

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)	
)	
Wireless Telecommunications Bureau)	WT Docket No. 15-125
Seeks Comment on the State of Mobile)	
Wireless Competition)	

COMMENTS OF CTIA – THE WIRELESS ASSOCIATION®

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EXECUTIVE SUMMARY

In 2015, the wireless industry became more vibrant and vigorously competitive than ever before. The extremely high adoption and usage rate in the wireless industry, as well as the astronomical year-over-year increases in these numbers, demonstrate the continued dynamism of the wireless industry. CTIA – The Wireless Association[®] (“CTIA”) urges the Federal Communications Commission (“FCC” or “Commission”) to confirm the existence of effective competition in the wireless industry as demonstrated by the data in these comments. Since the release of the last *Mobile Wireless Competition Report*, there have been tens of millions more wireless connections added nationwide and data show that smartphone adoption is now at or above 50% in every demographic group. Data use on mobile wireless networks increased more than 25% from the end of 2013 to the end of 2014, and Americans are rapidly adopting wireless technologies and demand for more innovation, functionality, and network expansion shows no signs of slowing.

Carriers are devoting considerable resources to remain competitive and respond to consumer demand by continuing to invest billions in wireless infrastructure. In 2014 alone, carriers invested more than \$32 billion in their networks. Importantly, the wireless industry has been aggressively deploying LTE: today, fully 98% of Americans have access to 4G LTE networks and there are 158 million LTE connections for the country’s population of 318 million. As a result of this investment, mobile providers are offering faster and more efficient networks across more areas in the U.S.

In this competitive marketplace, consumers are the ultimate winners. As networks continue to advance, wireless carriers, equipment manufacturers, and application developers are competing to bring the newest technologies for devices and applications into the hands of

Americans. That competition creates innovation throughout the marketplace. New wireless devices feature faster speeds, bigger screens, slimmer bodies, and better cameras and displays. And the applications industry now boasts more than five million mobile applications. In the last few years, carriers have also launched wearable devices, including smartwatches offering integration with smartphones and biometric monitoring, providing customers with more ways to take advantage of mobile wireless networks.

And in this robustly competitive environment, wireless carriers are offering innovative promotions and service plans every day to ensure that consumers have affordable access to these new offerings: countless different voice, data, and device plans abound to meet the specific communications needs of wireless consumers. Competition among carriers and increasing competition from dozens of Mobile Virtual Network Operators (“MVNOs”) has also resulted in diverse voice plan offerings, more affordable access to data, and more options for purchasing the devices consumers want. Moreover, carriers using hybrid Wi-Fi/cellular networks and Mobile Satellite Service (“MSS”) providers are also introducing new sources of competition in the marketplace, offering consumers low-cost service options and new methods for delivering mobile wireless services. Compared to other developed countries, the United States has one of the least concentrated wireless markets based on Herfindahl-Hirschman Index (“HHI”) values. In short, flexibility and consumer choice abound in the wireless market today.

The healthcare, education, transportation, banking and finance, and energy sectors have also reaped the benefits of mobile wireless innovation and aggressive deployment of high-speed wireless broadband. Some analysts predict that the economic impact of Inter of Things (“IoT”) deployments in healthcare, for instance, will be \$1.6 trillion by 2025. The transportation sector is also taking advantage of technological advancements, providing services and applications over

wireless networks such as safety and entertainment services, traffic management, and roadside assistance. Fully 60% of cars are expected to have wireless connections by 2017.

Despite U.S. leadership in the mobile wireless sector, a spectrum shortfall threatens to disrupt the innovative and competitive services and devices described herein. The U.S. already lags behind other countries in the quantity of deployed LTE spectrum per LTE subscriber and the currently available spectrum simply will not meet the future demands of consumers or the marketplace. More spectrum must therefore be identified for auction now to ensure the continued vibrancy of the U.S. wireless industry.

To date, the industry has flourished under a light regulatory touch, but the onerous obligations imposed by the FCC's new *Open Internet Order* further threaten to disrupt future growth and expansion of the wireless industry. This light regulatory touch is particularly important given the mobile market's unique technical and operational characteristics, which require rapidly evolving technologies and flexible management of user demand. The newly imposed *Open Internet Order* threatens to stifle the competitiveness and vibrancy of this highly successful wireless ecosystem.

As these comments demonstrate, the wireless industry in 2015 is vigorously competitive, with innovations and investment in new technologies and expanded networks benefitting consumers, fueling the wireless industry, and contributing to the larger economy. The data also confirm the structure, conduct, and performance that typify a competitive market: choice in service providers and offerings; strong investment; rapid innovation; growing subscribership and usage; competition on price and product differentiation; and new market entry. These investments and innovations simply would not have occurred without intense competition in the marketplace. Furthermore, the factors that the FCC has examined previously in finding effective

competition in the core CMRS market – market structure, provider conduct, consumer behavior, and market performance – all indicate that today’s mobile wireless market is effectively competitive. CTIA therefore once again urges the FCC to confirm the existence of effective competition in the wireless industry.

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I. INTRODUCTION.

CTIA – The Wireless Association[®] (“CTIA”)¹ respectfully submits these comments in response to the Public Notice released by the Wireless Telecommunications Bureau (“Bureau”) of the FCC in the above-captioned proceeding.² In the *Eighteenth Mobile Competition Report Public Notice* (“*Public Notice*”), the Bureau seeks comment on the state of mobile wireless competition in the United States. As described in these comments, robust competition in the mobile wireless marketplace continues to drive investment and expansion of wireless networks and technologies, applications, functionality, and devices. As a result, the United States continues to lead the world in deployment and use of high-speed mobile networks and devices, and remains one of the least concentrated mobile wireless markets in the world.

In these comments, CTIA presents data documenting a vigorously competitive mobile wireless ecosystem. Providers are continuing to innovate and invest in the industry to meet the ever-growing demands of consumers, and consumers are buying more and more devices and

¹ CTIA – The Wireless Association[®] is an international nonprofit membership organization that has represented the wireless communications industry since 1984. Membership in the association includes wireless carriers and their suppliers, as well as providers and manufacturers of wireless data services and products. More information about CTIA is available on the Association’s website at <http://www.ctia.org/about-us>.

² *Wireless Telecommunications Bureau Seeks Comment on the State of Mobile Wireless Competition*, Public Notice, WT Docket No. 15-125, DA 15-647 (rel. May 29, 2015) (“*Public Notice*”).

using more and more mobile data. In this vibrant ecosystem, new technologies are evolving that provide faster and more reliable mobile broadband connections for consumers. These developments in the current mobile wireless market result from the strength of the competition therein.³ In the *Thirteenth Competition Report*, the FCC found effective competition in the core CMRS market after examining four factors – market structure, provider conduct, consumer behavior, and market performance.⁴ As demonstrated throughout these comments, these same factors indicate effective competition in today’s mobile wireless market.

Wireless customers continue to benefit from this competitive marketplace via lower prices and more voice, data, and device plan offerings, as well as increased device functionality. And customers have more options for providers and network technologies, including the ever-growing offerings of MVNOs and the possibilities presented by hybrid Wi-Fi/cellular networks and MSS providers. The expanded availability of high-speed wireless networks is also benefitting consumers, particularly through IoT developments, including in the healthcare, education, transportation, banking and finance, and energy sectors.

This rapid mobile wireless development and the ensuing skyrocketing demand from consumers highlights the need for additional spectrum. The industry continues to utilize existing spectrum more efficiently, but these efficiencies will not stay ahead of demand, and without more spectrum being made available the United States could lose its leadership in the wireless

³ Historically, data show that “innovations have been more rapidly deployed in telecommunications networks the more competitive have been the markets in which those networks operated.” Howard A. Shelanski, *Competition and Deployment of New Technology in U.S. Telecommunications*, 2000 U. CHI. LEGAL F. 85, 85 (2000) (examining historical developments and innovation in the telecommunications industry and arguing that regulators should “adopt a rebuttable presumption against claims that competition will conflict with technological advancement in the telecommunications industry”).

