (filed July 8, 2011). Additional spectrum for FDD use could be secured by expanding the AWS-3 downlink into the 2175-2180 MHz portion of the J Block spectrum. The Commission could then secure additional spectrum from Federal users located above 1755 MHz. In addition to the excellent technical characteristics of this AWS expansion spectrum, the band has been internationally harmonized and is developing a robust global ecosystem. *Id.* This spectrum was identified by the National Telecommunications and Information Administration ("NTIA") as the highest priority block that could be repurposed for mobile broadband services. *Id.*

[243] *See* Letter from Steve Largent, President and CEO, CTIA – The Wireless Association®, to Julius Genachowski, Chairman, Federal Communications Commission, *et al.*, GN Docket No. 09-51 (Mar. 13, 2013).

remaining for the statutory deadline to be met. Therefore, CTIA urges the Commission to begin the process of implementing this section of the Act with the purpose of identifying this 15 megahertz in an expeditious fashion.

Whenever possible, spectrum should be licensed for exclusive use and not shared.[244] Carriers must invest heavily in new technologies and infrastructure to utilize fully the available spectrum. Partial use of spectrum and the risk of harmful interference could significantly degrade the value of their carriers' investment, leading them to be reluctant to make the necessary outlays.[245]

### B. The Commission Should Work to Identify Additional Spectrum for Unlicensed Services.

CTIA notes that the Commission has opportunities to provide spectrum for both licensed and unlicensed uses. For example, the Commission's incentive auction is a vital component of a necessary effort by the federal government to clear and auction spectrum for exclusive licensed use, but also presents an opportunity to identify unlicensed spectrum in the guard bands to the extent technically feasible. Similarly, the Commission has sought comment on whether to make available an additional 195 megahertz of spectrum in the 5.35-5.47 GHz and 5.85-5.925 GHz bands for unlicensed use.[246] The Commission has stated that "this could increase the spectrum available to unlicensed devices in the 5 GHz band by approximately 35 percent and would represent a significant increase in the spectrum available for unlicensed devices across the overall radio spectrum."[247] Finally, CTIA notes that the Commission has sought comment on

[244] CTIA February 2013 Comments, at 2, 6, 10.

[245] CTIA March 2013 Reply Comments, at 12.

[246] *Revision of Part 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, Notice of Proposed Rulemaking, 28 FCC Rcd 1769 (2013)

[247] *Id.* ¶ 2.

whether to make available spectrum in the 3550-3650 MHz band ("3.5 GHz Band") for licensed and unlicensed use.[248]

## VII. THE U.S. WIRELESS MARKETPLACE LEADS THE WORLD IN EFFICIENCY, COMPETITION, AND VALUE FOR CONSUMERS

### A. The U.S. Market Is Characterized by Efficient and Intense Use of Limited Spectrum Resources.

U.S. wireless carriers are among the world's most intense and efficient users of spectrum resources, collectively serving over 688,000 subscribers for each megahertz of spectrum assigned for commercial wireless use. As the CTIA "flag chart" below illustrates, the German, French, British, Spanish and Italian markets average well under 200,000 subscribers per megahertz.

CTIA
The Wireless Association®

| 4Q 2012 | USA | Japan | Germany | U.K. | France | Italy | Canada | Spain | S. Korea | Mexico |
|---|---|---|---|---|---|---|---|---|---|---|
| Subscribers** | 326.4M | 134M | 113M | 78M | 68M | 92M | 28M | 53M | 54M | 101M |
| Average Consumers' Minutes of Use per Month** | 932 | 126 | 132 | 184 | 234 | 170 | 381 | 158 | 298 | 232 |
| Efficient Use of Spectrum -- Subscribers Served per MHz of Spectrum Allocated | 688,766 | 268,000 | 183,740 | 130,478 | 122,523 | 180,605 | 103,704 | 88,333 | 200,000 | 388,462 |
| | | | | | | | | | | |
| Spectrum Assigned for Commercial Wireless Use*** | 474 MHz* | 500 MHz | 615 MHz | 597.8 MHz | 555 MHz | 509.4 MHz | 270 MHz | 600 MHz | 270 MHz | 260 MHz |
| Potentially Usable Spectrum/In the Pipeline*** | 70 MHz | 255 MHz | (Recently auctioned 350 MHz) | (Recently auctioned 245 MHz) | 50 MHz (Recently auctioned 200 MHz) | 45 MHz (Recently auctioned 240 MHz) | up to 181 MHz | (Recently auctioned 260 MHz) | 120 MHz | 150 MHz |

*Figure includes AWS-1 & 700 MHz spectrum not yet fully in use, 20 MHz of WCS spectrum, 55.5 MHz of spectrum at 2.5 GHz, and 40 MHz of MSS S-band spectrum.
** Glen Campbell, et al., "Global Wireless Matrix 1Q12," Bank of America Merrill Lynch, Apr. 15, 2013, at Tables 1-2. ***Regulatory and company websites and press reports.

[248] *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Notice of Proposed Rulemaking and Order, 27 FCC Rcd 15594 (2012).

Of course, simply looking at the number of customers with a wireless connection tells only part of the story; it is even more instructive to consider the intensity of subscriber usage. On a per capita basis, Americans use some 932 minutes of voice minutes per month. This is by far the highest per capita usage among the 49 international markets tracked by Bank of America Merrill Lynch Global Research, where the median usage is only about 200 minutes per month, just over one-fifth the U.S. average.[249] Even the country with the next closest ranking in the survey (Ukraine) has a per capita usage volume that is 40 percent less than in the U.S.

The high level of consumer consumption of wireless service is even more remarkable when considering that the amount of spectrum assigned for commercial mobile use in the U.S. lags behind that of many other developed nations. CTIA calculates that that there is 474 MHz of currently available commercial mobile spectrum in the U.S (see "flag chart" above). By comparison, Germany has 615 MHz, Spain has 540 MHz (not including 60 MHz which has been auctioned but is not available for use until the end of 2014), the U.K. has 598 MHz, and France has 555 MHz. And while there is some 70 MHz of potentially usable spectrum in the U.S. pipeline, that will be inadequate to close the gap with other countries, many of which are also adding spectrum for commercial mobile use. Although U.S. carriers have been able to make very efficient use of their existing spectrum resources, they will not be able to continue outpacing their international counterparts on the key metrics of subscribers and usage without significant new spectrum allocations.[250]

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[249] Glen Campbell, *et al.*, "Global Wireless Matrix 1Q13," Bank of America Merrill Lynch, 97 (April 15, 2013) ("Global Wireless Matrix").

[250] The "flag chart" is primarily intended to provide a readily understandable short-hand illustration of (among other things) the disconnect between the amount of spectrum made available for commercial mobile radio service in the U.S. and other countries, in light of the different subscriber populations of those countries. This illustration should be understood in the context of the conclusion (by the ITU and other impartial analysts) that more commercial mobile spectrum is needed around the world to meet the

### B. U.S. Consumers Receive Superior Value on Wireless Services.

The U.S. wireless industry provides extraordinary value for consumers compared to other developed countries. According to a recent study, while U.S. consumers do spend more on a monthly basis for wireless services – about $30/month more than the European Union average, for example – that somewhat higher spending buys consumers over *five times* the number of voice minutes, plus 75 percent more data usage at significantly higher speeds, than is used by E.U. consumers.[251] This means that the effective cost to the end user per unit of use (minutes or megabytes) is dramatically lower in the U.S.[252] Indeed, it may be because of the higher cost of mobile data in Europe that, according to GSMA, "significant numbers of E.U. smartphone users

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growing demand for spectrum-based services. It is that growing demand which led the Administration's National Broadband Plan to call for identifying 300 MHz of spectrum in five years, and 500 MHz of spectrum in ten years, to support commercial mobile radio services.

The chart illustrates the risk we face in falling behind in fulfilling that plan, and illuminates the disparity between the population of users and the amount of spectrum allocated to or in the pipeline to deliver mobile service in the U.S., compared to various countries with which the U.S. is often compared. Alternate metrics could include minutes of use per MHz or data traffic per MHz, but given the broad adoption of wireless service, equally meaningful and more readily-available elements for such international comparisons are population per MHz, or subscribers per MHz. Indeed, given the extent to which active subscriber units now exceed the population in many countries, subscribers per MHz may be superior to population.

As a readily understandable illustration, the chart demonstrates the degree to which the U.S. needs to act in order to continue to serve the rising demand for spectrum-based service, and remain competitive with other countries.

[251] *See 2013 GSMA Report* at 5-7. The GSMA Report cites 2012 data showing a monthly average of 901 minutes of use ("MOU") and 273 MB of data in the U.S., versus 170 MOU and 480 MB in the E.U. *See also* Peter Svensson, "Americans Talk, Surf More than Europeans on Wireless Phones," Post and Courier (June 3, 2013), *available at* http://www.postandcourier.com/article/20130603/PC05/130609833/1010/americans-talk-surf-more-than-europeans-on-wireless-phones (last accessed June 17, 2013); Daniel Thomas, "Europe trails US in Next-Generation Wireless," Financial Times (May 29, 2013), available at http://www.ft.com/intl/cms/s/0/f3240dc2-c852-11e2-acc6-00144feab7de.html (last accessed June 17, 2013).

[252] Unlike prior versions of the report, the latest Global Wireless Matrix (1Q13) does not track voice revenue per minute for the U.S. However, the last data available showed $0.03/minute in the U.S., compared to $0.10/minute in the E.U. *2013 GSMA Report* at 8.

forego data plans and instead rely on Wi-Fi networks," while nearly all U.S. smartphone users have a data plan.[253]

Because wireless service is available at a good value, U.S. consumers, not surprisingly, buy more of it. Total wireless service revenues were up 3.7 percent in the U.S. at the end of 2012.[254] By contrast, revenues for all developed markets tracked by BofA/Merrill Lynch were down 0.9 percent and, in the E.U., were down 5.7 percent.[255] With higher consumer demand and higher wireless revenues, U.S. carriers are able to invest more in their networks. Since 2007, capital expenditures on U.S. wireless networks have grown over 70 percent, while in Europe, where wireless revenues are lower, capital expenditures declined.[256] In turn, the increased investment in the U.S. leads to service improvements – such as high-speed data, discussed below – that encourage more consumer use, thus creating a virtuous cycle.

> The GSMA Report[257] concluded that, compared to the U.S., wireless markets in the E.U.:
>
> > are characterized by lower prices, lower intensity of use, lower revenues, lower quality (at least along some significant dimensions), less product differentiation and consumer choice, a slower pace of innovation, and lower rates of capital investment than the mobile wireless market in the U.S.[258]

Moreover, analysts have noted that, in Europe, mobile services have become "increasingly commoditized," making it "difficult to establish sustainable differentiation between the various

[253] *See 2013 GSMA Report* at 4, 14.

[254] Global Wireless Matrix at 2.

[255] *Id.*

[256] *2013 GSMA Report* at 17 (citing Goldman Sachs Global Investment research).

[257] *See 2013 GSMA Report*.

[258] *See id*. at 21.

operators," compared to the U.S., where there is a high level of differentiation due to variety in pricing plans and network technologies.[259]

### C. The U.S. Has One of the Least Concentrated Wireless Markets.

The U.S. is one of the least concentrated mobile wireless marketplaces compared to other developed countries, based on HHI values.[260] The table below shows the relative level of market concentration across 28 OECD countries. The most recent figures, from 4Q 2012, demonstrate that the U.S. remains the least concentrated wireless market among these 28 countries by a significant margin, with an HHI of about 2,401. Even taking into account the recently completed T-Mobile/MetroPCS merger, the HHI for the U.S. would only rise to 2,457.[261] Moreover, it is worth noting that the U.S. has the most facilities-based providers of any nation in the world, and is one of the few countries with five or more licensees per market.[262]

[259] *Id*. at 11.

[260] As CTIA has previously noted, the Herfindahl-Hirschman Index (HHI) is a measure of concentration, but it is not a measure of competition as such. *See, e.g.*, Reply Comments of CTIA – The Wireless Association®, WT Docket No. 11-186, at 27 (filed Dec. 20, 2011). It is a measure most often deployed in the context of determining whether a proposed merger warrants close (or closer) examination for the potential impact, but it is not a tripwire upon one side of which competition exists, and on the other of which competition does not exist. See Horizontal Merger Guidelines at 19, http://ftc.gov/os/2010/08/100819hmg.pdf (last visited June 16, 2013) ("The purpose of these thresholds is not to provide a rigid screen to separate competitively benign mergers from anticompetitive ones, although high levels of concentration do raise concerns. Rather, they provide one way to identify some mergers unlikely to raise competitive concerns and some others for which it is particularly important to examine whether other competitive factors confirm, reinforce, or counteract the potentially harmful effects of increased concentration.").

[261] Moreover, if Clearwire's retail subscribers are acquired as part of a merger, the post-transaction HHI for the industry would only increase slightly, to 2,468.

[262] *See* Global Wireless Matrix at 67-68 (showing the U.S. and Canada as the only developed countries with at least five wireless providers).

| Wireless Mobile Competition in OECD Countries, 4Q 2012<br>HHI Values | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of Operators | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Others | HHI Sum |
| Australia | 2,222.17 | 980.85 | 464.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3,667.06 |
| Austria | 1,527.83 | 889.05 | 366.22 | 143.01 | 0.00 | 0.00 | 0.00 | 0.00 | 2,926.11 |
| Belgium** | 1,721.70 | 1,222.54 | 554.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3,498.46 |
| Canada** | 1,232.01 | 816.17 | 813.84 | 5.11 | 4.82 | 3.42 | 0.00 | 0.00 | 2,875.37 |
| Chile | 1,474.30 | 1,455.11 | 550.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3,479.66 |
| Czech Republic | 1,551.99 | 1,326.53 | 584.82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3,463.34 |
| Denmark** | 1,652.77 | 841.23 | 398.25 | 107.86 | 0.00 | 0.00 | 0.00 | 0.00 | 3,000.11 |
| Finland | 1,648.74 | 1,155.49 | 645.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3,449.53 |
| France | 1,894.68 | 1,035.08 | 276.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3,205.77 |
| Germany | 1,044.32 | 896.96 | 427.62 | 290.90 | 0.00 | 0.00 | 0.00 | 0.00 | 2,659.80 |
| Greece | 2,603.47 | 853.48 | 390.51 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3,847.46 |
| Hungary | 2,227.12 | 868.40 | 544.71 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3,640.23 |
| Israel | 1,155.47 | 999.99 | 911.32 | 17.62 | 0.00 | 0.00 | 0.00 | 0.00 | 3,084.39 |
| Italy | 1,209.52 | 1,008.96 | 548.18 | 100.89 | 0.00 | 0.00 | 0.00 | 0.00 | 2,867.55 |
| Japan | 2,069.00 | 754.00 | 546.07 | 13.59 | 0.00 | 0.00 | 0.00 | 0.00 | 3,382.66 |
| Korea | 2,527.77 | 946.98 | 359.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3,833.85 |
| Mexico | 4,870.58 | 361.04 | 53.87 | 14.98 | 0.00 | 0.00 | 0.00 | 0.00 | 5,300.46 |
| Netherlands | 1,856.28 | 904.37 | 720.52 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3,481.18 |
| New Zealand | 2,110.49 | 1,170.11 | 394.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3,674.74 |
| Norway | 2,845.52 | 760.14 | 364.28 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3,969.93 |
| Poland | 923.22 | 796.12 | 681.29 | 234.04 | 0.00 | 0.00 | 0.00 | 0.00 | 2,634.67 |
| Portugal | 1,899.35 | 1,292.19 | 419.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3,610.62 |
| Spain** | 1,488.96 | 831.65 | 655.75 | 48.54 | 0.00 | 0.00 | 0.00 | 0.00 | 3,024.89 |
| Sweden | 2,127.15 | 692.00 | 278.87 | 118.24 | 0.00 | 0.00 | 0.00 | 0.00 | 3,216.25 |
| Switzerland | 3,862.79 | 458.54 | 270.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4,591.44 |
| Turkey | 2,701.76 | 785.67 | 399.67 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3,887.10 |
| United Kingdom** | 1,178.51 | 854.83 | 624.60 | 130.90 | 0.00 | 0.00 | 0.00 | 0.00 | 2,788.84 |
| United States** | 1,073.29 | 905.29 | 290.31 | 104.59 | 7.41 | 3.15 | 2.63 | 14.17 | 2,400.85 |

Sources: Bank of America Merrill Lynch Global Wireless Matrix 1Q2013, CTIA Research, Canadian Wireless Telecommunications Association (CWTA), Japanese Telecommunications Carriers Association (TCA), and carrier investor releases.
#Source CWTA
##Source Japanese TCA, including PHS.
**Recalculated by CTIA Research.

### D. The U.S. Outpaces Other Countries on High-Speed Mobile Deployment.

The U.S. is a world leader in the deployment and use of high-speed mobile networks. As the GSMA Report explains, this trend began in 2008, as U.S. adoption of 3G data services outpaced adoption in the E.U.[263] Today, Cisco calculates that, at over 2.6 Mbps, average connection speeds for mobile data are already highest in North America, about 75 percent faster than in Europe (and even more compared against other regions).[264] Given the current heavy investment by U.S. providers in high-speed network build-out, that gap is projected to increase to 14 Mbps in North America, versus 7 Mbps in Western Europe, by 2017.[265] Ericsson reports that North America also has, at 31 percent, the highest proportion of Speedtest measurements showing large bandwidth mobile connections – *i.e.*, those of 10 Mbps more, which accommodates streaming video.[266] U.S. carriers are far ahead of European counterparts in LTE deployment. As of 4Q 2012, only three countries in Europe had more than 1 percent of wireless connections using LTE.[267] Sweden, the top European country with 4.7 percent LTE connections, was still far behind the U.S. average of 10 percent.[268] By year-end 2013, the LTE coverage difference is expected grow, with 19 percent projected for the U.S. and under 2 percent in the E.U. [269]

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[263] *See 2013 GSMA Report* at 4.

[264] *See id.* at 12-13 (citing *Cisco Visual Networking Index 2012-2017*).