⁴ *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, Thirteenth Report, 24 FCC Rcd 6185 ¶ 1 (2009) (“*Thirteenth Competition Report*”).

sector. The FCC must make more spectrum available to ensure continued innovation, growth, and leadership for the mobile wireless industry in the United States.

The FCC should also beware of the stifling effect its *Open Internet Order* will have on the wireless industry. The wireless ecosystem thrives under a light regulatory touch that allows flexible network management. The *Open Internet Order* is likely to chill the innovation and development that drive the vibrant and competitive wireless market.

As these comments demonstrate, the wireless industry is growing, evolving, and innovating as a result of vigorous competition in the marketplace. Therefore, the FCC should affirmatively find that the wireless market is competitive, similar to its recent finding regarding the multichannel video programming distributor (“MVPD”) market.

II. WIRELESS ADOPTION, USAGE, AND FUNCTIONALITY CONTINUE TO INCREASE IN THE COMPETITIVE WIRELESS MARKETPLACE.

More Americans are using more data on more devices. To meet the needs of consumers and the increasing capabilities of wireless devices, programmers and carriers are scrambling to provide better networks, improved applications, and seamlessly integrated processes. After examining similar growth in usage, adoption, and functionality in the CMRS market, the FCC in the *Thirteenth Competition Report* found market performance indicative of competition in the marketplace.⁵ The wireless industry, however, continues to need more spectrum to continue this trend of expansion and innovation.

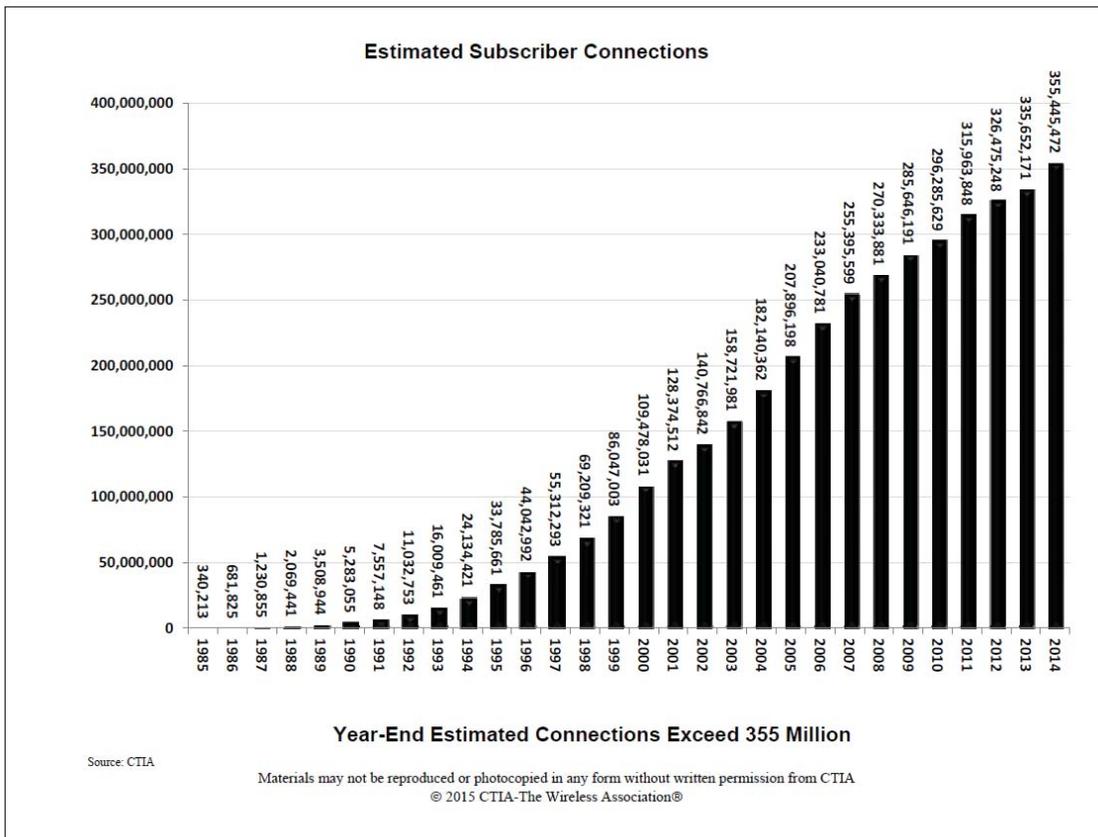
A. Adoption.

Wireless subscribership in the United States continues to surge upward. As of December 2014, there were approximately 355.4 million wireless connections nationwide, an increase of nearly 20 million over the end of 2013 and an increase of nearly 30 million over the end of

⁵ See *Thirteenth Competition Report* ¶ 187.

2012.⁶ The number of connections comprises 110% of the population, continuing to exceed U.S. population growth.⁷ Many American adults now exclusively have access to telephone service via wireless devices. According to government data from the last half of 2014, more than half of U.S. households, home to 44% of adults and 54% of children, have a wireless telephone but no landline telephone.⁸

The chart below shows the growing number of wireless connections in the U.S. market:



⁶ CTIA Annual Survey Report, CTIA – THE WIRELESS ASSOCIATION® (June 2015), available at <http://www.ctia.org/your-wireless-life/how-wireless-works/annual-wireless-industry-survey> (“CTIA Survey Report”).

⁷ *Id.*

⁸ Stephen J. Blumberg, Ph.D., and Julian V. Luke, *Wireless Substitution: Early Release of Estimates From the National Health Interview Survey, July-December 2014*, NATIONAL CENTER FOR HEALTH STATISTICS (June 2015), available at <http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201506.pdf>.

Smartphone use continues to grow and provide Americans with more choices for accessing the Internet. The Pew Research Center has reported that “nearly two-thirds of Americans are now smartphone owners,” and in the past year, more than half have used their phones to look up health information online (62%) or to do online banking (57%). While 19% of American adults are primarily or solely dependent on their smartphones for online access, Pew reported that recent surveys have found that 97% of 18-29 year olds, 90% of 30-49 year olds, and 80% of users 50+ used their mobile devices to access the Internet.⁹ Smartphone ownership is the highest among adults ages 18 to 29, but every demographic group shows smartphone adoption at or above 50%, with the sole exception of adults over 65 years old.¹⁰

Low-income households are also increasingly using smartphones as a low-cost alternative for accessing the Internet. According to the Pew Research Center, “[s]ome 13% of Americans with an annual household income of less than \$30,000 per year are smartphone-dependent. Just 1% of Americans from households earning more than \$75,000 per year rely on their smartphones to a similar degree for online access.”¹¹

B. Usage Levels.

Along with the surge in adoption of wireless devices, the usage of wireless devices and mobile data continues to skyrocket. There were 68.2 million active data-only devices in use at the end of 2014, up one-third from 51.1 million devices at the end of 2013.¹² Smartphones numbered 208 million at the end of 2014, up 19% from 175 million at the end of 2013.¹³ The

⁹ See Aaron Smith, *U.S. Smartphone Use in 2015*, PEW RESEARCH CENTER (Apr. 1, 2015), available at <http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015> (“*U.S. Smartphone Use*”).