[265] *Id.* at 13. As projected, by 2017, data rates in Central and Eastern Europe and in Asia-Pacific will trail even further behind, at 4.8 Mbps and 3 Mbps, respectively. *Id.*

[266] "Ericsson Mobility Report," Ericsson, 17 (June 2013), *available at* http://www.ericsson.com/ericsson-mobility-report. Ericsson explains that Speedtest is an app that allows users to measure uplink and downlink throughput. Each time the app is run, the results are stored in a database, which is approaching 1 billion measurement records.

[267] *2013 GSMA Report* at 20.

[268] *Id.* at 20-21.

[269] *Id.* at 21.

## VIII. THE FCC SHOULD REACH THE CONCLUSION THAT THE MOBILE MARKET IS SUBJECT TO EFFECTIVE COMPETITION

Although Congress has specifically mandated that the Commission make a determination as to the competitive nature of the market,[270] and despite strong showings of competition in the CMRS marketplace, the Commission has elected in recent years not to reach an overall conclusion regarding whether the CMRS marketplace is effectively competitive, noting challenges in making such a determination that would apply across the segments, services, and geographic areas served by the mobile wireless industry.

By all relevant indices, however, the core CMRS market is even more vibrant – and even more competitive – than it was at the time the Commission analyzed the market for the *Sixteenth Competition Report*. It is also more vibrant and competitive than it was in the *Thirteenth Competition Report* (when the Commission concluded that the CMRS market was subject to effective competition). Moreover, as noted above, the wireless ecosystem is marked by extreme investment, high-speed network deployment, evolving operating systems, cutting-edge devices, and a multitude of content and applications. From a carrier perspective, the U.S. remains the least concentrated wireless market among the 28 OECD countries by a significant margin, has the most facilities-based providers of any nation in the world, contains the majority of the world's 4G LTE subscribers, continues to experience widespread network expansion (including in rural areas), and is one of the few countries with five or more licensees per market. For these reasons and in light of the data provided above, the FCC should once again conclude that the core CMRS market is robust and subject to effective competition.

[270] 47 U.S.C. § 332(c)(1)(C).

## IX. CONCLUSION

As the foregoing comments demonstrate, the wireless ecosystem is vibrant, dynamic, and robustly competitive at each of the levels discussed herein. Wireless carriers continue to invest tens of billions of dollars in their networks, deploying 4G technologies at unprecedented rates in both urban and rural areas. Device vendors have welcomed the increased network speeds and functionalities by bringing to market a wide array of advanced handsets and tablets, which in turn has spurred the development of new applications and content. Consumers are the beneficiaries of this virtuous cycle of investment and innovation – today, the number of active wireless connections exceeds the U.S. population, and over half the handsets owned by American consumers are smartphones. In addition, the 4G wireless networks impact all sectors of our economy, from intelligent transportation to electrical smart grids to mobile health services, as well as helping to transform the lives of seniors and persons with disabilities.

All this means that wireless data usage in our country has skyrocketed, which should be a positive factor for network, device, and content investors. One crucial component of the virtual cycle – spectrum – is in short supply, however, and unless more is made available to commercial wireless providers in the near future, sustained investment is at risk. Accordingly, while CTIA hopes the information supplied in these comments will lead the Commission to find the wireless marketplace is effectively competitive, it also urges policymakers to ensure that competitiveness continues by identifying and auctioning more higher- and lower-band spectrum, including bands currently used by broadcasters and federal government users, as soon as possible.

Respectfully submitted,

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June 17, 2013

# APPENDIX A

# Mobile Wireless Performance in the EU & the US

MAY 2013

NAVIGANT ECONOMICS

# Mobile Wireless Performance in the EU & the US

By Erik Bohlin, Kevin W. Caves and Jeffrey A. Eisenach

Erik Bohlin is a Professor at the Department of Technology Management and Economics, Chalmers University of Technology. Kevin Caves is a Director at Navigant Economics. Jeffrey Eisenach is a Managing Director at Navigant Economics and an Adjunct Professor at George Mason University Law School. The authors are grateful to GSMA for support and to Phillip Mantyh for research assistance. The views expressed are their own, as is responsibility for any errors or omissions.

# CONTENTS

1.

# Executive Summary

There is broad agreement that the EU mobile wireless market is underperforming relative to other advanced economies, including the U.S. We find that the EU is lagging well behind the U.S. in deployment of next generation wireless infrastructures and the advanced services they make possible, and that EU consumers are worse off as a result. EU regulatory policies have resulted in a fragmented market structure which prevents carriers from capturing beneficial economies of scale and scope and retards the growth of the mobile wireless ecosystem. We recommend reforming and harmonizing spectrum policies, permitting efficient levels of consolidation, and promoting innovation by fostering dynamic competition.

## First, the U.S. market is outperforming the EU market in many important respects:

- EU consumers pay less per month than U.S. consumers for mobile wireless services, but U.S. consumers use five times more voice minutes and twice as much data.
- Growth in investment in the U.S. is translating into faster data connection speeds: U.S. speeds are now 75 percent faster than the EU average, and the gap is expected to grow.
- The U.S. is deploying LTE at a much faster pace than the EU; by YE 2013, 19 percent of U.S. connections will be on LTE networks compared to less than two percent in the EU.

## Part of the cause for the divergent performance is the relatively inefficient structure of mobile wireless markets in the EU:

- Market fragmentation prevents EU carriers from capturing economies of scale and scope. America's two largest carriers are each larger than the three largest EU carriers combined.
- Market fragmentation limits consumer choice: it explains, at least in part, why Apple chose not to make the iPhone 5 compatible with some EU mobile networks.
- Efficient consolidation would provide incentives for investment, facilitate a more integrated mobile wireless ecosystem and improve consumer welfare.

## Renewed growth in the mobile wireless ecosystem depends in significant part on regulatory reform, including:

- Harmonization of spectrum policy, including a coordinated release of spectrum by EU Member States in a narrow window, foregoing discrimination in favor of new entrants, and creating a presumption of license renewal with flexible ownership rights;
- Reducing impediments to efficient consolidation by simplifying merger reviews and taking a more cautious approach to the imposition of remedies;
- Refocusing policy on enhancing dynamic competition and fostering innovation rather than preserving competitors and achieving short-run price cuts.

The mobile wireless marketplace is extremely dynamic. While the current performance of the EU market is below par, sensible policy reforms could bring rapid improvement, creating substantial benefits for EU consumers and spurring accelerated economic growth.

**2.**

# Introduction

As recently as five years ago, markets for mobile wireless services in Europe were performing on par with, or even better than, markets in the United States.

Today, there is broad agreement that the EU has fallen behind in at least some dimensions, and especially with respect to the deployment of next generation LTE networks.[1] We assess the divergence in performance, analyze its causes, and suggest policy changes that would improve performance going forward.

We conclude, in part, that the current market structure inhibits the realization of economies of scale and scope. The reforms we suggest include improving coordination and harmonization of spectrum management policies, permitting efficient levels of consolidation, and incentivizing investment to promote infrastructure-based competition.

To be clear, it is not our contention that U.S. markets are outperforming EU markets in every respect, but rather that the comparison can be useful from the perspective of benchmarking policies and outcomes. Similarly, we do not assert that all or even most of the divergence in performance is accounted for by differences in market structures or regulatory policies, but suggest that market structure is likely one significant factor, and that potentially beneficial changes in policy should be considered in all cases.

The remainder of this paper is organized as follows. Section 2 compares the performance of EU and U.S. mobile wireless markets currently and over time, noting that while prices in the EU are by some measures lower than those in the U.S., U.S. consumers increasingly benefit from more advanced networks, and, partly as a result, consume more services – which in turn generates the revenues necessary to support continued investment. Section 3 discusses the relationship between industry structure and market performance in dynamic markets such as mobile broadband, compares the structures of mobile wireless markets in the EU and the U.S., and posits that at least some of the differences in performance can be traced to differences in industry structures. Section 4 discusses the ways in which three key policy areas – spectrum allocation, competition policy, and policies towards investment and infrastructure-based competition – may affect mobile wireless market performance, and presents recommendations for beneficial reforms. Section 5 summarizes our conclusions.

1. See e.g., Neelie Kroes, "Building Our Digital Single Market: 10 Steps to Deliver Broadband," (January 30, 2013) ("Once, Europe led the world in wireless communication: now we have fallen behind. Europe needs to regain that lead.")(available at http://europa.eu/rapid/press-release_SPEECH-13-80_en.htm) See also Prepared Statement of FCC Chairman Julius Genachowski, Hearing on Oversight of the Federal Communications Commission (July 10, 2012) ("The U.S. has regained global leadership, particularly in mobile. The U.S. leads the world in 3G subscribers by a wide margin, and we are leading the world in deploying 4G mobile broadband at scale.") (available at http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db0710/DOC-315097A1.pdf).

3.

# The Diverging Performance of EU and U.S. Mobile Wireless Markets

While European consumers pay less per month than those in the U.S., U.S. consumers use their devices more intensely than consumers in the EU, and thus pay relatively lower unit prices. Beginning in 2008, U.S. adoption of 3G data services outpaced adoption in the EU, and U.S. carriers have a clear lead in deploying 4G networks. The consumer value created by the move to 4G networks has generated increasing revenues for U.S. carriers, while EU carriers have not kept pace.

In May 2008, Commissioner Viviane Reding warned in an important speech that the EU was losing its lead in mobile wireless:

"[G]rowth [in mobile wireless] has been faster in the U.S., particularly in mobile services [which are] growing more than three times faster in the USA than in Europe. Despite our widely applauded leadership in rolling out the 2nd Generation services we seem to be lagging behind on moving to the mobile web."[2]

The data presented below suggest that Commissioner Reding's concerns were well-founded.

This section reviews the comparative performance of EU and U.S. mobile wireless markets. Data on prices and output show that EU consumers incur lower monthly fees than their U.S. counterparts, but that U.S. consumers utilize mobile services more extensively and thus pay lower unit costs. The higher levels of use exhibited by U.S. consumers are broadly consistent with the thesis that, in a differentiated product market, policies that reduce the amount consumers spend do not necessarily enhance consumer welfare.

The data we present on service quality and choice also suggests that U.S. markets are outperforming EU markets in many respects. For example, while the proportion of customers using smartphones does not differ significantly between the EU and the U.S., it appears that significant numbers of EU smartphone users forego data plans and instead rely on Wi-Fi networks (or do not use data services on their phones at all). The data also suggests that connection speeds on U.S. data networks have surpassed those in the EU.

The third set of performance data we present focuses on network investment and, in particular, the transition to LTE technologies. As noted in the introduction, the EU is deploying LTE more slowly than the U.S.

2. Viviane Reding, "Europe on the Way to a High Speed Internet Economy" (May 8, 2008) at 4.

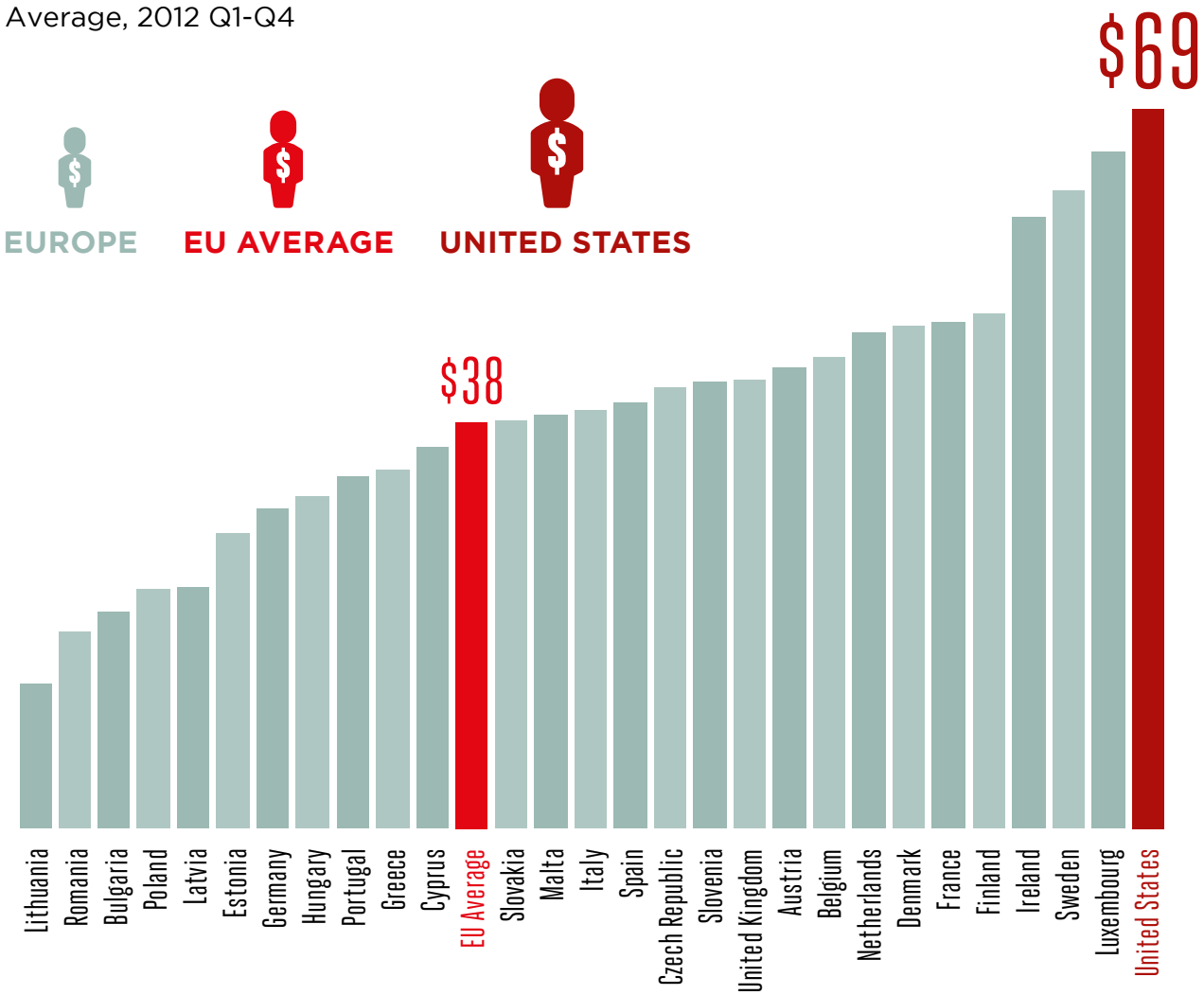
**A.**

# Prices and Output

On average, consumers in the EU pay less per month for mobile wireless services than consumers in the U.S. Figure 1 below shows 2012 average revenue per user (ARPU) for the EU countries as compared to the U.S. As the figure indicates, ARPU in the U.S. is higher than in any EU country, $69 per month compared with an average of $38 for the EU.

## MONTHLY REVENUE PER SUBSCRIPTION

Average, 2012 Q1-Q4




Source: GSMA Wireless Intelligence

*Figure 1*

While EU consumers pay less per month, U.S. consumers use mobile services more intensely, spending more time on the phone and downloading more data than in the EU. As shown in Figure 2, U.S. consumers use 901 voice minutes per month, more than five times the European average of 170 minutes.

## VOICE MINUTES OF USE PER SUBSCRIPTION

2012

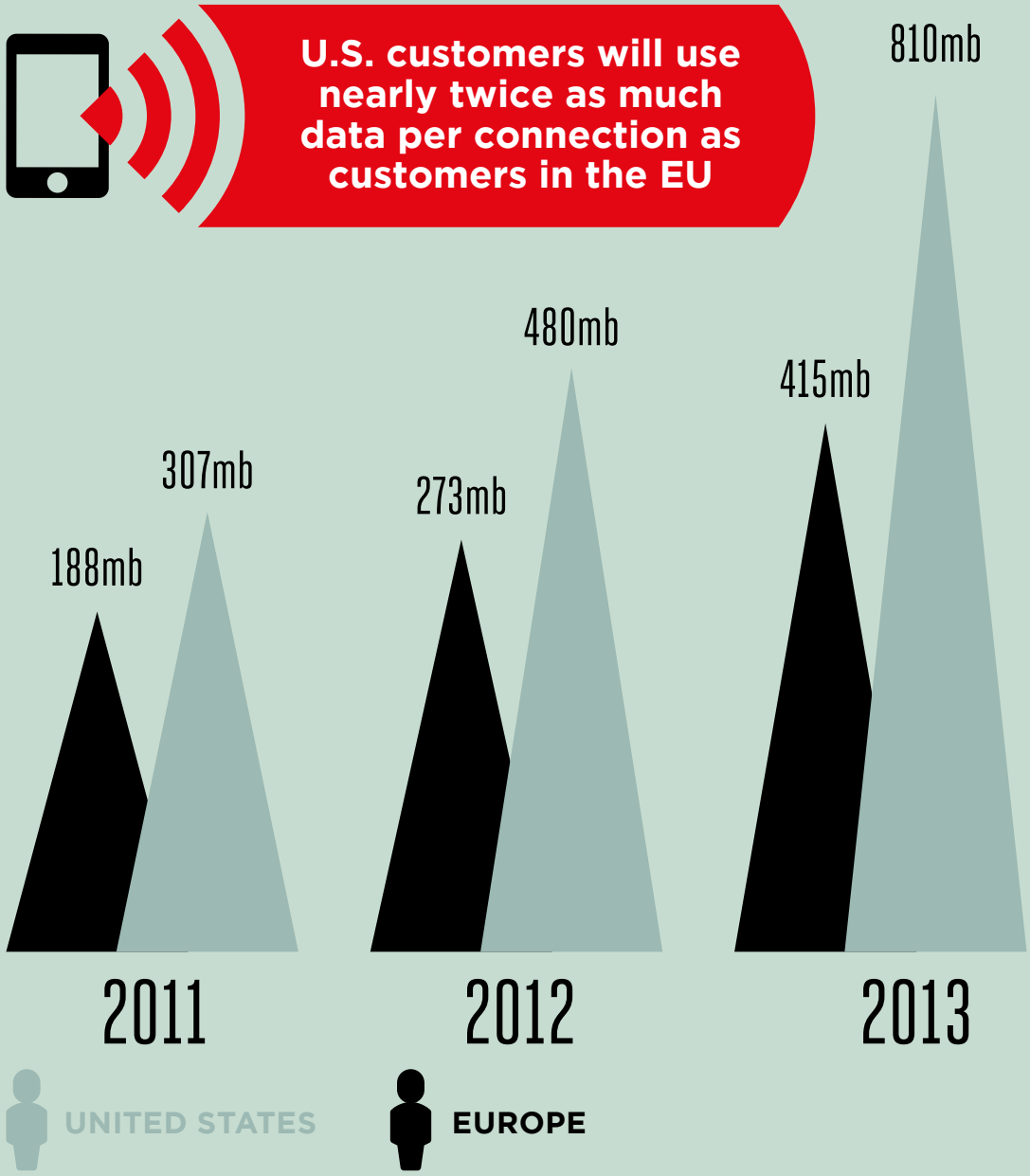

Merrill Lynch Global Wireless Matrix 4Q12 (hereafter, "Global Wireless Matrix")

*Figure 2*

Similarly, as shown in Figure 3, data from Cisco's Visual Networking Index shows that mobile wireless data use per connection in the U.S. is significantly higher than in the EU: in 2013, Cisco projects U.S. customers will use nearly twice as much data per connection as customers in the EU.

## MEGABYTES OF DATA TRAFFIC PER CONNECTION

2011-2013



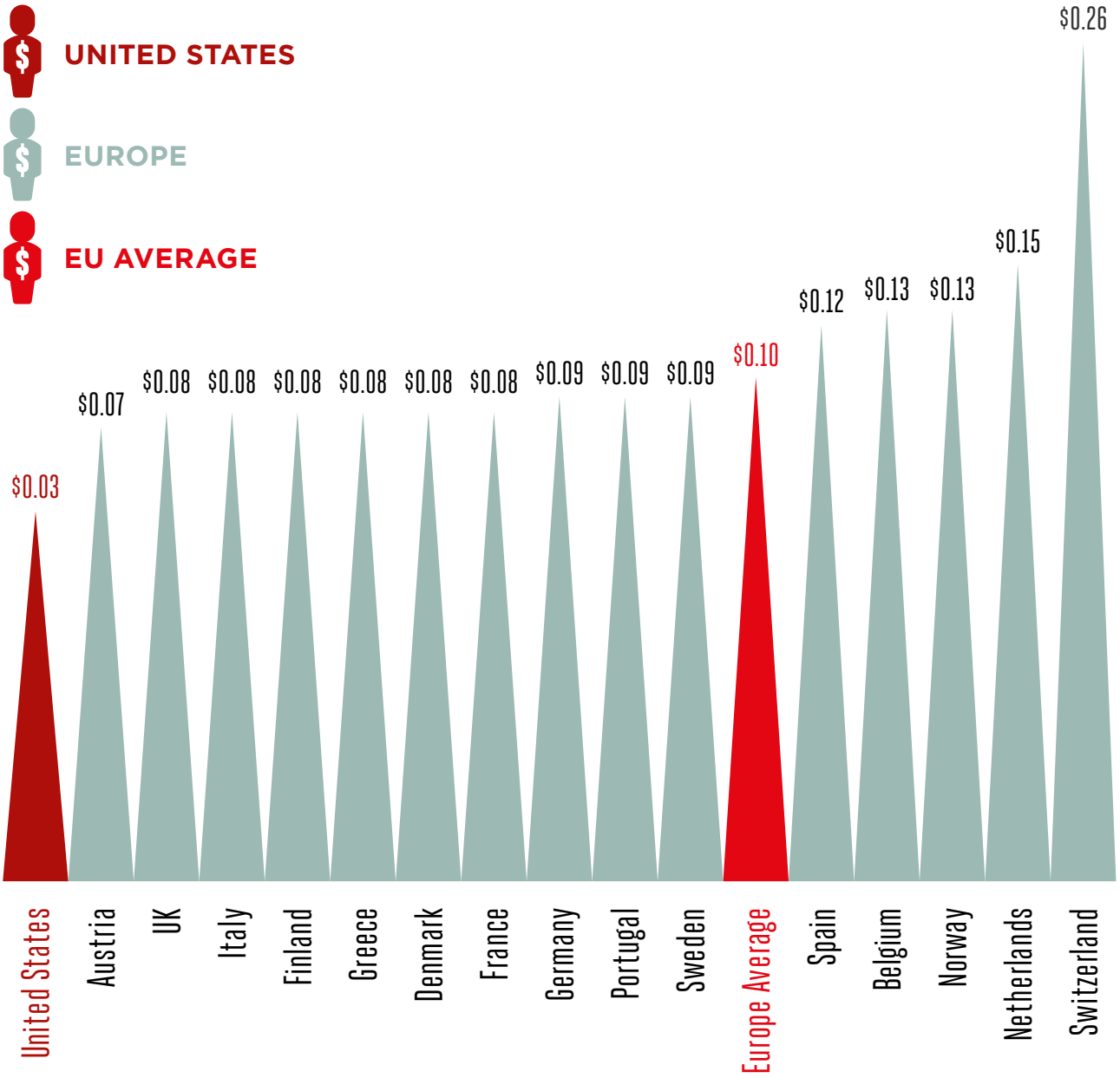

Cisco VNI

*Figure 3*

Thus, while U.S. consumers pay more per month than those in the EU, they pay less per unit of usage. For example, as shown in Figure 4, Merrill Lynch reports that average revenue per minute of voice usage in the U.S. is far lower than in any European country, and less than a third of the European average.

## VOICE REVENUE PER MINUTE

2012



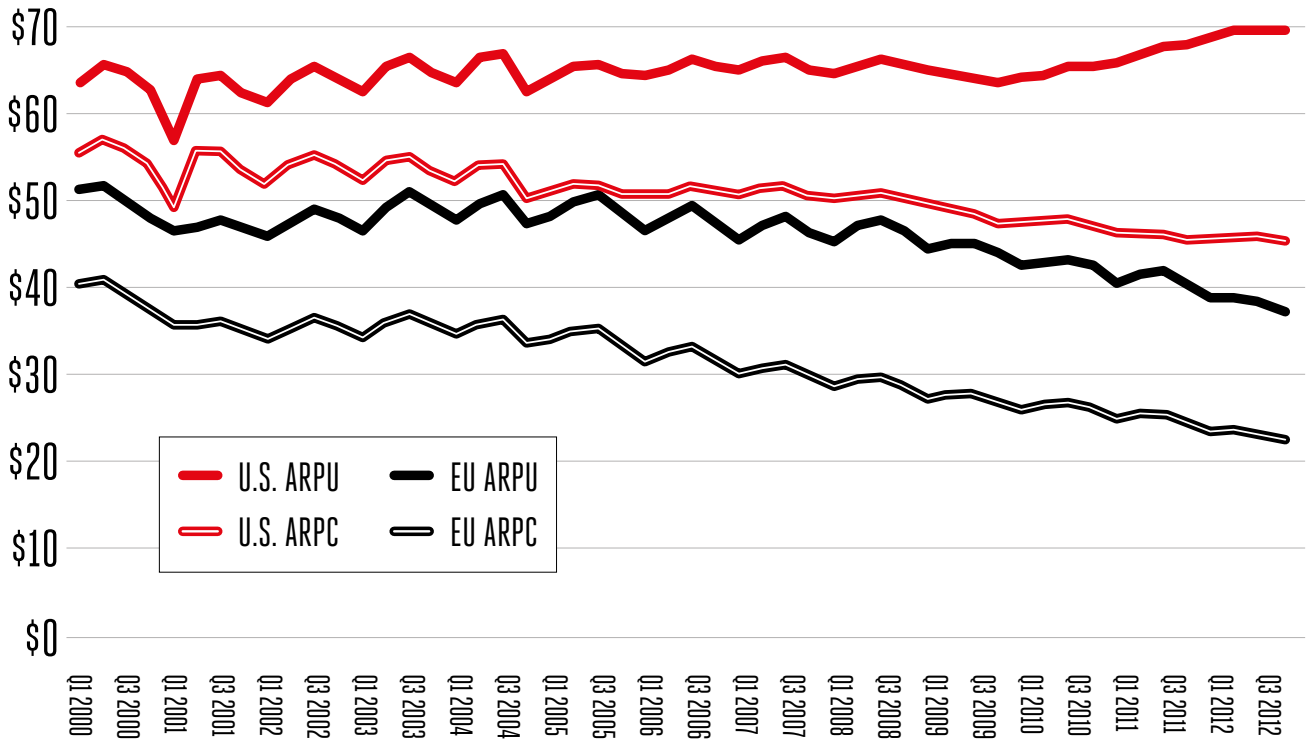

Source: Merrill Lynch

*Figure 4*

Both U.S. and EU consumers have experienced a long-term secular decline in cost (per connection). Average revenue per connection (ARPC) in the EU has fallen by 45 percent since 2000, from over $40 per month to just over $22 per month at the end of 2012, while ARPC in the U.S. fell by 18 percent, to $45, over the same period. However, U.S. consumers tend to connect more data-intensive devices to the network per subscription than in the EU. As a result, as shown in Figure 5, revenue per subscription in the U.S. is actually increasing, while revenue per subscription in the EU continues to decline.

## MONTHLY WIRELESS ARPU AND ARPC, U.S. AND EU

2000 – 2012, $US




Source: GSMA Wireless Intelligence

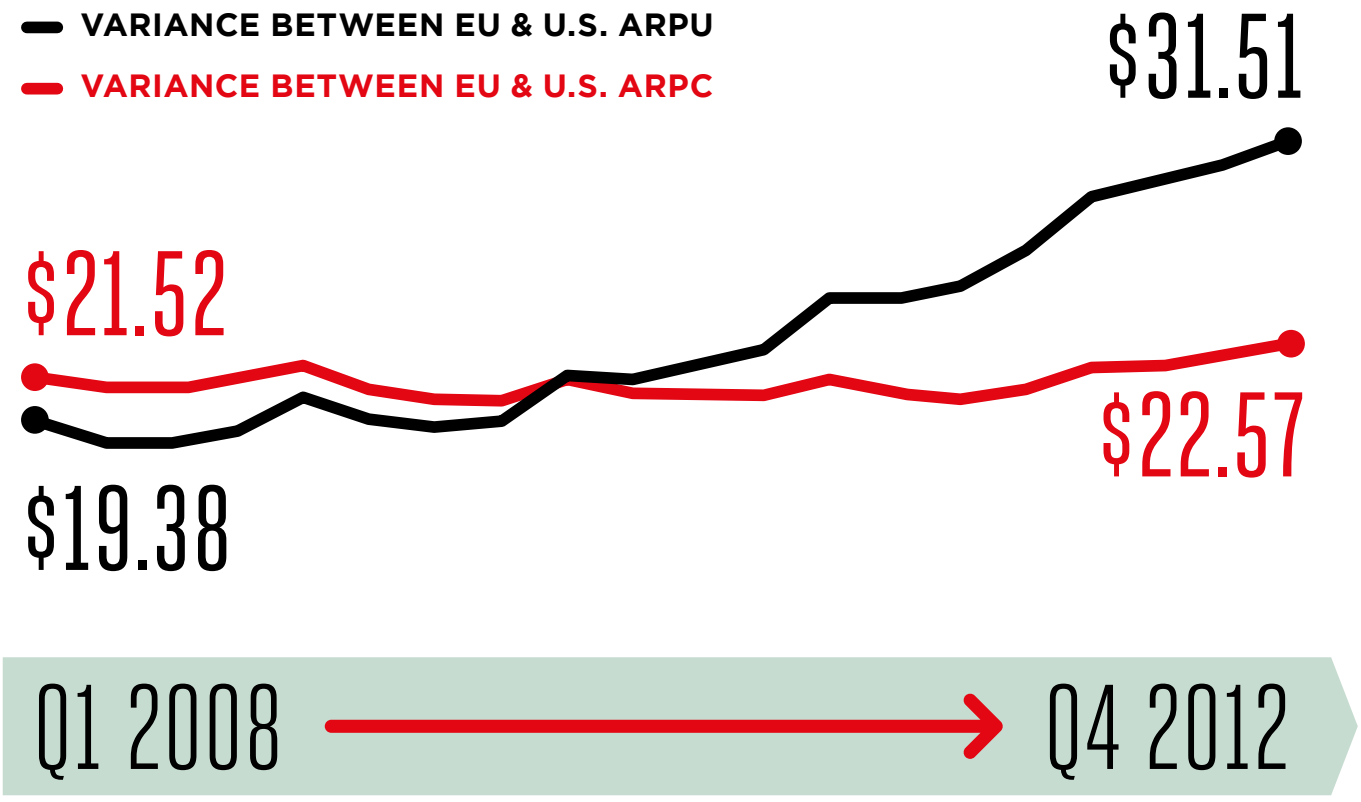
*Figure 5*

**ARPU** AVERAGE REVENUE PER USER
**ARPC** AVERAGE REVENUE PER CONNECTION

The divergence between EU and U.S. revenue performance in recent years is highlighted in Figure 6. The red line shows the difference between EU ARPC and U.S. ARPC from 2008 through the end of 2012. As Figure 6 indicates, ARPC was approximately $22 higher in the U.S. than in the EU throughout the period.
The black line shows the difference between ARPU – revenue per subscription – in the EU and the U.S. over the same time period. As the figure shows, the gap between the EU and the U.S. was less than $20 in 2008, but increased to over $31 by 2012. In both cases, subscribers were spending less per connection (and far less per unit of usage) at the end of the period than the beginning, but U.S. subscribers were choosing to buy more connections.

## DIFFERENCES BETWEEN EU AND U.S. MONTHLY ARPU METRICS

2008 – 2012, $US




Source: GSMA Wireless Intelligence

*Figure 6*

In assessing the causes of these shifts, it is noteworthy that the widening of the gap between U.S. and EU subscriber ARPU (beginning in 2010) coincided with introduction of the first mobile enabled tablets and with the initial deployments of LTE networks (primarily in the U.S.). Analysts attribute growth in the number of connections per user to the "rapid adoption of mobile broadband devices (e.g., USB dongles, datacards, laptops, tablets),"[3] and note that in the U.S. especially, "continued traffic growth from additional usage and multiple devices is encouraging users towards more expensive plans, which is resulting in consistently increasing ARPU."[4]

They also note that U.S. markets display a relatively high level of product differentiation in terms of network technologies (3G versus WiMax versus LTE), as well as a variety of pricing plans.[5] By contrast, analysts attribute downward pricing pressure in Europe to "increasingly commoditized service,"[6] making it "extremely difficult to establish sustainable differentiation between the various operators, with the result that pricing has continuously deteriorated."[7]

While there clearly are multiple causes for the higher revenues earned by U.S. carriers relative to EU carriers, the divergence between EU and U.S. performance in recent years is likely explained in part by the more rapid expansion of the mobile wireless ecosystem in the U.S., spurred by the more rapid and extensive deployment of LTE.

In sections 3 and 4, we discuss the extent to which these differences in performance may relate to differences in market structure and/or regulatory policies. Before doing so, we first describe two other important aspects of market performance: quality and choice; and, investment and innovation.

3. See Joss Gillet, "Global Mobile Penetration – Subscribers Versus Connections," GSMA Wireless Intelligence (October 2012) at 11.
4. Chris Nicoll, "LTE Lessons from Market Leaders in the USA," Analysys Mason (January 25, 2013). According to Merrill Lynch, the U.S. surpassed the EU in the proportion of revenues attributable to data services in 2008. As of Q3 2012, 41 percent of U.S. service revenues were from data, compared with 35 percent for the EU-15. See Global Wireless Matrix at 93.
5. Chris Nicoll, "LTE Lessons from Market Leaders in the USA," Analysys Mason (January 25, 2013).
6. Leila Abboud and Harro Ten Wolde, "Divide Between European and U.S. Telcos Widens," Reuters (February 24, 2013) (quoting Bernstein analyst Robin Bienenstock).
7. HSBC, "European Mobile: A Proposal for Progressive Consolidation," (December 7, 2012).

**B.**

# Quality and Choice

The previous section showed that, whether measured by connection or by subscriber, EU consumers pay less per month for mobile wireless service than U.S. consumers, but they also consume less connectivity, making fewer voice calls and using less data.