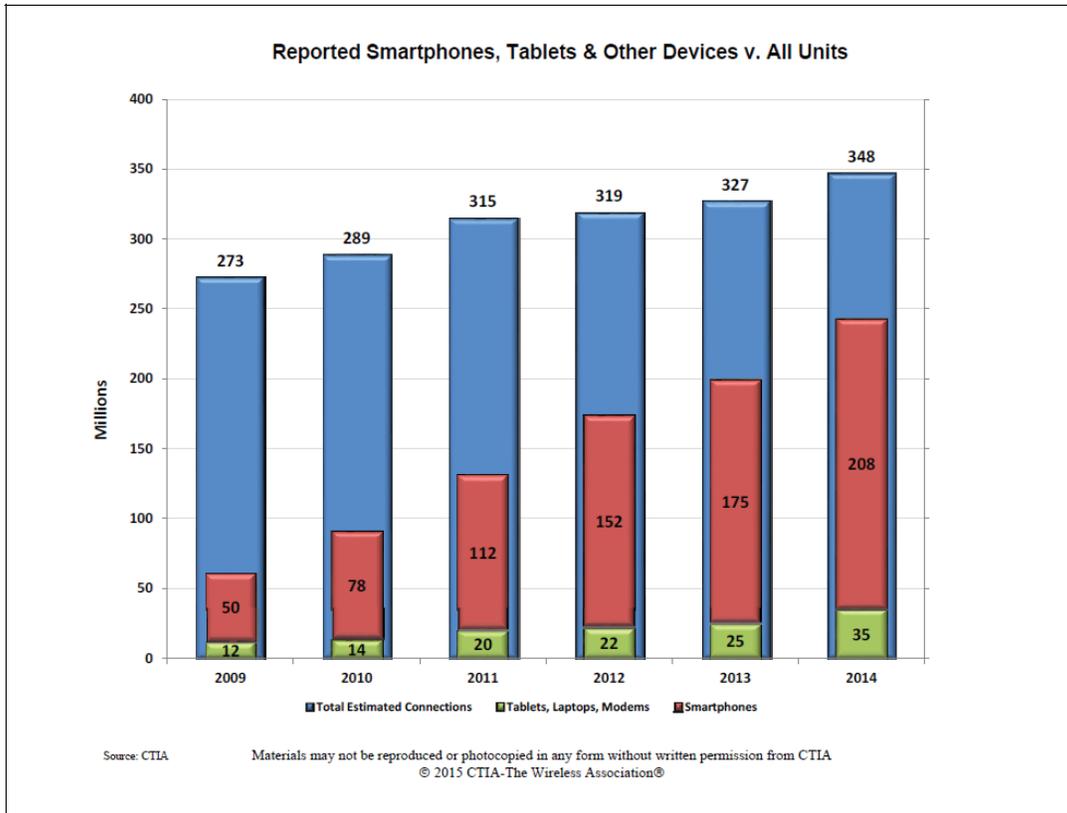
¹⁰ *Id.*

¹¹ *Id.*

¹² See *CTIA Survey Report*.

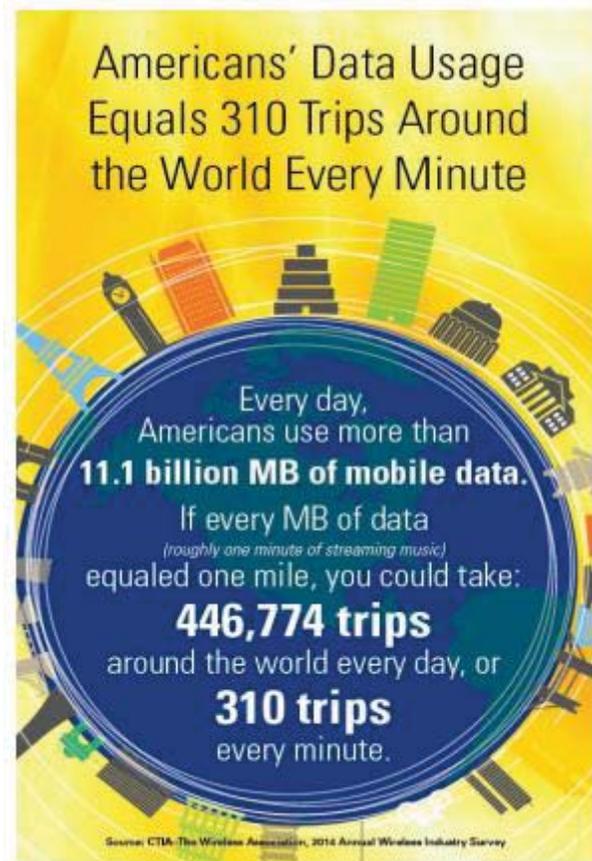
¹³ *Id.*

number of active wireless-enabled tablets and laptops increased more than 40% from the end of 2013 to the end of 2014, rising from approximately 25 million to more than 35 million.¹⁴ Moreover, the number of total active web-capable devices went up 14% from the end of 2013 to the end of 2014.¹⁵ The chart below demonstrates this growth of active devices in the marketplace.



¹⁴ *Id.*

¹⁵ *Id.*



Rising wireless adoption and usage are fueling demand for mobile data. Reported mobile data traffic in 2014 was 30 times the size of the entire global Internet in 2000.¹⁶ From the end of 2013 to the end of 2014, CTIA reports an increase of more than 25% of data use on mobile networks, from 3.2 trillion megabytes (“MB”) to more than 4 trillion MB.¹⁷ That is more than *ten times* the volume of data reported just four years ago.¹⁸ In fact, Americans use more than 11.1 billion MB of data every day.¹⁹ While U.S. consumers overall spent 131 billion minutes

engaged in smartphone Internet usage in December 2010, in November 2014 U.S. consumers spent 574 billion minutes engaged in smartphone Internet usage.²⁰ Despite the pressure of this

¹⁶ Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update 2014–2019 White Paper, CISCO (Feb. 3, 2015), available at http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white_paper_c11-520862.html.

¹⁷ CTIA Survey Report.

¹⁸ *Id.*

¹⁹ Thomas Sawanobori and Dr. Robert Roche, *Mobile Data Demand: Growth Forecasts Met: Significant Growth Projects Continue to Drive the Need for More Spectrum*, CTIA – THE WIRELESS ASSOCIATION® (June 22, 2015), <http://www.ctia.org/docs/default-source/default-document-library/062115mobile-data-demands-white-paper.pdf> (“*Mobile Data Demand*”).

²⁰ *Id.* at 4; see also Gian Fulgone, *A Digital Update, By The Numbers*, COMSCORE (2015), <https://www.comscore.com/Insights/Presentations-and-Whitepapers/2015/A-Digital-Update-By-the-Numbers>.

relentless demand, wireless data networks are only getting faster: it is estimated that the average mobile connection speed in the U.S. will grow 2.3-fold from 2014 to 2019.²¹

In this competitive marketplace, while providers work constantly to improve their networks, speeds, reliability, and offerings, customers freely switch among the various carriers in search of plans better fitting each individual's use of mobile wireless. Providers are, however, reporting decreased movement of customers from one carrier to another, known as churn. In the first quarter of 2015, Verizon had the lowest postpaid churn, at 1.03%, down from 1.07% in the first quarter of 2014. T-Mobile's churn decreased significantly, from 1.47% in the first quarter of 2014 to 1.3% in the first quarter of 2015. Providers largely attribute the recent decrease in churn to their renewed focus on customer service improvements, network build-out, and the expansion of next-generation LTE technology.²²

C. Functionality.

American wireless customers are increasingly using their mobile devices for both essential daily needs and important life events, and carriers are competing vigorously to provide the most and best functionality for all wireless devices to meet these consumer demands. For example, consumers are now more often relying on their wireless devices to research health information on the Internet, search for a new home, search for a job, and submit job applications.²³ A boom in mobile payment options has also occurred over the past year, bringing additional functionality to wireless devices. For instance, Apple announced Apple Pay in 2014, Samsung unveiled Samsung Pay and LoopPay in early 2015, and Android released Android Pay

²¹ VNI Mobile Forecast Highlights, 2014-2019, CISCO, http://www.cisco.com/assets/sol/sp/vni/forecast_highlights_mobile/index.html#~Country (last visited June 22, 2015) (“VNI Mobile Forecast”).