In addition to prices and quantities, mobile services are differentiated along several non-price dimensions. Some of these differences are associated with the growing divergence of network capabilities between EU and U.S. networks, i.e., the more rapid deployment of LTE in the U.S. than in the EU. As one analyst firm wrote in late 2012:

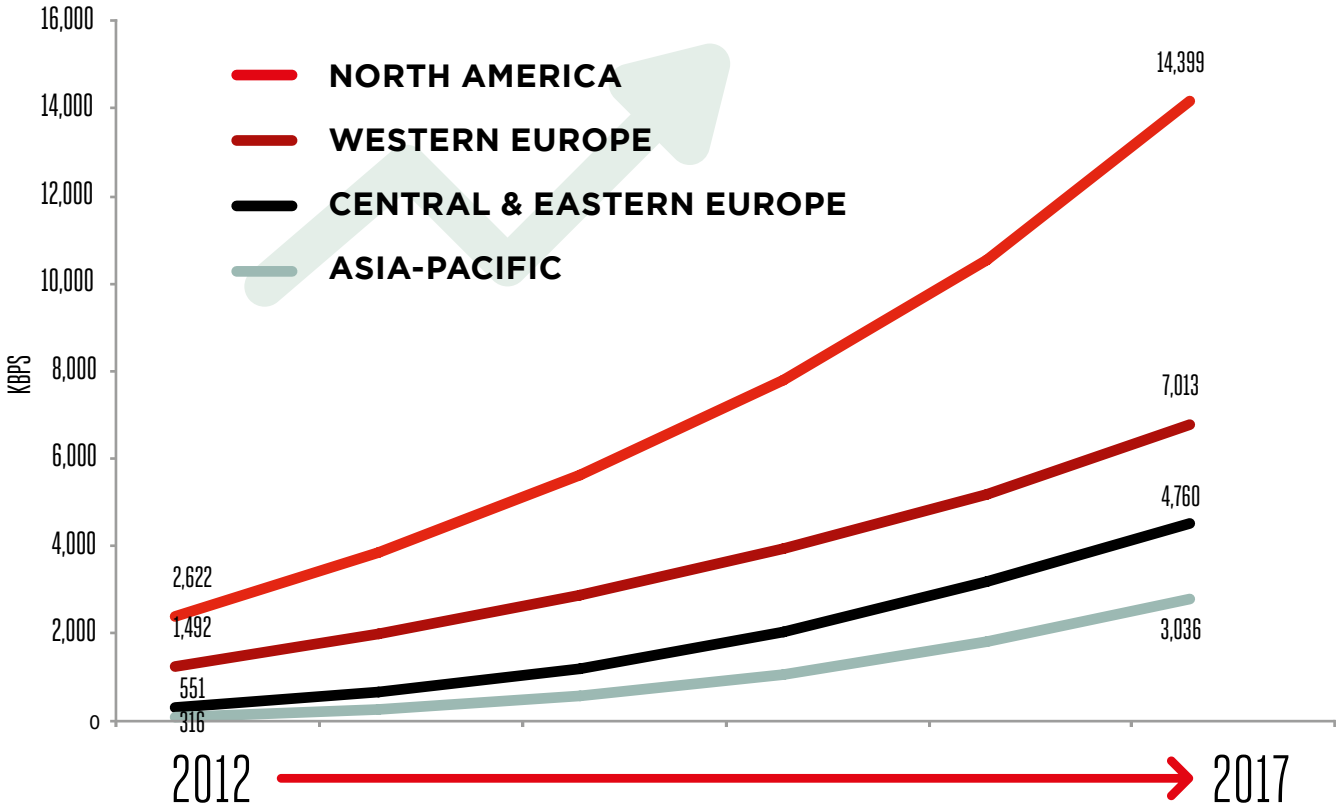
> Europe already has some of the cheapest telecoms services seen in the global developed peer group; the problem is rather that it is falling behind in terms of network capability.... While Americans may pay more for their services, they have access to an increasingly superior platform. U.S. prices might be higher, but this does not necessarily indicate that consumers there receive worse value for money....[8]

One important aspect of mobile wireless quality is the connection speed for mobile data services. While EU and U.S. average connection speeds have been comparable for many years, the more advanced deployment of LTE networks in the U.S. (detailed in the next section) is now beginning to create a gap, which is expected to widen in the immediate future. As seen in Figure 7, Cisco reports that average mobile data connection speeds in North America in 2012 were about 75 percent faster than those in Europe (2.6 Mbps versus 1.5 Mbps), and projects that the gap will expand going forward. By 2017, average mobile connection speeds are projected to exceed 14 Mbps in North America, compared to 7 Mbps in the EU.[9]

8. HSBC, (December 7, 2012).
9. While Cisco reports data only on a regional basis, other data suggest there is substantial variation in performance across both EU carriers and EU Member States. Accordingly, some EU wireless consumers undoubtedly enjoy connection speeds substantially in excess of the averages reported in Figure 7. For instance, Akamai's State of the Internet report shows that U.S. carriers rank above many (but not all) EU carriers in terms of mobile broadband delivered speeds. See Akamai, The State of the Internet (Q4 2012), at Figure 26.

# MOBILE DATA AVERAGE CONNECTION SPEEDS

BY REGION, 2012 AND PROJECTED 2013-2017




Source: Cisco VNI Mobile Forecast (2013)

*Figure 7*

The slow deployment and limited reach of LTE networks in Europe has led some handset manufacturers to focus their device portfolios on the requirements of large-scale U.S. operators, thereby limiting the choice of LTE devices for EU consumers.[10] Most notably, Apple elected not to make its 4G iPhone 5, released in September 2012, compatible with European 4G networks utilizing the 800MHz and 2.6GHz bands which are prevalent in Western Europe, including France, Italy and Spain. Similar issues have confronted the European rollout of the 4G-enabled iPad.[11]

Apple is not alone in choosing not to incur the costs necessary to support 4G devices for the relatively small EU LTE marketplace. Thus, despite TeliaSonera's 4G network launch in late 2009, and Vodafone Germany's 4G deployment in late 2010, the first 4G-enabled European smartphones did not arrive until early 2012.[12] In contrast, customers in the larger U.S. mobile wireless ecosystem have had access to 4G-enabled smartphones since at least mid-2010,[13] and can now choose from among dozens of different LTE-compatible devices. The U.S. Federal Communications Commission (FCC) notes that:

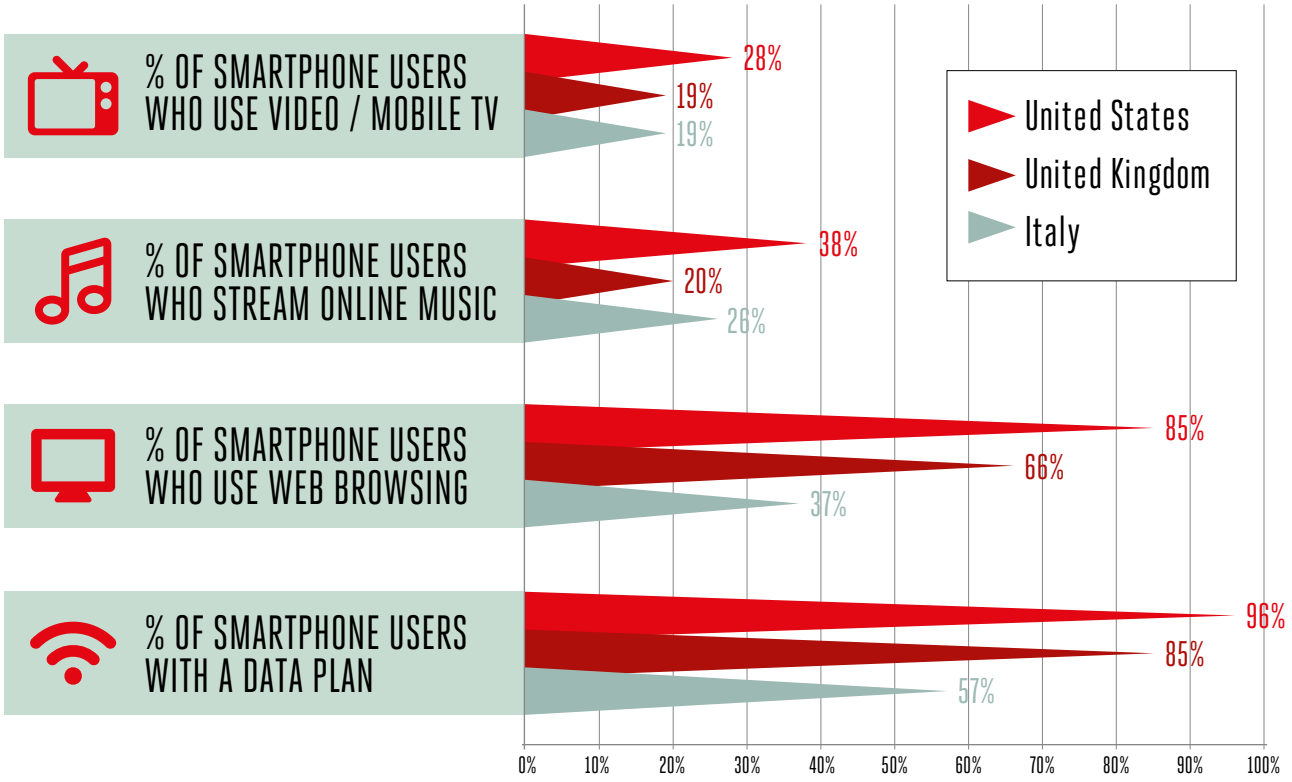
"In addition to competing on price and network quality, mobile wireless providers continue to compete by offering consumers a variety of different mobile wireless devices with innovative features."[14]

While EU and U.S. consumers are equally likely to own smartphones,[15] U.S. consumers are more likely than those in the EU to use their phones for web-related activities. As shown in Figure 8 below, a 2012 Nielsen survey of smartphone use around the world found that U.S. consumers are more likely than those in Italy and the UK to engage in web browsing, music downloading and video streaming; moreover, while nearly all U.S. smartphone owners have a data plan, one out of six Britons and more than four out of 10 Italians do not.[16]



10. See Paul Sandle and Leila Abboud, "Apple's iPhone 5 Puts Europe in 4G Slow Lane," Reuters (September 14, 2012); see also Zack Whittaker, "iPhone 5, Meet Europe: Where 4G Really Means 3G, LTE is Scarce," ZDNet (September 14, 2012). A number of European operators, including Deutsche Telekom in Germany and EE in the UK, have now deployed LTE in the 1.8 GHz band, which is supported by the iPhone5. (See http://www.apple.com/iphone/LTE/.) However, these deployments have sometimes suffered regulatory delays associated with spectrum reframing. EE, for example, waited 10 months for Ofcom to approve its application to use its 1.8 GHz spectrum to support LTE. (See Ofcom,"Decision to Vary Everything Everywhere's 1800 MHz Spectrum Licenses to Allow Use of LTE and WiMax Technologies" (August 21, 2012) (available at http://stakeholders.ofcom.org.uk/binaries/consultations/variation-900-1800mhz-lte-wimax/statement/statement.pdf).Zack Whittaker, "Europeans, Australians: Don't Rush to Buy a 4G New iPad Just Yet," ZDNet (March 15, 2012).
11. Zack Whittaker, "Europeans, Australians: Don't Rush to Buy a 4G New iPad Just Yet," ZDNet (March 15, 2012).
12. Vodafone Germany released the HTC Velocity, Europe's first 4G smartphone, in February 2012. TeliaSonera began offering the Samsung Galaxy S II LTE in March 2012. See, e.g., Daniel Gleeson, "Vodafone Germany launches first European 4G smartphone," IHS (17 February 17,2012) (available at http://www.screendigest.com/news/2012_02_vodafone_germany_launches_first_european_4g_smartphone/view.html).
13. Sprint's Android-based HTC EVO 4G was launched June 4, 2010. See Dave Hendrick, "Sprint 4G phone to launch in June," SNL Kagan ( May 13, 2010).
14. Federal Communications Commission, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, Sixteenth Report (March 21, 2013) at ¶220. Hereafter 16th CMRS Report.
15. According to Merrill Lynch, 39 percent of consumers own Smartphones in each region. See Global Wireless Matrix at 2.
16. Nielsen, The Mobile Consumer: A Global Snapshot (February 2013). The study surveyed ten countries, of which Italy and the UK were the only two in the EU.

# INTENSITY OF SMARTPHONE USE FOR DATA CONSUMPTION




Source: Nielsen, The Mobile Consumer: A Global Snapshot (February 2013).

*Figure 8*

There is no single metric by which to compare the overall quality of mobile broadband services, especially since consumer tastes are themselves heterogeneous, meaning that different consumers assign different values to various product characteristics. This said, the evidence suggests that the relative performance of EU markets on some significant characteristics is deteriorating.

**c.**

# Investment and Innovation

As the FCC noted in its most recent report on competition in the U.S. mobile wireless industry, "Network investment remains a centerpiece of service providers' efforts to improve their customers' mobile wireless service experience.... [A] critical way in which mobile wireless service providers differentiate themselves is with the speeds, reliability, capabilities, and coverage of their mobile broadband networks."[17] In recent years, such competition has centered on the deployment of LTE infrastructures, and U.S. deployments are now well advanced. As the evidence below indicates, EU deployments of LTE infrastructures are occurring more slowly.

We note at the outset of this section that deployment of mobile wireless networks depends on a variety of factors, including the availability of necessary spectrum. Some U.S. carriers are relying in part on spectrum made available from the "digital TV transition" – the so-called "digital dividend" – for LTE deployment. This 700MHz spectrum was made available through an auction conducted in early 2008, which produced winning bids totaling nearly $19 billion.[18] By contrast, several EU nations have lagged behind in re-allocating analog television spectrum. As a result, EU carriers have not been able to utilize some of the lower spectrum bands which are widely regarded as most favorable for LTE deployments. That said, U.S. carriers such as Sprint and T-Mobile are making large investments to deploy widespread LTE networks in comparable spectrum bands as those currently available to many EU carriers.[19] As discussed in Section 4, we believe spectrum allocation and related policies play an important part in the divergence between EU and U.S. wireless performance, but that other factors contribute as well.

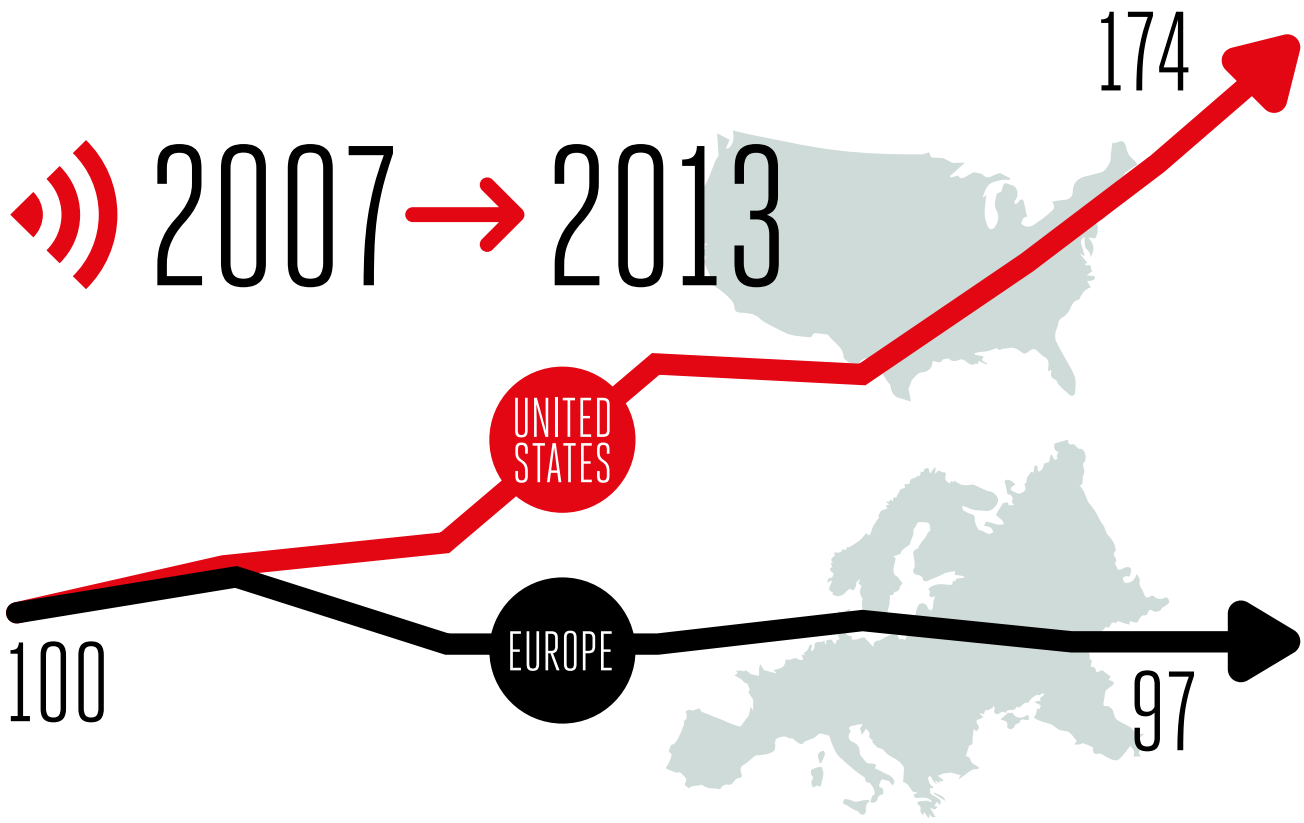
17. See 16th CMRS Report at 181.
18. See Federal Communications Commission, "Auction 73" (available at http://wireless.fcc.gov/auctions/default.htm?job=auction_factsheet&id=73).
19. For example, Sprint has deployed its LTE network using its 10 MHz PCS G block licenses in the 1910-1915 MHz and 1990-1995 MHz bands. See 16th CMRS Report at 192, 197.

## Ultimately, the deployment of new telecommunications infrastructures depends on investment, and the data show mobile wireless investment in the U.S. has outpaced the EU.

Figure 9 shows the divergence between the level of capital expenditures on wireless infrastructure in the EU and the U.S. as estimated by Goldman Sachs. As the figure shows, the level of wireless capex in the U.S. has grown by over 70 percent since 2007, while declining in the EU.[20]

### WIRELESS CAPEX IN EUROPE VERSUS THE U.S.

Index 2007 = 100




**Source: Goldman Sachs Global Investment Research**

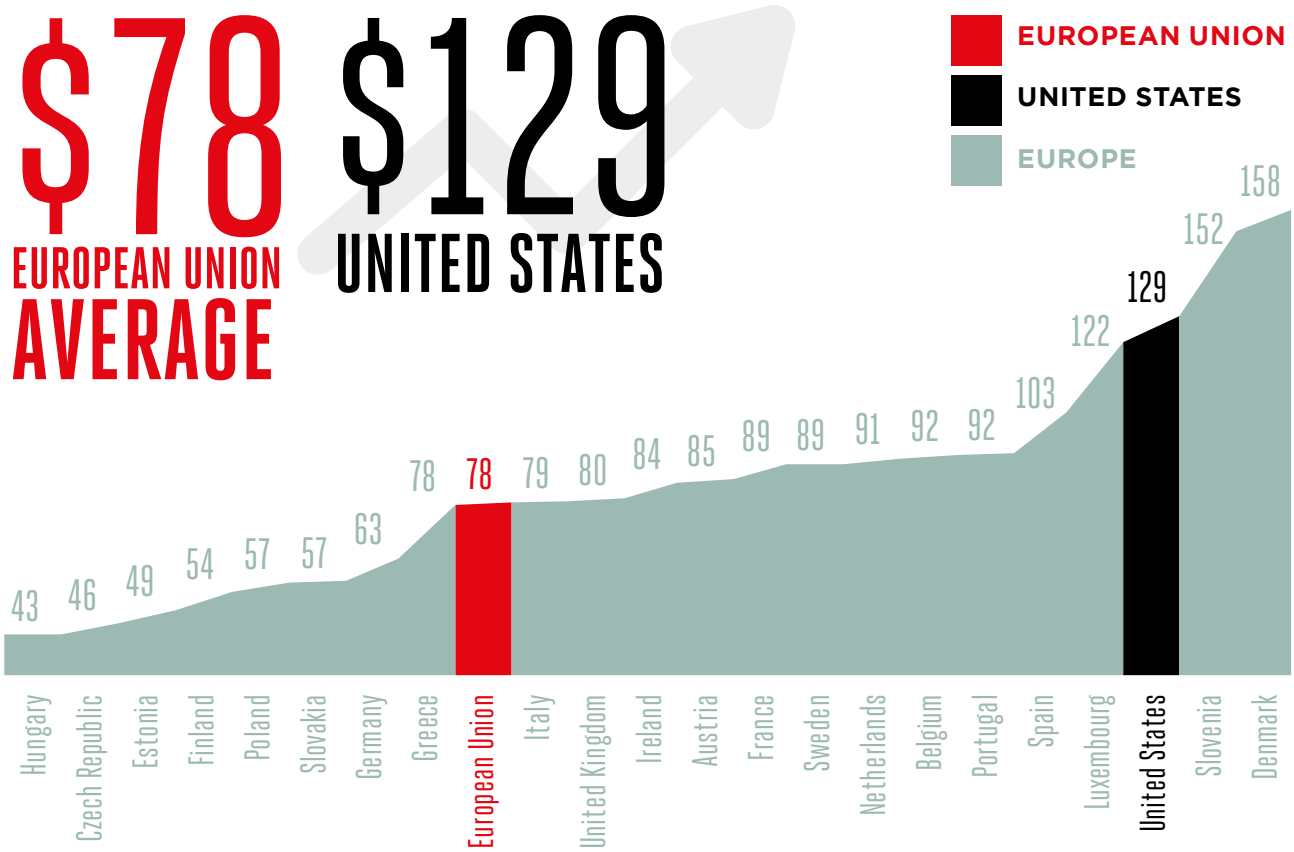
*Figure 9*

20. In addition to industry structure and regulatory policies, capital expenditures may be affected by several factors, including macroeconomic conditions and the underlying investment cycle.

The relative decline is all the more serious given that the evidence suggests that the EU started from a lower base: as shown in Figure 10 below, in 2007, U.S. carriers invested $129 per access path, more than any European Union country except Denmark and Slovenia, and far higher than the EU average of $78.[21]

## ANNUAL TELECOMMUNICATIONS INVESTMENT PER COMMUNICATIONS ACCESS PATH

SELECTED COUNTRIES, 2007, $U.S.




**Source: OECD Communications Outlook, 2011**

*Figure 10*

The divergence in network investment has directly affected the pace of LTE deployment. Deployment in the U.S. has gone forward at what some analysts have called an "unprecedented" pace.[22] Since their initial deployments in December 2010 (Verizon Wireless) and September 2011 (AT&T), the two major US carriers have extended coverage to over 273 million POPs and 170 million POPs, respectively. Verizon Wireless' LTE network now covers over 85 percent of the U.S. population, and is already carrying 50 percent of the company's total data traffic.[23]

21. The data in Figure 10 refer to capital expenditures on both fixed and mobile networks; however, there is no prima facie basis for believing that mix between fixed and mobile capex differs significantly between Europe and the U.S.
22. Sharon Armbrust, "Race to Flood US With 4G LTE Networks in High Gear," SNL Kagan Wireless Investor (March 19, 2012).
23. HSBC Global Research, "European Telecoms: A Singular Vision for the Sector," (February 18, 2013) at 11.

As shown in Table 1, even smaller U.S. players are also deploying rapidly: Sprint, U.S. Cellular, Leap Wireless and MetroPCS/T-Mobile (now merged) are all in the process of large-scale deployments.[24]

## U.S. LTE NETWORK COVERAGE AND SUBSCRIBERSHIP

AS OF Q4 2012

| OPERATOR | LAUNCH DATE | COVERED POPS | POPULATION COVERAGE | LTE CONNECTIONS AS % OF TOTAL |
|---|---|---|---|---|
| **VERIZON WIRELESS** | December 2010 | 273 million | 86% | 18.9% |
| **AT&T MOBILITY** | September 2011 | >170 million | 53% | 7.5% |
| **METROPCS** | September 2010 | ~100 million | ~31% | 24.8% |
| **SPRINT** (SPRINT NEXTEL) | July 2012 | 88 cities | n/a | 7.3% |
| **US CELLULAR (TDS)** | March 2012 | 57 million | 18% | 13.2% |
| **CRICKET COMMUNICATIONS** (LEAP WIRELESS) | December 2011 | 21 million | 7% | 1.1% |

**Source: GSMA Wireless Intelligence**

*Table 1*

24. As discussed below, one of the rationales offered by the FCC for approving the merger of T-Mobile and MetroPCS (the fourth and fifth largest U.S. carriers) was the ability of the combined firm to capture economies of scale and scope and thus enhance and accelerate LTE deployment.

In contrast, although operators in some EU nations launched LTE services relatively early, deployment has proceeded slowly, and LTE coverage and uptake has remained quite limited. As shown in Table 2, although several EU nations deployed LTE in 2009 and 2010, 16 out of 27 had not launched as of the end of 2011, and several have not done so yet.

## EU LTE LAUNCH DATES AND SUBSCRIBERSHIP

AS OF 2012 Q4

| COUNTRY | LAUNCH DATE | PERCENTAGE OF CONNECTIONS USING LTE |
|---|---|---|
| **EUROPEAN UNION** | Q4 2009 | 0.30% |
| **SWEDEN** | Q4 2009 | 4.70% |
| **POLAND** | Q3 2010 | 0.10% |
| **GERMANY** | Q4 2010 | 0.60% |
| **FINLAND** | Q4 2010 | 1.60% |
| **DENMARK** | Q4 2010 | 1.10% |
| **ESTONIA** | Q4 2010 | 0.60% |
| **AUSTRIA** | Q4 2010 | 0.00% |
| **LITHUANIA** | Q2 2011 | 0.20% |
| **LATVIA** | Q2 2011 | 0.20% |
| **PORTUGAL** | Q1 2012 | 0.60% |
| **HUNGARY** | Q1 2012 | 0.10% |
| **NETHERLANDS** | Q2 2012 | 0.00% |
| **CZECH REPUBLIC** | Q2 2012 | 0.00% |
| **SLOVENIA** | Q3 2012 | 0.00% |
| **UNITED KINGDOM** | Q4 2012 | 0.10% |
| **ITALY** | Q4 2012 | 0.00% |
| **FRANCE** | Q4 2012 | 0.00% |
| **LUXEMBOURG** | Q4 2012 | 0.10% |
| **GREECE** | Q4 2012 | 0.00% |
| **BELGIUM** | Q4 2012 | 0.00% |
| **ROMANIA** | Q4 2012 | 0.00% |
| **SPAIN** | Q2 2013 (est.) | n/a |
| **IRELAND** | Q3 2013 (est.) | n/a |
| **SLOVAKIA** | Q3 2013 (est.) | n/a |
| **BULGARIA** | Q1 2014 (est.) | n/a |

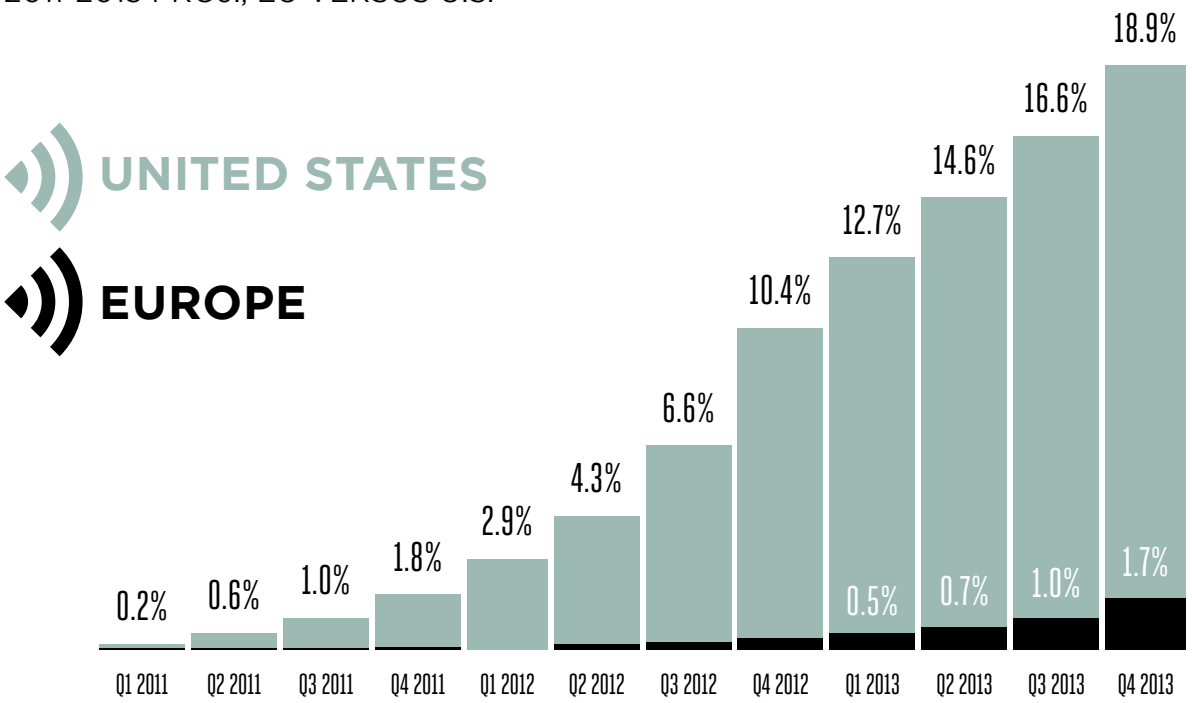
Source: GSMA Wireless Intelligence

*Table 2*

Not surprisingly, uptake of LTE services in the U.S. is outpacing uptake in the EU. As depicted in Figure 11, by late 2012 more than 10 percent of U.S. wireless connections were on LTE networks, compared with less than one percent in the EU. Moreover, U.S. carriers are moving quickly to transition customers to the new networks: by year-end 2013, nearly 20 percent of U.S. connections are expected to be on LTE networks, compared to less than two percent in the EU; Verizon has announced it intends to phase out its 2G and 3G networks entirely by 2021.[25] By contrast, even in EU countries where LTE has been deployed, uptake is very low and projected to remain far below U.S. levels. As shown in Table 2 above, even Sweden has migrated less than five percent of its subscriber base. The extreme case is Austria, where, despite LTE deployments by three different wireless carriers in 2010 and 2011, one Austrian carrier recorded fewer than three hundred LTE subscribers during the first half of 2012, and uptake remains minimal overall. The lack of demand is explained at least partially by limited network coverage.[26]

## LTE CONNECTIONS AS PERCENTAGE OF TOTAL

2011-2013 PROJ., EU VERSUS U.S.




**Source: GSMA Wireless Intelligence**

*Figure 11*

To summarize the material presented in this section, mobile wireless markets in the EU are characterized by lower prices, lower intensity of use, lower revenues, lower quality (at least along some significant dimensions), less product differentiation and consumer choice, a slower pace of innovation, and lower rates of capital investment than the mobile wireless market in the U.S. The next sections assess the extent to which these differences may be related to market structure and/or regulatory policies.

25. See Mike Dano, "Verizon Wireless to Sunset 2G and 3G CDMA Networks by 2021," FierceWireless (October 10, 2012).
26. Joss Gillet, "European LTE Rollouts Hampered by Lack of Digital Dividend Spectrum," GSMA Wireless Intelligence (February 15, 2013) ("Austria is a good example of this. Both T-Mobile (Deutsche Telekom) and A1 (Telekom Austria) launched their respective LTE networks in Q4 2010, followed by 3 (Hutchison) in Q4 2011. All three operators deployed LTE in the 2600 MHz band which is only economically viable to cover Vienna and a limited number of other cities, resulting in only a quarter of the Austrian population being covered by LTE networks to date. This phenomenon has in turn led to low adoption of LTE services by end users; the local regulator (RTR) reported that LTE connections stood at a mere 223 in Q1 2012 and 287 in Q2 2012 for one 'unnamed' Austrian operator.").

4.

# Structural Determinants of Market Performance

Mobile wireless markets are dynamic and benefit from economies of scale and scope. The relationship between market structure and performance in these markets is more complex than in traditional "textbook" markets, and policies designed to "promote competition" can have unintended consequences. National markets in the EU are both smaller and more concentrated than the U.S. market. The fragmentation of the EU market deprives EU carriers of economies of scale and scope, raising costs and hampering innovation in the mobile wireless ecosystem.

The relative performance of U.S. and EU mobile wireless markets is determined by a variety of factors, including macroeconomic conditions (which in recent years have favored the U.S.), differences in culture and demographics, and so forth. In addition to these differences, one factor which is known to affect market performance is market structure.

In traditional markets, it is generally believed that less concentrated market structures are associated with lower prices and better performance.[27] In markets with high rates of innovation and other characteristics usually associated with the Internet ecosystem ("dynamic markets"), the relationship between structure and performance is more complex.[28] In the first subsection below, we discuss the ways market structure can affect performance in dynamic markets. In the second subsection we describe differences in mobile wireless market structure between the EU and the U.S.

27. While the relationship between concentration and performance is widely assumed, many economists question its empirical foundations. See e.g., See Dennis W. Carlton and Jeffrey M. Perloff, Modern Industrial Organization (Addison Wesley 2005), at 281 ("The empirical relationship between measures of performance, such as price-cost margins, and market structure, such as concentration and entry barriers, is not clear.").
28. See e.g., Timothy J. Tardiff and Dennis L. Weisman, "The Dominant Firm Revisited," Journal of Competition Law and Economics 5(3) (2009) 517-536 at 530 ("In telecommunications markets, in particular, where demand complementarities, multi-market participation, and high price/cost margins are the norm, traditional, single-market measures of market power are likely to seriously overstate extant market power.")

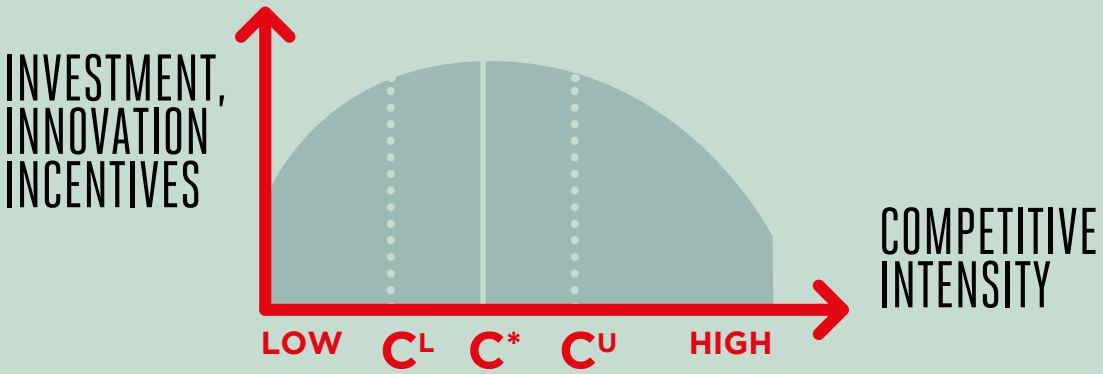
**A.**

# Dynamic Markets and the Economics of Mobile Wireless

Like other markets in the Internet ecosystem, mobile wireless markets are characterized by dynamism, product differentiation, economies of scale and scope, network effects, multi-sidedness, and modularity.[29] Competition in such dynamic markets differs from the standard textbook model of static competition, which assumes the existence of many suppliers selling a commoditized (homogeneous) product that does not change over time.

Mobile wireless markets are subject to rapid innovation, with new generations of mobile wireless technology being introduced approximately every five years.[30] Firms in such markets engage in "Schumpeterian" competition, vying to offer consumers products with new and more valuable features, a process which includes making large, risky investments.[31] In contrast to static textbook markets, where lower levels of concentration are thought – other things equal – to be associated with higher consumer welfare, there is no consistent relationship between market concentration and innovation.[32] To the contrary, as illustrated in Figure 12 below, increasing the number of competitors in dynamic markets can lower consumer welfare by reducing the incentives of all firms in the market to innovate and invest.[33] Thus, competition regulation of such markets must take into account the effect on incentives for ongoing innovation and investment.[34]

## TRADE-OFF BETWEEN COMPETITIVE INTENSITY AND INNOVATION




**Source: Bauer (2010)**

*Figure 12*

29. See generally Jeffrey A. Eisenach, Theories of Broadband Competition (Washington: American Enterprise Institute, 2012).
30. See Federal Communications Commission, Omnibus Broadband Initiative, Technical Paper No. 6: Mobile Broadband (October 2010) at 15. See also Robert Hahn and Hal J. Singer, "Why the iPhone Won't Last Forever and What the Government Should do to Promote Its Successor," Journal on Telecommunications and High Technology Law 8 (2010) 313-350, esp. at 317-330.
31. See e.g., Michael L. Katz and Howard A. Shelanski, "'Schumpeterian' Competition and Antitrust Policy in High-Tech Markets," Competition 14 (2005).
32. See Katz and Shelanski at 19 ("[A] proper understanding of innovation-based competition means that, in some markets, antitrust enforcement cannot rely on its long-established presumptions that increased concentration or market power will reduce innovation or harm consumer welfare.") (available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=925707). See also Carl Shapiro, Antitrust, Innovation, and Intellectual Property, Testimony before the Antitrust Modernization Commission, November 8, 2005 at 11-12 ("[T]here is no consensus among industrial organization economists about the general relationship between concentration and innovation competition.").
33. See e.g., Johannes M. Bauer, "Regulation, Public Policy and Investment in Communications Infrastructure," Telecommunications Policy 34 (2010) 65–79.
34. See e.g., Johannes M. Bauer and Erik Bohlin, "From Static to Dynamic Regulation," Intereconomics (January/February 2008) 38-50.

Mobile wireless markets are also characterized by modularity (or "platform competition"), meaning that sellers compete to differentiate their products by assembling the most attractive packages of complementary products and services – that is, combinations of communications services, handsets and other devices, and content and applications – that best meet consumers' needs.[35] In such markets, the success of the entire ecosystem is dependent upon advances (or shortcomings) in each of its complementary elements. Thus, for example, the failure of mobile carriers operating in a certain spectrum band to achieve sufficient scale may make it uneconomic for equipment producers to create compatible handsets, resulting in feedback effects that further retard the growth of the entire system.