²² See Kate Pearce, *Q1 in Wireless Shows Declining Service Revenues, Focus on Reducing Churn*, INSIDE MOBILE (May 11, 2015), <http://blog.compassintelligence.com/?p=1097>.

²³ See *U.S. Smartphone Use*.

in May of 2015.²⁴ Moreover, developers are also looking for more ways to seamlessly predict and facilitate wireless customer needs in the form of predictive “personal assistant” functions on wireless devices. For example, Google’s Google Now and Now on Tap programs, as well as Cortana on Windows phones and Siri on Apple phones, can remind users of appointments, sync the functions of multiple applications on a single device, and integrate GPS data to remind a user to buy flowers when they walk by a florist.²⁵ Wireless users are also relying more and more on wireless devices for navigation via programs like Waze, Apple Maps, and Google Maps.²⁶ Carriers and application developers are rushing to improve the capability of navigation programs, and the networks they run on, to improve the user experience for consumers.²⁷ For example, Google Maps recently added lane guidance for its driving directions and Apple Maps now offers information about nearby businesses as part of its program.²⁸

Expansion of wireless device functionality also extends to media and recreation. According to a 2014 Adobe state-of-the-industry report, individuals are using “TV Apps” to watch television programming from wireless devices in ever-increasing numbers. Mobile video viewing went up 57% from 2013 to 2014 and overall online video viewings increased 43%, representing more than 35 billion viewings.²⁹ Growth of authenticated viewing of subscriber

²⁴ See, e.g., Jason Abbruzzese, *Android pay has finally arrived*, MASHABLE (May 28, 2015), <http://mashable.com/2015/05/28/android-pay-google-io/>.

²⁵ See, e.g., Joshua Topolsky, *What Google Just Announced Is a Bombshell*, BLOOMBERG (May 28, 2015), <http://www.bloomberg.com/news/articles/2015-05-28/what-google-just-announced-is-a-bombshell>.

²⁶ *U.S. Smartphone Use*.

²⁷ Molly Wood, *The Map Apps That Move You in the Right Direction*, N.Y. TIMES (Nov. 12, 2014), http://www.nytimes.com/2014/11/13/technology/personaltech/the-map-apps-that-move-you-in-the-right-direction.html?_r=0.

²⁸ *Id.*

²⁹ *U.S. Digital Video Benchmark, Adobe Digital Index Q1 2014*, http://www.cmo.com/content/dam/CMO_Other/ADI/Q12014_VideoBenchmark/Q12014_VideoBenchma

channels on mobile devices (*i.e.*, HBO Go) outpaced the growth of online channels such as YouTube and Hulu. And according to Recon Analytics LLC, Americans use mobile devices to watch videos and TV, as well as make video calls, more than mobile users in any other country.³⁰

The expansion of functionality for wireless devices is driving consumer use of, and benefits from, mobile data, as well as competition among the carriers and developers to offer the newest, best, and most reliable functionality on all devices. As such, carrier innovation is bringing expanded functionality to customer mobile wireless devices.

III. COMPETITION IN THE WIRELESS MARKETPLACE IS DRIVING EXPANDED NETWORK COVERAGE AND INCREASED NETWORK RELIABILITY.

A. Competition is Increasing Efficiency and Modernization in Wireless Infrastructure and Data Predicts a Growing Need for More Future Investment.

1. Capital Expenditures in the Wireless Industry Have Grown Steadily as Wireless Carriers Continue to Invest Vigorously in their Networks.

Along with adoption and usage rates, one of the best indicators of the wireless industry's vibrancy and competitiveness continues to be its capital investment record. The FCC has recognized that "network investment remains a centerpiece of service providers' efforts to improve their customers' mobile wireless service experience."³¹ Since the FCC's last report on competition in the mobile marketplace, U.S. wireless carriers have continued to invest vigorously in their networks. These investment numbers help demonstrate wireless carriers' commitment to improving and expanding the quality and capacity of their networks to accommodate new technologies and meet consumers' needs in light of increased use of wireless

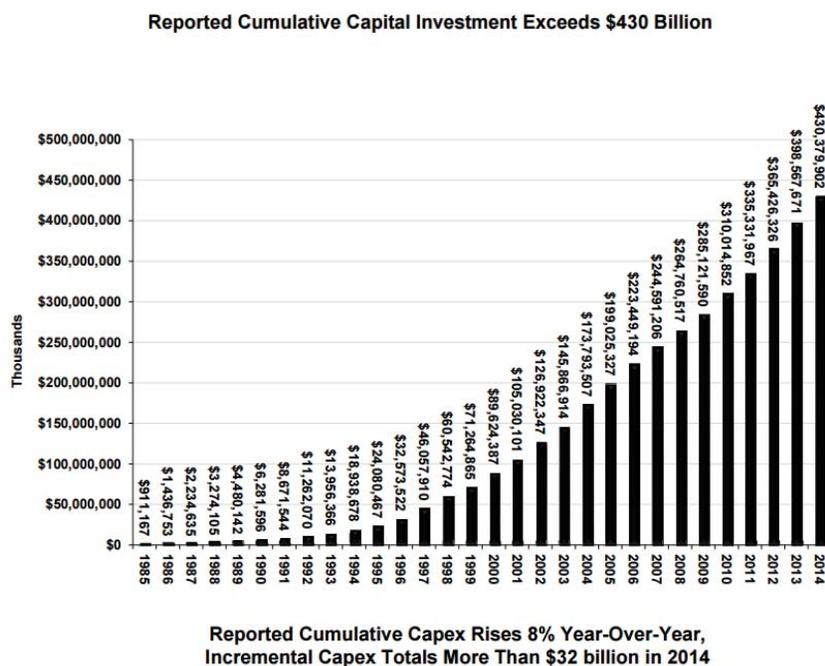
rk.pdf (last visited June 25, 2015); *see also* U.S. Digital Video 2014 Inaugural Report, Adobe Digital Index, <http://www.cmo.com/articles/2015/3/2/ADI-2015-Inaugural-Video-Benchmark-Report.html> (last visited June 25, 2015).

³⁰ *Mobile Data Demand* at 5.

³¹ *Annual Report and Analysis of Competitive Market Conditions with Respect to Mobile Wireless, Including Commercial Mobile Services*, Seventeenth Report, 29 FCC Rcd 15311 ¶ 173 (2014) ("Seventeenth Competition Report").

data applications, ever-widening smartphone penetration, and the adoption of other emerging and embedded wireless devices.

Capital expenditure data going back to the advent of the wireless era confirms that the wireless market has consistently been a thriving industry in which firms invest substantial amounts of money to remain competitive. As shown in the graph below, capital expenditures by wireless providers continue to escalate, with cumulative capital investment at the end of 2014 totaling more than \$430 billion, up 8% from 2013. Notably, when converted to constant 2013 dollars, the cumulative capital investment by the wireless industry in the U.S. is more than \$500 billion.



Source: Background on CTIA's Wireless Industry Survey (June 2015).

Over just the last six years, wireless carriers invested \$166 billion into the U.S. GDP.³² From January 2003 to December 2013, wireless carriers spent just under \$315 billion on capital expenditures, or approximately \$28.6 billion annually.³³ And in 2014 alone, wireless carriers invested more than \$32 billion in their networks.³⁴ This represents nearly a 30% increase from 2010.³⁵

Moreover, as reported by the U.S. Census's Annual Capital Expenditures Survey, in 2013 wireless telecommunications carriers spent \$33.573 billion on structures and equipment, including \$9.95 billion on deploying network structures of which all but \$2 million was spent on new structures.³⁶ (Investment in related equipment totaled \$23.62 billion, of which \$23.52 billion was spent on new equipment). The steady growth in demand for wireless network improvements by the wireless industry also causes other industries to invest in infrastructure used by wireless providers.³⁷ For example, the tower company Crown Castle reports that its site

³² CTIA – *The Wireless Association*[®] *Survey Shows Americans Used 26 Percent More Wireless Data in 2014*, CTIA Press Release, June 17, 2015, available at <http://www.ctia.org/resource-library/press-releases/archive/ctia-survey-shows-americans-used-26-percent-more-wireless-data-in-2014> (“CTIA June 17, 2015 Press Release”).