In the same sense, high-tech markets are typically multi-sided, meaning that mobile wireless providers must not only compete for the favor of "downstream" consumers, but also for the cooperation of "upstream" producers of complementary inputs. The ability to do so depends on both economies of scale and scope and on the ability to engage successfully in product differentiation.[36] Thus, policies that inhibit product differentiation, e.g., by encouraging commoditization around lowest-price offerings, may tip the competitive scales against the commoditized firm or industry, lowering its returns while raising the returns of its platform competitors.[37] More broadly, holding prices below market levels in differentiated product markets will generally limit consumer choice and result in suboptimal levels of product quality.[38]

To put these concepts in more concrete terms, consumers have demonstrated through their purchasing decisions that they value the improved functionalities – such as faster speeds, more capable handsets, access to music and video content, and a multitude of mobile apps – that have been enabled by mobile wireless innovation.

From a consumer welfare perspective, continuing improvements in product quality effectively increase the value consumers attach to mobile wireless services, and thus increase consumer surplus. To accurately assess the impact of policy on consumer welfare, it is necessary to balance these qualitative, dynamic forms of value creation against the static, short-term benefits of lower prices.

Innovation accounts for the largest share of improvement in consumer welfare.[39] Policies that sacrifice long-term dynamic efficiency for short-term gains in static efficiency (e.g., by pursuing policies that set prices at or near short-term marginal costs) risk being penny-wise and pound foolish. Similarly, regulatory policies that prevent firms from achieving optimal scale, or result in below-market prices, can create the illusion of greater competition or enhanced consumer welfare while in fact detracting from both objectives. In markets characterized by network effects, policies that limit firms' ability to capture economies of scale and scope may be particularly pernicious, as they may prevent new products and services from reaching the "tipping point" at which positive network effects lead to rapid increases in adoption (and accompanying consumer welfare benefits).

As we explain in the next section, the observed shortfalls in the performance of European mobile wireless markets are consistent with the hypothesis that fragmented market structures are hindering carriers' ability to achieve economies of scale and scope, and thus limiting the exploitation of beneficial network effects throughout the mobile wireless ecosystem.

35. See e.g. Thomas Hazlett, David Teece and Leonard Waverman, "Walled Garden Rivalry: Creation of Mobile Network Ecosystems," George Mason University Law and Economics Research Paper Series (November 2011).
36. See Eisenach (2012).
37. See e.g., Everett M. Ehrlich, Jeffrey A. Eisenach and Wayne A. Leighton, "The Impact of Regulation on Innovation and Choice in Wireless Communications," Review of Network Economics 9;1 (2010).
38. For a more complete discussion, see Sherwin Rosen, "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition," The Journal of Political Economy 82; 1. (January - February 1974) 34-55.
39. The seminal work is Robert Solow, "Technical Change and the Aggregate Production Function," Review of Economic Studies 39 (August 1957) 312-320 at 320 (finding that 87.5 percent of the increase in non-farm output in the U.S. between 1909 and 1949 was due to technological progress). See also Robert D. Atkinson and David B. Audretsch, "Economic Doctrines and Approaches to Antitrust," Information Technology & Innovation Foundation (January 2011) at 13-14.

**B.**

# Comparing Market Structures

In an effort to promote low retail prices for wireless consumers, regulators in the EU have emphasized policies designed to maintain low levels of concentration in retail wireless markets. At the same time, the lack of a single market in mobile wireless services has resulted in market fragmentation: each national market has unique regulatory characteristics and, crucially, distinct spectrum licensing regimes. As a result, EU carriers are forced to operate in smaller markets and are less able to capture economies of scale and scope that would come with efficient consolidation.

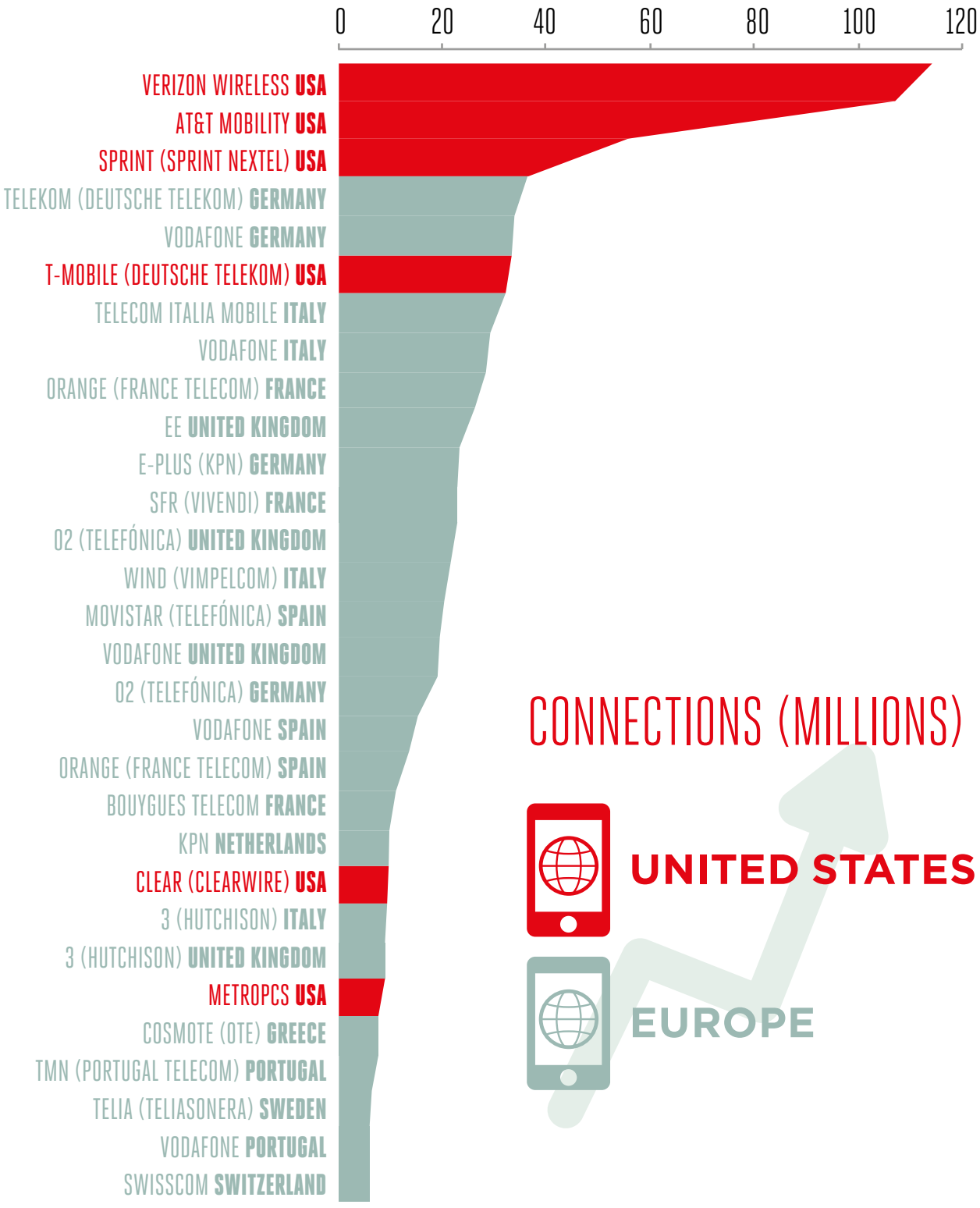
The obvious consequence of market fragmentation is that national EU markets are each much smaller than the U.S. market: Merrill Lynch estimates there were 341 million wireless subscriptions in the U.S. at year-end 2012, while the largest EU market – Germany, with 115 million subscriptions – was only a third as large.[40]

As shown in Figure 13, based on national counts, each U.S. carrier serves far more connections than their EU counterparts. Indeed, America's two largest carriers are each larger than the three largest EU carriers combined. With the completion of the merger between T-Mobile and MetroPCS, the four largest U.S. carriers are each larger than the largest EU national carrier (Deutsche Telekom).

40. Merrill Lynch also estimates the EU-15 in total was significantly larger than the U.S., with 533 million subscriptions in the EU-15 alone. See Global Wireless Matrix at 62.

# MOBILE CONNECTIONS BY CARRIER, NATIONAL MARKETS

Selected Carriers, Q4 2012




Source: GSMA Wireless Intelligence

*Figure 13*

The data in Figure 13 are relevant for assessing firm-level, market-specific economies of scale, which are only one of several types of scale and scope economies present in mobile wireless markets. For example, some firm-specific scale economies presumably are not limited by market, and thus would be better reflected in firm-wide measures of scale (rather than market-specific data like what is reported above). Economies of scale are also present at the industry level, based (for example) on the compatibility of common technology platforms (e.g., GSM, LTE) or spectrum bands.[41] Further, there are likely significant economies of scope (for example, between the provision of fixed and mobile services) that are not captured in mobile subscriber counts alone, but which may be affected by market fragmentation.

While the relationship between scale and efficiency is admittedly multidimensional, it is certainly reasonable to hypothesize that the fragmented nature of EU markets impedes performance and harms consumer welfare in both static and dynamic terms. In static terms, national markets limit the exploitation of economies of scale and hence lead to higher levels of concentration, which may, in turn, spur even more stringent regulatory efforts to subsidize entry and deter consolidation.

A potentially more costly effect of regulatory fragmentation is to hamper dynamic efficiency. Because each of the 27 EU regulatory regimes is distinct, each poses a separate layer of regulatory risk for any proposed innovation or change that requires regulatory approval or facilitation. Especially for changes such as the transition to LTE, in which economies of scope and scale cross geographic borders (e.g., efficiencies associated with homogenous band plans, equipment availability, and consumer expectations about cross-border compatibility) are important, the lack of predictability, homogeneity and synchronicity implied by multiple regulatory regimes has the potential to inhibit beneficial innovation.

The recently consummated merger between U.S. carriers T-Mobile (33 million connections) and MetroPCS (nine million connections) provides a good example of the positive dynamic effects of efficient consolidation. In fact, the FCC justified its decision to approve the merger in part on its finding that the merger will "enable the deployment of a substantial LTE network nationally":

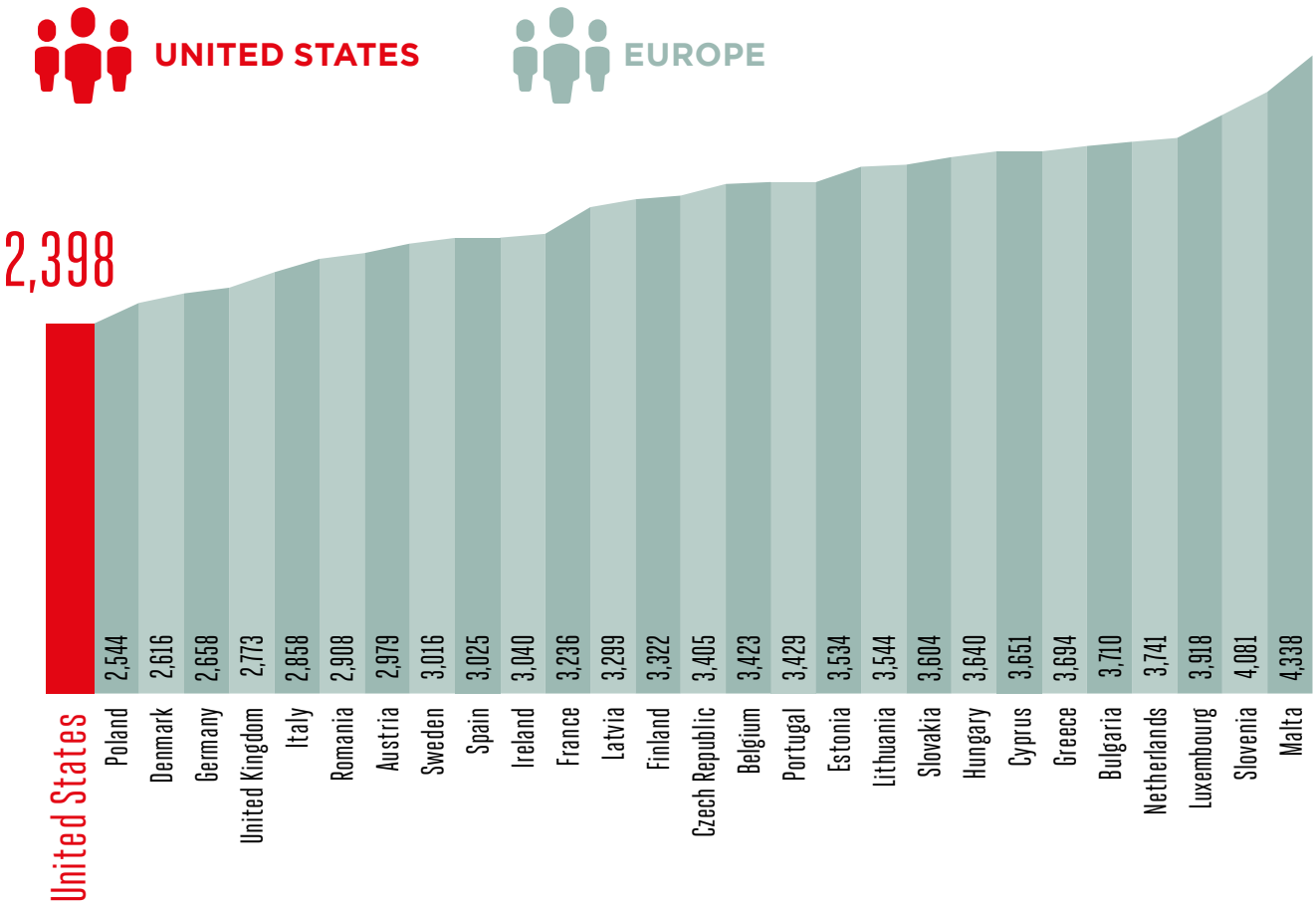
> "[T]he combination of T-Mobile USA and MetroPCS would enable the deployment of a substantial LTE network nationally that would enhance competition and provide important benefits for consumers. By merging the two companies, and their network assets and spectrum, we find that the resulting Newco would provide for a broader, deeper, and faster LTE deployment than either company could accomplish on its own."[42]

Finally, it is not surprising that market fragmentation results in higher levels of concentration as measured on a national level, as shown in Figure 14, which shows the Herfindahl-Hirschman Indices for EU countries as well as for the U.S.

41. See e.g., 16th CMRS Report at 184 ("When competing mobile wireless service providers deploy compatible network technologies, greater economies of scale in the production of both end-user devices and network infrastructure equipment can result....").
42. See Federal Communications Commission, In the Matter of Applications of Deutsche Telekom AG, T-Mobile USA, Inc., and MetroPCS Communications, Inc. for Consent to Transfer of Control of Licenses and Authorizations, Memorandum Opinion and Order and Declaratory Ruling, WT Docket No. 12-301 (March 12, 2013) ( available at http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0312/DA-13-384A1.pdf) (emphasis added).

# MARKET CONCENTRATION

HERFINDAHL–HIRSCHMAN INDEX (HHI) INDICES, EU VERSUS U.S., 2012




**Source: GSMA Wireless Intelligence**

*Figure 14*

As discussed above, however, in dynamic markets such as mobile wireless, economics does not predict a negative relationship between concentration and performance. Indeed, as shown in Figure 15, we compared market concentration (as measured by the HHI) with price levels in EU Member States. As the trend line and regression results reported in the figure indicate, there is no statistically significant relationship between market concentration and prices. Indeed, as indicated by the negative slope of the regression line, higher levels of concentration are (very weakly) correlated with lower prices, not higher ones.[43]

43. In addition to comparing HHI to average revenue per connection (shown in Figure 15), we also examined the relationship between HHI levels and both average revenue per subscriber and average revenue per minute of voice usage. None of the three measures showed a statistically significant relationship.

# HHI INDICES VERSUS AVERAGE REVENUES PER CONNECTION

EU MEMBER STATES, Q4 2012

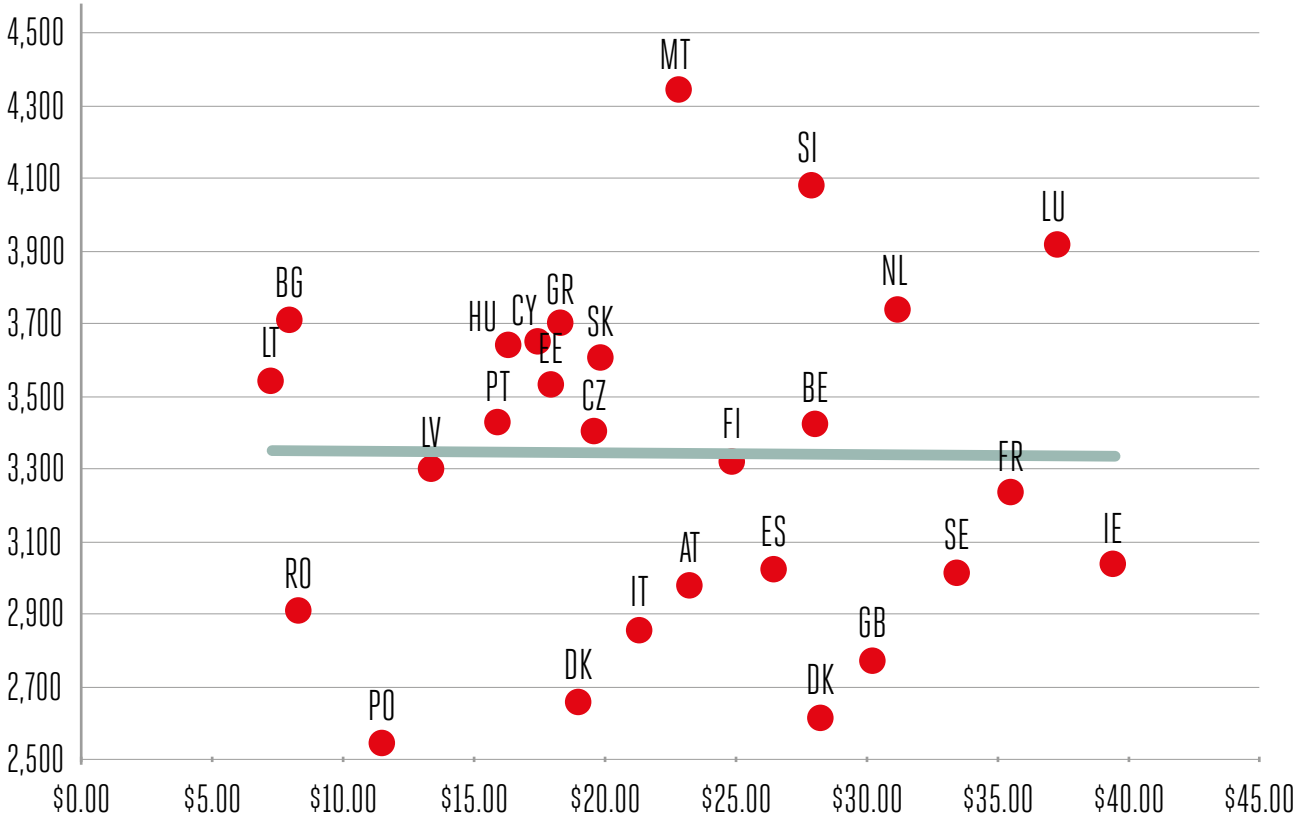



*Figure 15*

To summarize, the fragmentation of EU national wireless markets, including the divergent regulatory policies and distinct spectrum regimes of 27 national regulatory authorities, creates, at a minimum, a prima facie concern that market performance in the EU is being hampered by the inability of carriers and other firms in the mobile wireless ecosystem to exploit economies of scale and scope, thereby slowing network deployment, impeding innovation, and harming consumer welfare.

5.

# The Role of Policy: Options for Reform

Policy reforms can help restore the growth of the EU mobile wireless industry by removing barriers to the rationalization of market structures and by focusing on facilitating investment and innovation. Spectrum policy changes are needed to achieve harmonization and create certainty, while competition policy should be reformed to reduce barriers to efficient consolidation. Overall, regulators should shift their focus from short-term static objectives to achieving medium term dynamic efficiency gains that will enhance consumer welfare.

The evidence presented above suggests that the performance of EU mobile wireless markets would be improved – that is, that consumer welfare would be increased – by reducing fragmentation among suppliers, thereby allowing them to capture economies of scale and scope; and, by increasing incentives for investment and innovation, thereby speeding the deployment of next generation wireless broadband infrastructures and accelerating the growth of the mobile wireless ecosystem.[44]

Simply put, reforms must seek to remove barriers to efficient restructuring and to facilitate, rather than impede, rapid innovation.

Key regulators appear to share these conclusions, at least in broad terms. For example, Commissioner Kroes has stressed the need to create an investment environment that is "open, competitive, and transparent," and to offer the "incentives, certainty, and confidence [companies] need to invest."[45] And while Commissioner Almunia has defended the EC's merger control policies, he has also said he "fully share[s] the call for a Single Market in telecommunications," and also indicated that "The [mobile] industry would do well to consolidate across national borders, if that meant lower prices and new and better services."[46]

In this section we discuss three areas of policy reform designed to achieve these goals. Specifically, we recommend (A) harmonizing and simplifying spectrum allocation and licensing policies, (B) permitting efficient consolidation among wireless carriers, and (C) refocusing regulatory policy on investment and innovation rather than static efficiencies.

44. It should be noted that accelerating the deployment of NGA wireless infrastructures generates an external benefit in the form of increased competition for wireline. See e.g., Robert Litan and Hal J. Singer, The Need for Speed (Brookings Institution, 2013).
45. Nellie Kroes, "Incentives to invest in the future; creating an open, competitive telecoms market," Speech to European Competitive Telecommunications Association (Brussels, 28 Nov. 2011).
46. See Joaquin Almunia, "Relying on the Single Market for the Future of Europe," European Competition Forum (February 28, 2013) (available at http://europa.eu/rapid/press-release_SPEECH-13-168_en.htm).

A.

# Spectrum Allocation, Assignment and Refarming

Spectrum is a critical input in the provision of mobile wireless services. Two decades of liberalization, beginning with the first spectrum license auctions in 1993, have created relatively efficient spectrum allocation schemes in the U.S., including a robust secondary market in which license holders are able to engage in routine leasing and transference of mobile wireless licenses with minimal oversight and delay, as well as to provide the services and deploy the technologies of their choice. While spectrum licenses are (by necessity) specific to particular geographies, band plans, reallocation programs and other aspects of spectrum regulation are national in scope.[47] Thus, several carriers have been able to acquire the spectrum necessary to build out an integrated national mobile infrastructure.

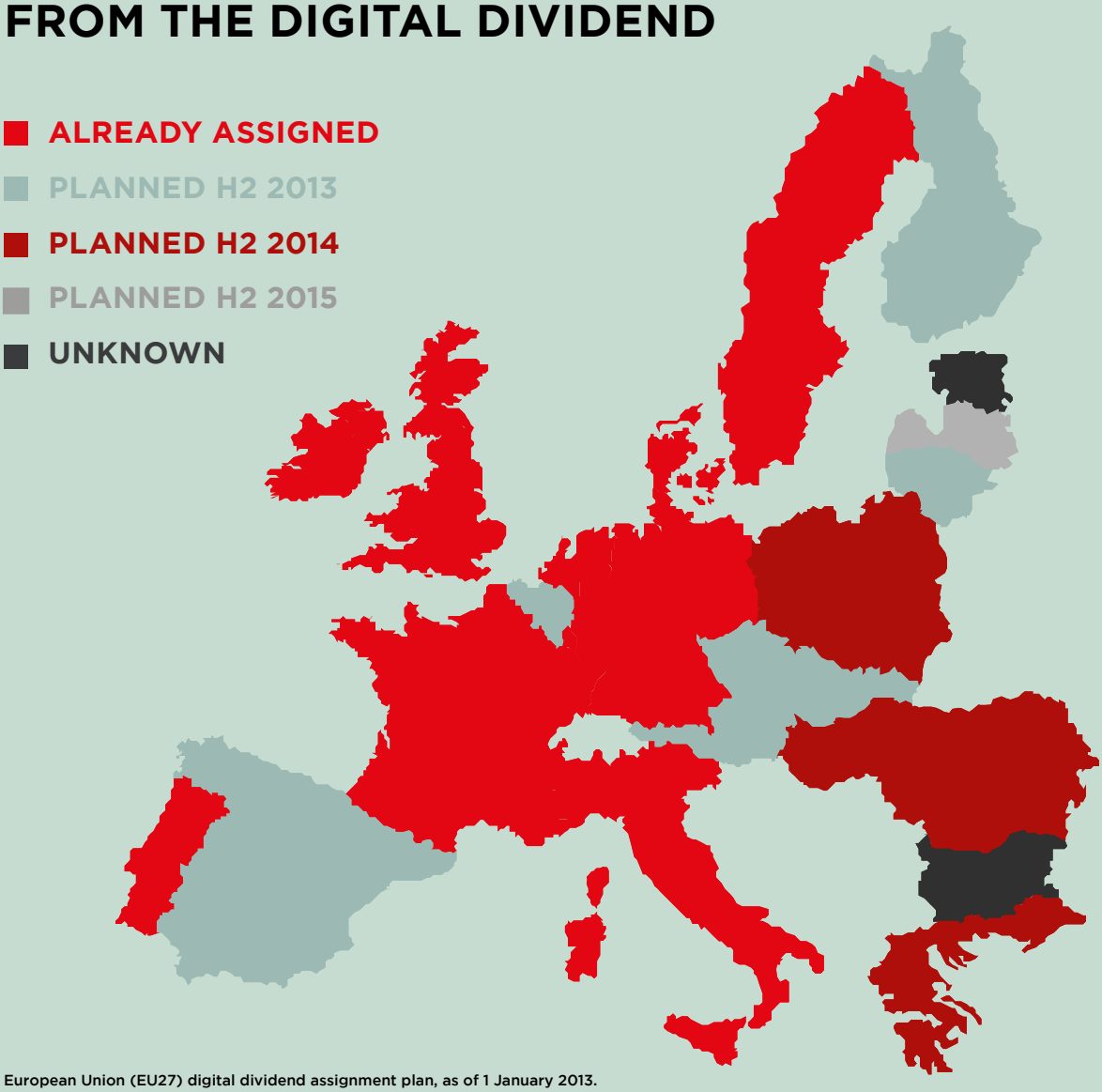
The spectrum reform consensus that led to the liberalization of U.S. spectrum policy was by no means limited to the U.S.: EU nations have not only adopted important reforms, but, in important respects, led the way.[48] That said, spectrum reform remains a work in progress, and the EU remains hampered, especially by the market fragmentation inherent in placing control over spectrum resources under the purview of 27 independent national regulatory authorities, as well as by relatively restrictive policies regarding spectrum license renewals, limitations on license flexibility, and a pattern of discriminating in favor of new entrants in the allocation of spectrum rights. We discuss each issue below and suggest reforms we believe would enhance competition and increase consumer welfare.

47. For a history of the liberalization of U.S. spectrum policy, see Jeffrey A. Eisenach, "Spectrum Reallocation and the National Broadband Plan," Federal Communications Law Journal 64:1 (December 2011) 88-135.
48. See e.g., Martin Cave, "Remarks at the Improving Spectrum Management through Economic or Other Incentives Workshop: International Experiences in Market-Based Approaches" (March 1, 2006) (available at www.ntia.doc.gov/files/ntia/publications/spectrumworkshop_030106.pdf).

## RELEASE OF SPECTRUM FROM THE DIGITAL DIVIDEND SHOULD BE ACCELERATED:

As discussed previously, technical and bureaucratic delays in the allocation of 800MHz "digital dividend" spectrum (obtained from phasing out analog TV services and refarming the spectrum for mobile wireless usage) have hampered the rollout of LTE infrastructures. Under the European Commission's Radio Spectrum Policy Programme (RSPP), all 27 EU Member States committed to make the 800 MHz band available for mobile broadband services by the beginning of 2013. Yet as shown in Figure 16, as of February 2013, only nine countries had confirmed digital dividend spectrum assignments, while the remaining 18 Member States announced that they would fail to meet the deadline.[49] Thus, the EC's goal of making at least 1,200MHz of spectrum available for mobile broadband by 2015 appears to be in jeopardy.[50]

## STATUS OF SPECTRUM ASSIGNMENT FROM THE DIGITAL DIVIDEND




**European Union (EU27) digital dividend assignment plan, as of 1 January 2013.**
**Source: European Commission, GSMA Wireless Intelligence.**

*Figure 16*

49. See Neelie Kroes (February 13, 2013) ("Our success or failure in wireless does not happen by chance: it depends on the policy decisions we take. Fragmented spectrum availability means a fragmented market. Yet the digital dividend spectrum – offering cheap network roll-out and wide coverage – is currently only being used in just a few Member States. And, on average, national governments have only awarded 65% of the spectrum we harmonised in the EU."). See also Joss Gillet, "European LTE Rollouts Hampered by Lack of Digital Dividend Spectrum," GSMA Wireless Intelligence (February 15, 2013); see also Joss Gillet, "The Impact of European Spectrum Harmonisation on LTE Network Deployments," GSMA Wireless Intelligence (February 15 2013).
50. Caroline Gabriel, "Red Tape Threatens Digital Dividend Returns," Wireless Watch (June 20, 2012).

In addition to accelerating deployment of new infrastructure, timely release of digital dividend spectrum would have beneficial effects from a competition perspective.

For example, the European Commission (EC) explained the need to impose spectrum divestiture requirements on the UK's Orange-T-Mobile merger in part on the basis of uncertainties about the availability of additional spectrum: "The [merging] parties will also have a significant time advantage [in deploying LTE] due to the uncertain timing of the auction and the time needed to clear the sub 1GHz spectrum."[51] In other words, the Commission determined that delays in making additional spectrum available created sustainable market power and the need, ultimately, to impose conditions on an important merger which would not have been necessary had spectrum reallocation been proceeding at a more rapid pace and on a less uncertain path.

As a leading group of spectrum experts recently concluded, "Perhaps the most important step the government can take to enhance competition is making more spectrum available and making the spectrum available sooner rather than later."[52]

## CO-ORDINATED RELEASE OF SPECTRUM BY ALL EU MEMBER STATES IN A NARROW WINDOW:

As discussed above, the inability of EU carriers to capture the economies of scale possible under a single market regime imposes significant costs on EU consumers. Thus, while making additional spectrum available is in itself a laudable goal, the ability of carriers to capitalize on additional spectrum, and of consumers to benefit thereby, depends on also increasing the level of harmonization. A co-ordinated release of harmonized spectrum bands and allocations by Member States within a similar time frame would be beneficial to consumers. Both academic[53] and private[54] experts believe such a step would be beneficial, and the evidence presented above supports the same conclusion.

## SPECTRUM LICENSES SHOULD BE ROUTINELY RENEWED RATHER THAN REPOSSESSED AND RE-AUCTIONED:

Problems also exist with respect to spectrum that has already been deployed, but for which license terms are nearing expiration. Little formal guidance exists for GSM licenses reaching the end of 15-year terms, but which remain key inputs to wireless carriers, giving rise to uncertainty with respect to the future assignment of these rights.[55] Furthermore, the EU's electronic communications regulatory framework requires National Regulatory Authorities (NRAs) to conduct 'competition reviews' of spectrum currently in use, creating considerable uncertainty by presenting several divergent legal standards that could potentially be applied to any given matter.[56] This could lead to inconsistency in spectrum management policies across (and even within) EU Member States, with carriers running the risk that existing license terms could be altered, spectrum could be reassigned, or that access to new spectrum could be constrained.[57]

More broadly, arbitrary limitations on the terms of spectrum licenses are a direct disincentive to long-term investments in mobile broadband ecosystems. Such investments depend on the ability of producers of complementary inputs, including carriers, to make long-term commitments to support platform innovations, commitments which are both risky and may have long payback periods. Limited license renewal terms truncate the ability of carriers to earn returns on such investments.

51. See European Commission, Case No Comp/M.5650 - T-Mobile/ Orange, Regulation (EC) No 139/2004 Merger Procedure, Article 6(1)(b) in Conjunction with Art 6(2) (March 1, 2010) at 128 (available at http://ec.europa.eu/competition/mergers/cases/decisions/M5650_20100301_20212_247214_EN.pdf) (hereafter.T-Mobile Decision.).
52. See Peter Cramton, Evan Kwerel, Gregory Rosston and Andrzej Skrzypacs, "Using Spectrum Auctions to Enhance Competition in Wireless Services," Journal of Law and Economics 54 (November 2011) S167-S188 at S168 (available at http://www.cramton.umd.edu/papers2010-2014/cramton-kwerel-rosston-skrzypacz-spectrum-auctions-and-competition.pdf).
53. Arnd Weber, Michael Haas and Daniel Scuka, "Mobile Service Innovation: A European Failure," Telecommunications Policy 35 (2011) 469-480 at 479.
54. See e.g., HSBC, (December 7, 2012).
55. Vodafone, "Spectrum: Renewal and Pricing in Europe," The Policy Paper Series 14 (May 2012) at Introduction.
56. Vodafone (2012) at 7.
57. Vodafone (2012) at Introduction.

## SPECTRUM RIGHTS SHOULD BE FLEXIBLE WITH RESPECT TO TECHNOLOGIES AND SERVICE OFFERINGS:

As noted above, when Everything Everywhere decided to redeploy spectrum in the 1.8GHz band from 2G to 4G services, it applied for permission to Ofcom, which took 10 months to come to a decision. The EC's Digital Agenda Progress Report, issued in June 2012, makes clear that the combination of insufficient flexibility and multiple licensing regimes impedes spectrum reallocation:

> Notwithstanding the changes in the plans in all Member States, however, the implementation of the refarming process, i.e. the process of changing the allowed uses of specific rights of use of frequencies, remains a complex exercise where several factors are involved and where the heterogeneity of conditions at national level does not allow for one-size-fits all approach.[58]

The report also highlighted the discretion currently afforded to NRAs to block or condition license transfers. The EC report finds, for example, that:

> Depending on the timing, the balance of spectrum holdings, the duration of existing rights of use and the financial conditions attached to these rights, the refarming process can lead to different regulatory actions by Member States, including changes in the terms of the individual licenses, trading among operators, reshuffling of current holdings, additional payments.[59]

Ultimately, the solution to regulatory impediments to spectrum reallocation is to adopt spectrum flexibility, whether through harmonization of NRA policies, or, if necessary, through a pan-European mandate.

## SPECTRUM AUCTIONS SHOULD NOT DISCRIMINATE IN FAVOR OF NEW ENTRANTS:

Member States have actively used spectrum auctions to favor new entrants, either setting aside spectrum specifically for new entrants or providing them with advantageous terms. Yet even academics who express concerns about wireless market concentration agree that attempts to reengineer market structures through spectrum allocation risks doing more harm than good. In a recent article, Cramton, Kwerel, Rosston and Skrzypacs examine the use of set asides and similar tools designed to advantage entrants.

They find that "experience with these instruments has been mixed," and that their use has sometimes resulted in "lengthy delay in the use of the spectrum."[60] Thus, they write, "[o]ur conclusion is that these instruments must be used with care. The phrase attributed to the Hippocratic Oath very much applies: first, do no harm."[61]

58. European Commission, Digital Agenda Progress Report (June 2012) at 28-29.
59. Progress Report (June 2012) at 29-30.
60. Cramton et al at S187.
61. Id. On this point, see e.g., RSPG BEREC Report on Competition: Transitional Issues in the Mobile Sector in Europe (February 2011) at 17 ("[A] greater number of MNOs can help to increase competition but the benefits of such increased competition may need to be balanced against any potential downsides, such as inadequate spectrum block sizes for broadband technologies.")(available at http://www.irg.eu/streaming/BoR%20(11)%2007%20Transitional%20issues_final.pdf?contentId=547147&field=ATTACHED_FILE).

**B.**

# Competition Policy and Merger Control

While U.S. regulatory authorities have not taken a laissez faire approach to merger control and consolidation, they have permitted a substantial degree of both geographic and economic consolidation.