³³ Coleman Bazelon and Giulia McHenry, *Substantial Licensed Spectrum Deficit (2015-2019): Updating the FCC's Mobile Data Demand Projections*, THE BRATTLE GROUP, at 6-7 (June 23, 2015) (“June 2015 Brattle Report”).

³⁴ CTIA June 17, 2015 Press Release.

³⁵ *Id.*

³⁶ *Id.*; see also *2003 Annual Capital Expenditures Survey*, U.S. Census Bureau (Feb. 5, 2013), at Table 4a, available at http://www.census.gov/econ/aces/xls/2013/html_tables.html#table4a.

³⁷ See, e.g., Crown Castle Annual Report (Form 10-K) at 23 (Feb. 19, 2015) (“Discretionary capital expenditures of \$696.1 million, including wireless infrastructure improvements in order to support additional site rentals, construction of wireless infrastructure, and land purchases.”); American Tower Annual Report (Form 10-K) at 5 (Feb. 24, 2015) (noting that, in 2014, the company made “\$1.9 billion of investments, including \$1.0 billion of acquisitions and \$974.4 million of capital expenditures”).

rental revenues increased 3% from 2014 to 2015, including an approximately 6% increase in new leasing activity to wireless service providers.³⁸

These robust investment figures represent a true success story for the U.S. wireless market and for the U.S. economy. For example, in 2013, U.S. carriers spent about four times as much in network infrastructure per subscriber as the rest of the world – or 120% of the combined European Union countries.³⁹ These figures, moreover, do not even tell the entire story, as they do not include the more than \$87 billion carriers have spent on spectrum auctioned by the FCC or the additional sums spent acquiring spectrum resources in subsequent market transactions.⁴⁰

2. Network Efficiencies and Cell Site Deployment.

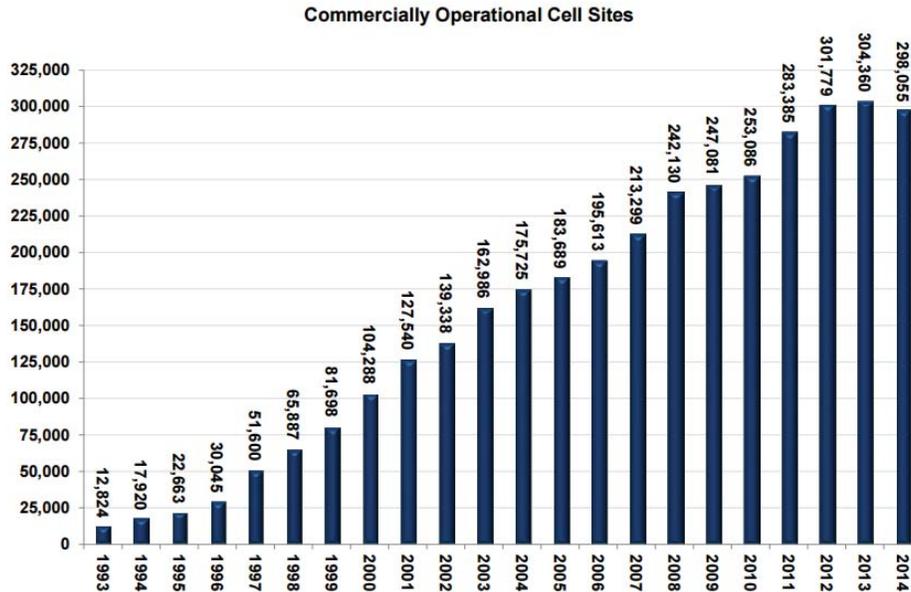
While this on-going investment has resulted in the addition of new sites and the deployment of more advanced and efficient network technologies, there was a 2.1% decline in the aggregate number of cell sites deployed nationwide as of year-end 2014, which dropped to 298,055, compared to 304,360 as of year-end 2013.⁴¹ The chart below illustrates the trend in operational cell sites over time.

³⁸ Crown Castle Quarterly Report (Form 10-Q) at 15 (May 8, 2015) (“*Crown Castle 10-Q*”); *see also* American Tower Quarterly Report (Form 10-Q) at 34 (Apr. 30, 2015) (“We continue to believe that our site leasing revenue is likely to increase due to the growing use of wireless communications services and our ability to meet the corresponding incremental demand for wireless real estate.”).

³⁹ CTIA Wireless Quick Facts.

⁴⁰ *Id.*

⁴¹ *CTIA Survey Report.*



Cell Sites Fall 2% Year-to-Year as a Result of Consolidation and Retirement of Older Technologies

Source: Background on CTIA's Wireless Industry Survey (June 2015).

This minor reduction in the number of cell sites is in part attributable to the retirement of older technologies (e.g., retirement of 2G sites), which was not entirely offset – and indeed was driven – by the deployment of new cell sites (including overlays) using more efficient and more powerful next-generation technologies

Industry consolidation has also contributed to increased network efficiencies as carriers move to shut down redundant sites in favor of more advanced solutions. For example, T-Mobile has decommissioned some redundant network cell sites as part of its acquisition of MetroPCS⁴² and Sprint similarly has reduced its infrastructure portfolio to shed sites that were dedicated to the discontinued Nextel and Clearwire platforms.⁴³ Wireless operators have also sold tower

⁴² T-Mobile US, Inc. Quarterly Report (Form 10-Q) at 10 (Mar. 31, 2015).

⁴³ Sprint Corporation Quarterly Report (Form 10-Q) at 44 (Feb. 5, 2015).

assets to third-party companies, leasing back the facilities for siting purposes and freeing capital for network improvements.⁴⁴

In spite of this reduction, a recent report predicts the inventory of U.S. cell sites will rise at about 4% annually, from the 298,055 cell sites referenced above to 362,269 cell sites in 2019.⁴⁵ Moreover, although the introduction of new efficiencies into wireless mobile providers' networks can lead to apparently flat infrastructure deployment during transition periods, the need for additional spectrum to keep pace with demand and drive the innovation that enables the efficient provisioning of service is a constant. Wireless mobile broadband providers are aggressively competing to offer existing and potential customers new capabilities, and they continue to need additional spectrum to make their networks sufficiently robust to support the ever-increasing demands of consumers for anytime, anywhere high-speed and high-capacity connectivity.

3. The FCC Can Continue to Reduce Barriers to Deploying Critical Infrastructure.

To address their future needs for increased network capacity, most wireless mobile broadband providers will rely on a combination of three elements: new and existing macro towers that serve as their primary network framework; Distributed Antenna Systems ("DAS") and small cell technology that allow them to add targeted capacity and coverage; and additional spectrum.⁴⁶ DAS and small cells are predicted to be especially useful for deploying advanced networks, including in the transition to 5G, as well as to increase coverage and capacity in areas where macro cells are challenging to site. The small cell and carrier Wi-Fi market alone could

⁴⁴ Verizon Communications Inc. Quarterly Report (Form 10-Q) at 8 (Apr. 28, 2015); *Crown Castle 10-Q* at 6 (noting that approximately 52% of Crown Castle's towers are leased or subleased, or subject to some other agreement, from wireless providers).

⁴⁵ *June 2015 Brattle Report* at 12-13.