As shown in Table 3, between 2003 and 2012, the FCC approved 20 significant mergers and other major mobile wireless license transactions totaling over $288 billion. While many of these transactions were approved subject to various conditions, including required divestitures, for the most part these conditions have not served as a significant deterrent to efficient consolidation nor imposed undue costs on the merging parties.

2003 → 2012

**FCC APPROVED 20 SIGNIFICANT MERGERS AND OTHER MAJOR MOBILE WIRELESS LICENSE TRANSACTIONS**

$288 BILLION

# MAJOR U.S. MOBILE WIRELESS MERGERS AND SPECTRUM TRANSACTIONS

2003-2012

| APPLICATION DATE | ASIGNEE | ASSIGNOR | DESCRIPTION | VALUATION ($000) |
|---|---|---|---|---|
| 9/26/2003 | Cingular | Nextwave | Purchase of NextWave spectrum licenses by Cingular (34 markets) | $1,400,000 |
| 3/18/2004 | Cingular | AT&T | Acquisition of AT&T Wireless by Cingular | $41,000,000 |
| 1/24/2005 | Alltel | Western Wireless | Acquisition of Western Wireless Alltel (1.4 million customers in 19 states) | $6,000,000 |
| 2/8/2005 | Sprint | Nextel | Merger between Sprint and Nextel (40 million subscribers) | $70,000,000 |
| 12/2/2005 | Alltel | Midwest Wireless | Acquisition of Midwest Wireless by Alltel (400,000 subscribers) | $1,075,000 |
| 3/31/2006 | AT&T | Bellsouth | Acquisition of BellSouth by AT&T, including consolidation of Cingular Wireless JV | $86,000,000 |
| 6/25/2007 | Atlantis | Alltel | Acquisition of Alltel announced by TPG Capital and GS Capital Partners ("GSCP") | $27,500,000 |
| 7/13/2007 | AT&T | Dobson | Acquisition of Dobson Communications Corporation by AT&T (1.7 million subscribers) | $2,800,000 |
| 10/1/2007 | T-Mobile | Suncom | Acquisition of SunCom by T-Mobile Inc. | $2,400,000 |
| 6/10/2008 | Verizon Wireless | Alltel | Acquisition of Alltel by Verizon | $28,100,000 |
| 10/29/2007 | AT&T | Aloha | Purchase of Aloha 700 MHz licenses by AT&T (12 MHz covering 196 million people) | $2,500,000 |
| 6/6/2008 | Clearwire | Sprint-Nextel | Combination of Sprint Nextel spectrum with Clearwire spectrum in new Clearwire JV | $3,300,000 |
| 9/4/2007 | Verizon Wireless | Rural Cellular | Acquisition of Rural Cellular Corp. by Verizon Wireless (~716,000 subscribers in 5 regions) | $2,670,000 |
| 11/21/2008 | AT&T | Centennial | Acquisition of Centennial Communications Corp. by AT&T (~1,100,000 subscribers) | $945,000 |
| 5/22/2009 | AT&T | Verizon Wireless | Divestiture of Alltel spectrum from Verizon-Alltel acquisition | $2,350,000 |
| 6/16/2009 | Atlantic Tele-Network | Verizon Wireless | Divestiture of Alltel spectrum from Verizon-Alltel acquisition | $200,000 |
| 1/13/2011 | AT&T | Qualcomm | Purchase of Qualcomm spectrum licenses by AT&T | $1,930,000 |
| 12/21/2011 | Verizon | SpectrumCo | Purchase by Verizon of spectrum from Cox and SpectrumCo (a joint venture among other cable companies); a swap between Verizon and Leap wireless, and Verizon's assignment of licenses to T-Mobile, among other transactions | $3,900,000 |
| 8/1/2012 | AT&T | Comcast, Horizon Wi-Com, Nextwave Wireless | Purchase of WCS and AWS spectrum licenses from Comcast, Horizon Wi-Com, and Nextwave Wireless | $2,000,000 |
| 10/18/2012 | T-Mobile | MetroPCS | Acquisition of MetroPCS by T-Mobile | $2,250,000 |

**Source: Jeffrey A. Eisenach and Hal J. Singer, "Avoiding Rent-Seeking in Secondary Market Spectrum Transactions," Federal Communications Law Journal (forthcoming 2013).**

*Table 3*

Consolidation in the mobile sector has been comparatively rare in the EU; indeed, Curwin and Whalley, studying the history of proposed mergers among incumbent mobile operators in Europe over a period of two decades, conclude that "in virtually every case, the proposals [for mobile consolidation] failed to come to fruition."[62] Although there exist myriad factors that may determine the success or failure of any given proposal,[63] policymakers' influence is obviously confined to policy-driven factors. In this regard, both the EC and the EU national regulators have frequently discouraged wireless consolidation comparable to that which has occurred in the U.S., either by blocking mergers[64] or by imposing remedies designed explicitly to protect competitors, making consolidation less attractive ex ante.

62. Peter Curwen and Jason Whalley, "Merging Incumbent European Mobile Operators: Veni, Vidi, non Vici," Info: The Journal of Policy, Regulation and Strategy for Telecommunications 11(4) (2009) 34-52, at 34.
63. See Curwin and Whalley (2009) at 46 ("[There are] too many groups involved with quite different agendas, most obviously governments, the financial markets and company boards.").
64. For example, in 2010, the Swiss Competition Commission (ComCo) blocked a proposed merger of France Telecom's Orange Switzerland with Sunrise (owned by Denmark's TDC). ComCo prohibited the merger, arguing that competition among the remaining operators would have been insufficient, and that appropriate remedies could not be identified. See press release, ComCo, "WEKO untersagt Zusammenschluss von Orange und Sunrise" (available in German, French and Italian at http://www.news.admin.ch/message/index.html?lang=de&msg-id=32758); see also ABA Section of International Law, 2010 Year in Review (available atwww.cms-veh.com/Hubbard.FileSystem/files/Publication/b2a96da9-473e-4aa1-a4f3-014cac82c60f/Presentation/PublicationAttachment/12ee75af-e1f8-457d-b14f-01ca48b0aafe/ABA%202010%20Antitrust%20Year-In-Review_Swiss%20Part.pdf).

For example, in the course of the 2010 merger of Orange and T-Mobile (which created Everything Everywhere, the largest mobile network operator in the UK), the UK's Office of Fair Trading (OFT) requested a partial referral of the transaction from the EC to the OFT, asserting that the merger threatened to "significantly affect competition" in UK mobile communications markets in two ways.[65] First, the OFT expressed concern that 3UK – the smallest carrier in the UK, which, lacking its own 2G/GSM network, relied on national roaming agreements with Orange to provide voice service – could be "significantly weakened as a competitor or exit the UK mobile market."[66] Second, the OFT raised the possibility that, by further concentrating spectrum rights on the 1800MHz band, the merger "might result in just one mobile network operator offering [LTE] services."[67] The merger was approved only after the parties committed to (1) a revised commercial agreement with 3UK covering post-merger infrastructure sharing, including a fast-track dispute resolution process; and (2) divestiture(s) totaling one quarter of the parties' combined spectrum in the 1800MHz band.[68]

In Austria, the 2012 acquisition of Orange's mobile telephony business by Hutchison 3G was approved only after the parties agreed to a package of commitments designed to "facilitate the entry of new players into the Austrian mobile telecommunications market."[69] Specifically, the combined entity agreed to "divest radio spectrum and additional rights to an interested new entrant;"[70] the new entrant is also to be granted reserved spectrum in a 2013 auction to facilitate construction of its network, and will "benefit from privileged conditions for the purchase of sites for building up its own network."[71] In addition, HG3 committed to provide "wholesale access to its network for up to 30% of its capacity to up to 16 mobile virtual network operators (MVNOs) in the coming 10 years."[72] HG3 was also obligated to enter into a wholesale access agreement with at least one MVNO before completing the acquisition.[73]

Even when consolidation is allowed to proceed without the imposition of ex ante constraints, regulators have adopted ex post policies designed, in effect, to reverse the effects of mergers by increasing the number of market participants. For example, in 2007 France Telecom sold Orange, its Dutch mobile business, to Deutsche Telekom. The EC allowed the transaction to proceed without conditions, despite the fact that it reduced the number of carriers in the Netherlands from four to three.[74] Yet the Dutch regulator subsequently orchestrated new entry into the mobile market by setting aside three spectrum blocks for new entrants in auctions held in 2012.[75] Other national regulators have taken similar steps to facilitate entry: French regulators utilized discounted license and roaming arrangements to introduce a fourth mobile competitor (Iliad), substantially increasing pricing pressure in the industry; and, the Belgian communications regulator (BIPT) set aside 2.1GHz spectrum for new entrants in a 2011 auction.[76]

Recent remarks by EU regulators suggest an understanding of the need to permit pan-European consolidation. Commissioner Kroes, for example, recently noted that "[h]aving a few pan-European operators that are strong in the cross-border market would not necessarily be bad for competition… It can make sense… and be good for investment and innovation."[77] Given the importance of economies of scale and scope in the industry, removing barriers to entry and permitting efficient consolidation is a logical step towards facilitating future investment and innovation. In particular, efforts to facilitate the emergence of pan-European operators should place less emphasis on protecting competitors, and more on promoting competition. In addition, it would be desirable to streamline the review process to eliminate what has been called a "minefield" of multijurisdictional reviews.[78]

65. See T-Mobile Decision at 14-18.
66. T-Mobile Decision.
67. T-Mobile Decision.
68. See http://www.ictregulationtoolkit.org/en/Section.3552.html; T-Mobile Decision at 206-238.
69. European Commission, "Mergers: Commission Clears Acquisition of Austrian Mobile Phone Operator Orange by H3G, Subject to Conditions," (Dec. 12, 2012) (available at http://europa.eu/rapid/press-release_IP-12-1361_en.htm) (hereafter Austria Decision).
70. See Austria Decision.
71. See Austria Decision.
72. See Austria Decision.
73. See Austria Decision.
74. See T-Mobile Decision at 1-2.
75. See HSBC, "European Mobile: A Proposal for Progressive Consolidation," (December 7, 2012) at 9; see also Paul Rasmussen, KPN, Vodafone and T-Mobile Likely to Bid in Dutch Spectrum Auction," Fierce Wireless Europe (September 7, 2012) (available at http://www.fiercewireless.com/europe/story/kpn-vodafone-and-t-mobile-likely-bid-dutch-spectrum-auction/2012-09-07); see also Leila Abboud and Robert-Jan Bartunek, Analysis: Dutch Mobile Market Faces French-Style Price War," Reuters (September 14, 2012) (available at http://www.reuters.com/article/2012/09/14/us-dutch-telco-idUSBRE88D0KJ20120914).
76. See e.g., HSBC (2012) at 9.
77. See e.g., Leila Abboud and Claire Davenport, "M&A Could Help Telcos Close Europe's Network Gap: Kroes," Reuters (June 11, 2012) (available at http://www.reuters.com/article/2012/06/11/us-media-tech-summit-kroes-idUSBRE85A12A20120611); see also Kevin J. O'Brien, "Mergers of European Mobile Carriers Expected to Grow," New York Times (June 17, 2012) (available at http://www.nytimes.com/2012/06/18/business/global/mergers-of-european-mobile-carriers-expected-to-grow.html?pagewanted=all&_r=0).
78. Michael Rosenthal, "Mergers in the Telecommunications Sector: An Overview of EU and National Case Law," Institute of Competition Law (April 6, 2012) (noting that, while telecom is generally less problematic for merger reviews than other sectors, "the major challenge that businesses face, especially where there is pressure to close a deal quickly, is to navigate the jurisdictional minefield that sees cases referred by the Commission to national competition authorities or vice versa, with the associated - and unwelcome - delays. Besides the delays, merger statistics show that merging parties also have reason to worry about a possibly stricter review of their deals by the national authorities under their national merger control rules compared to a review carried out by the European Commission under the EU Merger Regulation.").

## C.

# Dynamic Regulation and Creating Incentives for Innovation

Beyond rationalizing spectrum policy and permitting efficient consolidation, we believe there is a third aspect of reform which falls under the general heading of designing regulation in such a way as to facilitate dynamic competition rather than preserve static competition.[79]

In broad terms, we recommend that regulatory policy strike a proper balance, paying attention to the need for preserving incentives for investment and innovation rather than focusing primarily or exclusively on the pursuit of static efficiency through the promotion of commoditized competition and ever lower prices.[80] This means acknowledging the uncertainty inherent in dynamic markets such as those at issue here, and recognizing that innovation and investment in such markets result from firms' decisions to exploit (or, through innovation, to create) market disequilibria. It also means accepting that successful innovators will capture large market shares and earn positive returns, at least temporarily, and allowing them to do so. Further, effective regulation of dynamic markets requires regulatory certainty; thus, regulations should be designed to be durable and consistent over time in order to enhance the ability of market players to engage in long-term and risky investments. Moreover, the regulatory approach should be sufficiently 'hands-off' (non-interventionist) to encourage innovations, new business models and market experiments. In order for dynamic markets to develop, regulators need to apply a predictable, transparent and non-intrusive framework.

The previous sections above have emphasized the need for a more harmonized spectrum management framework, and more room for market consolidation and for enabling a more integrated mobile wireless ecosystem throughout the EU. Beyond these specific policy areas, regulators should strive for a more unified regulatory framework across all Member States. By doing so, they can effectively enlarge the potential market, moving in the direction of a single digital market not just for wireless operators but for the entire mobile wireless ecosystem. Two examples help to illustrate our point.

First, one potential area of increased regulatory harmonization is conditions relating to MVNOs. MVNOs are present throughout the EU, but there is substantial cross-country variation in the degree and scope of regulation, as well as entry conditions.[81]

79. See generally Johannes M. Bauer and Erik Bohlin, "From Static to Dynamic Regulation: Recent Developments in US Telecommunications Policy," Intereconomics (January/February 2008) 38-50.
80. For a similar view, see CRA, "The Competition/Investment Trade-Off Revisited?" (April 2013) (available at http://www.crai.co.uk/ecp/assets/The_Competition_Investment_Trade-Off_Revisited-Hutchison_3G_Orange_Austria.pdf) .
81. See Livio Cricelli, Michele Grimaldi and Nathan Ghiron, "The Impact of Regulating Mobile Termination Rates and MNO-MVNO Relationships on Retail Prices," Telecommunications Policy 36 (2012) 1-12.

Recent spectrum licenses in several Member States have included requirements for license holders to negotiate with MVNOs and engage in other forms of spectrum sharing. As a result of these differing conditions, MVNOs have been more successful in some countries than in others. For instance, in France the MVNO market share in 2011 was 10 percent, while in the EU overall it was only four percent.[82]

The second example is international roaming, which demonstrates how market fragmentation can contribute to market failures and ultimately lead to direct retail pricing regulation and price caps. Arguably, reducing market fragmentation and enhancing pan-European competition could have ameliorated the concerns about the adequacy of price competition that led regulators to apply a retail pricing scheme for international roaming, both in voice and data (including unbundling requirements).[83]

By contrast, when the FCC imposed a limited data roaming mandate in April 2011, it chose not to regulate roaming rates directly, and instead adopted "a general requirement of commercial reasonableness….[which] preserves incentives to invest…."[84] For Europe to move towards a U.S. approach in data roaming, cross-border competition and pan-European markets must develop, which in turn requires that Member States be more willing to coordinate license conditions, spectrum management policies and other aspects of their regulatory regimes.

Our point is not to propose specific changes in either the MVNO or international roaming rules, but to urge regulators to take a more far-sighted and dynamic view – to focus their attention on creating incentives for innovation that would dramatically increase consumer welfare, and on taking steps toward an more integrated mobile wireless ecosystem, including consistent spectrum allocation and assignment conditions.[85]

82. GSMA Europe Response to the European Commission Public Consultation on the Revision of the Recommendation on Relevant Markets (January 8, 2013) (available at https://ec.europa.eu/digital-agenda/en/news/results-public-consultation-revision-recommendation-relevant-markets).
83. Data roaming rules adopted by the EC in 2012 lowered existing retail and wholesale caps on the price per MB that carriers are permitted to charge. The data roaming rules call for a roaming unbundling requirement to take effect in mid-2014, forcing carriers to allow subscribers to purchase their roaming service from a separate (presumably local) provider when traveling abroad. See Ben Woods, "Cut-price Data Roaming Gets All-Clear for July," ZDNet (May 30, 2012) (available at http://www.zdnet.com/why-data-roaming-costs-too-much-3040092266/); see also European Communications, "Opinion: EU Roaming Regulation – What Next for Operators?" (July 13, 2012) (available at www.eurocomms.com/features/opinion/8413-opinion-eu-roaming-regulation--what-next-for-operators-); and, David Meyer, "Europe Agrees on Changes for Cheaper Roaming," ZDNet (March 28 2012).
84. See Federal Communications Commission, Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers and Other Providers of Mobile Data Services, Second Report at Order, WT Docket No. 05-265 (April 7, 2011) at 21-23.
85. Bauer and Bohlin suggest the U.S.' success since 2008 has been at least partly due to its decision to embrace a dynamic approach to regulation. See Bauer and Bohlin (2008) at 50 ("U.S. policy is again diverging from the approaches in other nations. It is taking a new step in favor of dynamic market based competition. In mobile markets this approach is paying off after the U.S. initially lost ground compared to peer nations.")

6.

# Conclusion

As noted above, concerns about the progress of EU mobile wireless markets are not new; Commissioner Reding's warning about the slow pace of growth, for example, came almost exactly five years ago, in May 2008. Looking ahead, as Commissioner Kroes recently said,

"SUCCESS OR FAILURE IN WIRELESS DOES NOT HAPPEN BY CHANCE: IT DEPENDS ON THE POLICY DECISIONS WE TAKE."[86]

The evidence presented here suggests that the performance of EU markets continues to lag, and that the cause lies at least in part in policies that have placed too much emphasis on static measures of competitiveness and lower short-term prices and too little on innovation, investment, and the realization of economies of scale and scope.

Rationalizing and harmonizing spectrum policies, permitting efficient consolidation, and refocusing regulation on investment and innovation are three steps authorities should consider to return the EU mobile wireless ecosystem to economic health and provide EU consumers with the advanced and innovative mobile wireless services they demand.

86. Neelie Kroes (February 20, 2013).

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