⁴⁶ *LTE Backhaul Technology, Requirements and Trends in 2012 & 2013*, RCR WIRELESS NEWS (May 13, 2014), <http://www.rcrwireless.com/20140513/wireless/lte-backhaul>.

reach \$4 billion in 2015,⁴⁷ and analysts predict that somewhere between 1.5 and 2 million outdoor small cells will be installed by 2017.⁴⁸

The deployment of mobile broadband networks depends on mobile providers' ability to site and maintain the physical facilities, such as towers, that make up these networks.⁴⁹ Through new regulatory initiatives, the FCC has made it easier for carriers to repurpose existing infrastructure through collocation, as well as to deploy DAS and small cells, avoiding the need to build expensive new towers. For example, in October 2014 the FCC adopted new wireless infrastructure rules that streamline the environmental and historic preservation review process for collocations and DAS/small cell infrastructure, while preserving the ability of states, local jurisdictions, and Tribal Nations to protect their land-use priorities and safety interests.⁵⁰ The FCC also adopted the Part 17 Antenna Structure *Report and Order* last year, which implemented several practical provisions for the construction, marking and lighting of wireless infrastructure that will further assist wireless providers with their efforts to keep pace with consumer demand and continue the economic growth made possible through the expanding mobile ecosystem.⁵¹

⁴⁷ Ron Mundry, *Small Cell Fronthaul: Wireless Backhaul's Future*, LIGHTREADING (Oct. 27, 2014), <http://www.lightreading.com/mobile/backhaul/small-cell-fronthaul-wireless-backhauls-future/a/d-id/711667>.

⁴⁸ Cisco *Small Cell Wireless Backhaul Ecosystem: A Flexible and Proven Deployment Toolkit*, CISCO (Jan. 2014), http://www.cisco.com/c/en/us/solutions/collateral/service-provider/small-cell-solutions/brochure_c02-728436.pdf.

⁴⁹ See Comments of CTIA – The Wireless Association®, GN Docket No. 14-126, at 10 (filed Mar. 6, 2015).

⁵⁰ See *Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Policies; Acceleration of Broadband Deployment: Expanding the Reach and Reducing the Cost of Broadband Deployment by Improving Policies Regarding Public Rights of Way and Wireless Facilities Siting; 2012 Biennial Review of Telecommunications Regulations*, Report and Order, 29 FCC Rcd 12865 (2014).

⁵¹ *2004 and 2006 Biennial Regulatory Reviews—Streamlining and Other Revisions of Parts 1 and 17 of the Commission's Rules Governing Construction, Marking and Lighting of Antenna Structure*, Report and Order, 29 FCC Rcd 9787 (2014).

The FCC should continue to reduce barriers to deploying critical infrastructure to ensure that consumers' present and future connectivity needs are met. As one example, CTIA encourages the FCC to work with industry, the Advisory Council on Historic Preservation, and other stakeholders to develop a process to remove any regulatory uncertainty regarding the historic preservation review of "twilight towers."⁵² Just as critically, the FCC should move forward on a comprehensive program alternative for the historic preservation review of DAS/small cell technologies by its stated completion date of no later than October 2016.⁵³ In addition to quickly implementing a program alternative for DAS and small cells, the FCC should also find ways to streamline the environmental and historic preservation review of conventional towers. One step would be to adopt timeframes governing its review of Environmental Assessments, particularly in situations where no challenges are filed.⁵⁴ Adopting clear, specific timetables for completing review will expedite antenna siting on federal, Tribal, and private properties and will help eliminate delays associated with the failure to act promptly on uncontested applications.

⁵² The term "twilight tower" refers to towers that (a) were constructed after March 16, 2001 (the effective date of the Nationwide Programmatic Agreement for the Collocation of Wireless Antennas) and before March 7, 2005 (the effective date of the Nationwide Programmatic Agreement Regarding the Section 106 National Historic Preservation Act Review Process), and (b) cannot be shown to have gone through the requisite historic preservation review process under Section 106 of the National Historic Preservation Act and Section 1.1307(a)(4) and (5) of the FCC's rules. The term covers towers that never went through the process as well as towers that may have gone through it (or commenced it), but for which the tower owner is unable to document compliance.

⁵³ *Id.* ¶ 13.

⁵⁴ Comments of CTIA – The Wireless Association®, Department of Agriculture and Department of Commerce, *Broadband Opportunity Council Request for Comment*, Docket No. 150414365-5365-01, at 26 (filed June 10, 2015).

B. Wireless Technology Continues to Evolve, Providing Faster, More Robust, and More Reliable Mobile Broadband Connections for Consumers.

1. Operators are Aggressively Competing to Expand Their LTE Deployments.

Wireless operators recognize that LTE technology provides faster speeds, a better user experience, and improved spectral efficiency, and all are working hard to expand their LTE networks, both geographically and spectrally. Many U.S. operators provide or are introducing LTE service, and for several operators, LTE coverage is nearly ubiquitous – reaching nearly every area covered by their 2G/3G footprint.⁵⁵ Other operators are aggressively continuing their LTE deployments such that the number of people with a choice of three or more LTE networks is continuing to increase.

As LTE coverage improves and the number of LTE subscribers increases,⁵⁶ the amount of traffic carried by LTE networks has increased, and operators have found themselves in need of additional LTE capacity to compete effectively.⁵⁷ LTE is currently deployed and commercially

⁵⁵ See *AT&T covers more than 99% of Americans*, AT&T, <http://www.att.com/network/en/index.html> (last visited June 26, 2015); *Verizon Wireless A Leader in 4G LTE (covering 308 million people)*, VERIZON WIRELESS, <http://www.verizonwireless.com/news/LTE/Overview.html> (last visited June 26, 2015); Phil Goldstein, *T-Mobile catches up with Sprint: Both carriers now cover 280 million POPs with LTE*, FIERCEWIRELESS (MAY 14, 2015), <http://www.fiercewireless.com/story/t-mobile-catches-sprint-both-carriers-now-cover-280-million-pops-lte/2015-05-14>; *U.S. Cellular Launching New LG G4 Smartphone with Presale on May 29, Available in Store on June 4*, U.S. CELLULAR (May 26, 2015), <http://www.uscellular.com/about/press-room/2015/USCELLULAR-LAUNCHING-NEW-LG-G4-SMARTPHONE.html> (stating that “94 percent of U.S. Cellular customers have access to 4G LTE speeds, and 98 percent will have access by the end of 2015”). Additionally, dozens of regional operators have deployed LTE in markets that are home to millions of Americans, with deployment on-going. See, *infra*, Section III.C; see also, e.g., *Bluegrass Cellular Continues to Expand 4G LTE Network in Bowling Green*, BLUEGRASS CELLULAR (May 29, 2015), http://bluegrasscellular.com/about/news/bluegrass_cellular_continues_to_expand_4g_lte_network_in_bowling_green; *Carolina West Wireless Launches 4G LTE Network*, CAROLINA WEST (Oct. 30, 2014), <https://www.carolinawest.com/press-room/2014/10/30/carolina-west-wireless-launches-4g-lte-network/>.

⁵⁶ See *LTE: 1Q 2015 Americas*, 4G AMERICAS (June 2015), <http://www.4gamericas.org/en/resources/infographics/lte-1q-2015-americas/>.

⁵⁷ Alex Colon, *Some Verizon users might be dropped down to 3G as carrier struggles with 4G traffic in major cities*, GIGAOM (Nov. 13, 2013), <https://gigaom.com/2013/11/13/some-verizon-users-might-be-dropped-down-to-3g-as-carrier-struggles-with-4g-lte-traffic-in-major-cities/>.

available in the U.S. in several bands, including the 700 MHz, Cellular/SMR, PCS, AWS-1, and BRS bands,⁵⁸ and initial LTE deployments were limited to a single band. However, in order to serve increasing consumer demand, improve the user experience, and compete effectively, many operators have begun expanding LTE services into other frequency bands. Indeed, most of the national providers are now using multiple bands and carrier aggregation, and providers are also exploring ways to transition existing bands that are being used for 2G/3G service so that they can instead be used for more advanced LTE technologies. To support this, device manufacturers have been increasing the number of bands that smartphones and tablets support.⁵⁹ Nevertheless, these efforts alone are not sufficient to satisfy the heavy demands of data in the ever-expanding 4G LTE world.

2. Operators are Currently Deploying the Next Generation of LTE – LTE Advanced.

In addition to expanding their LTE networks both geographically and spectrally, U.S. mobile network operators have been among the first in the world to deploy LTE's Release 10, or LTE-Advanced,⁶⁰ which provides the capability to “aggregate” spectrum from the same or different frequency bands into a single “channel.” This feature, known as “carrier aggregation,” allows the bandwidth of multiple LTE carriers to be combined such that they effectively function as a single, very wide band carrier.⁶¹ Although current deployments can aggregate only two LTE carriers, the Carrier Aggregation feature is in the process of evolving such that it will allow up to

⁵⁸ See, e.g., United States GSM Coverage Map, Mobile World Live, <http://maps.mobileworldlive.com/network.php?cid=169&cname=United States> (last visited June 22, 2015).

⁵⁹ Ultrafast LTE, Apple, <http://www.apple.com/iphone/LTE/> (last visited June 22, 2015).

⁶⁰ See *4G Americas LTE Deployment Status Update*, 4G AMERICAS (June 1, 2015), http://www.4gamericas.org/files/8014/3319/3341/North_America_6.1.15.pdf.

⁶¹ See Jeannette Wannstrom, *Carrier Aggregation Explained*, 3GPP (June 2013), <http://www.3gpp.org/technologies/keywords-acronyms/101-carrier-aggregation-explained>.

five 20-megahertz carriers to be aggregated into a data pipe with up to 100 megahertz of bandwidth.



*Evolved Carrier Aggregation*⁶²

The additional capabilities of LTE-Advanced are not limited to carrier aggregation: LTE-Advanced also supports a wide range of new features that improve capacity, give operators increased flexibility, and support new, innovative capabilities, network architectures, and business models. LTE-Advanced includes features to support advanced antennas, higher modulation schemes, device-to-device communications, and broadcast/multicast capabilities. In addition, machine-to-machine communications have been enhanced and signaling overhead reduced. Major features such as Enhanced Inter-Cell Interference Cancellation (“eICIC”), Self-Optimizing Networks (“SON”), and Coordinated Multipoint (“CoMP”) will not only help to improve spectral efficiency, but will also improve performance of heterogeneous networks.

The U.S. wireless industry has been investing heavily in LTE-Advanced and its new capabilities. Due to fierce competition in the U.S. market, wireless operators cannot afford to “rest on their laurels.” Instead, operators are racing to offer customers new capabilities with LTE Advanced – Carrier Aggregation, LTE Multicast, and new capabilities for better throughput and higher speeds. Indeed, operators are upgrading their networks and deploying new features

⁶² *Mobile Broadband in the Americas*, 4G AMERICAS, at 12 (Mar. 2015), <http://www.4gamericas.org/files/4914/2592/1581/4G>.

and new technologies as they become available in order to improve their customers' performance and compete effectively in the marketplace. They are also actively marketing their "most reliable," "strongest LTE signal," and "fastest network" capabilities in order to better inform both potential and existing customers.

3. Operators are Adopting Voice over LTE ("VoLTE").

Another important innovation that U.S. wireless operators are adopting is Voice over LTE, or VoLTE.⁶³ Currently, the vast majority of wireless voice services are delivered using 2G or 3G circuit-switched technologies. Packet-switched voice technologies like VoLTE, on the other hand, transmit voice in Internet Protocol ("IP") packets, and thus do not "waste" valuable spectrum to maintain a call. Evolution to VoLTE will eventually obviate the need for operators to maintain their 2G and 3G networks, thus allowing efficient deployment of 100% LTE in all bands. Although this will require 100% penetration of VoLTE-capable handsets and therefore is a long-term goal, the migration to VoLTE is already underway and each VoLTE handset and call puts the industry a little closer to this important milestone.⁶⁴

⁶³ See, e.g., AT&T HD Voice, AT&T, <http://www.att.com/shop/wireless/features/hd-voice.html> (last visited June 26, 2015) ("AT&T HD Voice"); Advanced Calling 1.0, Verizon Wireless, <http://www.verizonwireless.com/support/advanced-calling-faqs/> (last visited June 26, 2015); Cam Buntun, *Google announces Android 5.1, complete with HD Voice on T-Mobile*, TMONNEWS (Mar. 10, 2015), <http://www.tmonews.com/2015/03/google-announces-android-5-1-complete-with-hd-voice-on-t-mobile/>; Dan Seifert, *Verizon Announces Initial Rollout of VoLTE, HD Voice for the 'Coming Weeks'*, THEVERGE (Aug. 26, 2014), <http://www.theverge.com/2014/8/26/6066201/verizon-volte-hd-voice-video-calling-launch>.

⁶⁴ See Mike Hibberd, *AT&T to launch VoLTE on May 23rd*, TELECOMS.COM (May 16, 2014), <http://telecoms.com/259812/att-to-launch-volte-on-may-23rd/>; see also Dan Meyer, *Verizon Wireless rolls out VoLTE service ahead of iPhone 6 launch*, RCR WIRELESS NEWS (Sep. 17, 2015), <http://www.rcrwireless.com/20140917/carriers/verizon-wireless-rolls-out-volte-service-ahead-of-iphone-6-launch-tag2>; Phil Goldstein, *T-Mobile launches VoLTE in Seattle, promises more markets this year*, FIERCEWIRELESS (May 22, 2014), <http://www.fiercewireless.com/story/t-mobile-launches-volte-seattle-promises-more-markets-year/2014-05-22>; Tammy Parker, *Rumor mill: Sprint laying groundwork for mid-2015 VoLTE launch*, FIERCEWIRELESSTECH (July 27, 2014), <http://www.fiercewireless.com/tech/story/rumor-mill-sprint-laying-groundwork-mid-2015-volte-launch/2014-07-27>.

VoLTE is a specification that is based on the IP Multimedia Subsystem (“IMS”). It enables new rich communications services (“RCS”), which offer better mobile-to-mobile voice quality with High Definition (“HD”) Voice, new video conferencing services, and new, richer messaging features. This results in clearer calls, better services available to consumers, and potential new revenue-generating services for operators.

As the industry is in the early stages of migration to VoLTE, there are many technical challenges facing operators that need to be resolved. For example, VoLTE interoperability is an issue that is being addressed, as operators are working together to ensure that VoLTE calls can be made among different operators’ networks.⁶⁵

4. Small Cell and Heterogeneous Network (“HetNet”) Technologies Continue to Evolve.

Heterogeneous networks, or HetNets, are wireless networks that employ a variety of cell sizes and wireless access technologies, such as small cells for targeted capacity and tight integration of LTE and Wi-Fi. Most wireless networks in the U.S. include indoor and/or outdoor DAS, which are small networks of nodes deployed in high-traffic areas like stadiums, malls, and airports. Thus, many wireless networks fit the definition of a HetNet today, and the small cell technology trend is definitely taking the industry further in this direction.⁶⁶ Covering buildings, particularly in urban areas and for enterprise buildings and campuses, is a competitive offering that requires new technology and innovation, particularly in order to be cost effective. Indeed, DAS and small cells are just one type of in-building solution.⁶⁷ LTE-Advanced features such as

⁶⁵ See Kevin Fitchard, *Can you hear me now? Verizon, AT&T to make voice-over-LTE interoperable in 2015*, GIGAOM (Nov. 3, 2014), <https://gigaom.com/2014/11/03/can-you-hear-me-now-verizon-att-to-make-voice-over-lte-interoperable-in-2015/>.

⁶⁶ See *AT&T, Verizon and others ride the DAS wave*, FIERCEWIRELESSTECH (Aug. 26, 2013), <http://www.fiercewireless.com/tech/special-reports/att-verizon-and-others-ride-das-wave>.

⁶⁷ In addition to DAS solutions, there are also new in-building solutions like the Ericsson Radio Dot System and SpiderCloud Wireless, as well as new pico cell/femtocell solutions. See, e.g., Ericsson Small

eICIC,⁶⁸ SON,⁶⁹ and LTE Multiflow⁷⁰ will also allow operators to deploy small cells more effectively, efficiently, and densely, thus bringing the network closer to the user and improving performance. U.S. wireless operators are investing heavily in HetNets⁷¹ and will likely be among the first in the world to deploy LTE-Advanced features that enhance their performance. These features will also help pave the way for 5G in 2020 and beyond, where performance enhancements are expected to take another great leap forward.⁷²

5. LTE Technologies are Being Developed Under Part 15.

The wireless industry is also looking at innovative ideas for utilizing unlicensed spectrum to improve services through the use of LTE-Unlicensed (“LTE-U”) and Licensed Assisted Access (“LAA”) technologies, about which the Bureau and the Office of Engineering and Technology (“OET”) recently sought information.⁷³ As CTIA explained,⁷⁴ LTE-U uses the 3GPP standards framework for LTE (Releases 10/11/12) along with supplementary coexistence

Cells, Ericsson, <http://www.ericsson.com/us/ourportfolio/telecom-operators/small-cells> (last visited June 26, 2015); SpiderCloud Wireless, <http://www.spidercloud.com/> (last visited June 26, 2015); In-Building Solutions, Alcatel-Lucent, <https://www.alcatel-lucent.com/solutions/in-building> (last visited June 26, 2015).

⁶⁸ See HetNet eICIC/IC, Qualcomm, <https://www.qualcomm.com/#/invention/research/projects/lte-advanced/hetnets> (last visited June 22, 2015).

⁶⁹ See *Self-configuring and self-optimizing Networks in LTE*, LTE WORLD (Oct. 11, 2009), <http://lteworld.org/blog/self-configuring-and-self-optimizing-networks-lte>.

⁷⁰ See LTE Multiflow, Qualcomm, <https://www.qualcomm.com/#/invention/research/projects/lte-advanced/lte-multiflow> (last visited June 22, 2015).

⁷¹ See David Orloff, *HetNet – Small Cell Placement and the resulting performance* (Apr. 20, 2015), <http://www.slideshare.net/SmallCellForum1/att-hetnet>.

⁷² See *Understanding 5G: Perspectives on future technological advancements in mobile*, GSMA INTELLIGENCE (December 2014), <https://gsmaintelligence.com/research/?file=c88a32b3c59a11944a9c4e544fee7770&download>.

⁷³ *Office of Engineering and Technology and Wireless Telecommunications Bureau Seek Information on Current Trends in LTE-U and LAA Technology*, Public Notice, ET Docket No. 15-105, DA 15-516 (rel. May 5, 2015).

⁷⁴ See Comments of CTIA – The Wireless Association[®], ET Docket No. 15-105 (filed June 11, 2015) (“CTIA LTE-U and LAA Comments”); Reply Comments CTIA – The Wireless Association[®], ET Docket No. 15-105 (filed June 26, 2015).

parameters adopted by the LTE-U Forum,⁷⁵ while LAA is being standardized through the 3GPP process in LTE Release 13. Both LTE-U and LAA will comply with the FCC's Part 15 unlicensed requirements. Although use of LTE in unlicensed bands is not a substitute for licensed spectrum, these technologies will have enormous benefits for wireless users, including faster peak speeds, reduced latency, and smoother transitions between licensed wireless carrier networks and unlicensed bands.⁷⁶

C. Expanded Coverage Means Rural Customers Have Access to More Choices.

Wireless carriers, including national and regional providers, continue to aggressively expand coverage in rural and remote areas. Although building out mobile broadband networks in rural and remote areas can be capital intensive, it is also an important way to strengthen nationwide roaming networks and to reach new or previously underserved consumers. For example, Verizon's LTE in Rural America Program, launched in 2010, now covers more than 2.9 million people in rural communities and more than 100,000 square miles with live LTE networks.⁷⁷ Additionally, T-Mobile has launched a program to provide rural and regional carriers with spectrum resources to build out LTE networks.⁷⁸ And last year, Sprint launched its Rural Roaming Preferred Providers program, which now includes 30 carriers serving a

⁷⁵ *LTE-U SDL Coexistence Specifications v. 1.0*, LTE-U Forum (Feb. 2015), http://www.lteuforum.org/uploads/3/5/6/8/3568127/lte-u_forum_lte-u_sdl_coexistence_specifications_v1.0.pdf.

⁷⁶ See CTIA LTE-U and LAA Comments at 2-7.

⁷⁷ Robin Nicol, *LTE in Rural America Continues to Grow*, VERIZON (May 30, 2014), <http://www.verizonwireless.com/news/article/2014/05/lte-rural-america-continues-to-grow.html>; Phil Goldstein, *T-Mobile Confirms It Has Leased Spectrum to Other Carriers to Expand LTE Network Coverage*, FIERCEWIRELESS (May 15, 2015), <http://www.fiercewireless.com/story/t-mobile-confirms-it-has-leased-spectrum-other-carriers-expand-lte-network/2015-05-15>.

⁷⁸ Phil Goldstein, *T-Mobile Confirms It Has Leased Spectrum to Other Carriers to Expand LTE Network Coverage*, FIERCEWIRELESS (May 15, 2015), <http://www.fiercewireless.com/story/t-mobile-confirms-it-has-leased-spectrum-other-carriers-expand-lte-network/2015-05-15>.

population of more than 38 million people.⁷⁹ For over a year, the company has also been sharing spectrum and other resources with rural providers to enable them to build out 4G LTE to rural populations as part of the Small Market Alliance for Rural Transformation.⁸⁰

Large macro cells may not be economical for advanced network deployment in small communities with low population density and relatively low capacity demands.⁸¹ New DAS and small cell technologies, which offer more flexible siting options than macro cells, may be more efficient and less costly ways for both national and regional carriers to deploy mobile broadband in rural and remote areas.⁸² By some accounts, rural small cells could open up access to 650 million new cellular users around the world and be worth an estimated \$163 billion.⁸³

⁷⁹ *Sprint Reaches 4G LTE Roaming Agreements with 15 Additional Rural Carriers*, SPRINT (Sep. 5, 2014), <http://newsroom.sprint.com/news-releases/sprint-reaches-4g-lte-roaming-agreements-with-15-additional-rural-carriers.htm>; Eric Zeman, *Sprint Partners Making Headway in Rural LTE Push*, PHONE SCOOP (May 21, 2015), <http://www.phonescoop.com/articles/article.php?a=15828>; Phil Goldstein, *Sprint: 16 of 30 rural LTE roaming partners have now launched LTE service*, FIERCEWIRELESS (May 20, 2015), <http://www.fiercewireless.com/story/sprint-16-30-rural-lte-roaming-partners-have-now-launched-lte-service/2015-05-20>.

⁸⁰ *NetAmerica Alliance Adds Partners as SMART Forges Ahead*, NETAMERICA ALLIANCE (Sep. 8, 2014), <http://www.netamericaalliance.com/news-events/press-releases/103-netamerica-alliance-adds-partners-as-smart-forges-ahead>.

⁸¹ *Extending Rural and Remote Coverage Using Small Cells*, SMALL CELL FORUM (Dec. 1, 2013), http://scf.io/en/documents/047_Extending_rural_and_remote_coverage_using_small_cells.php.

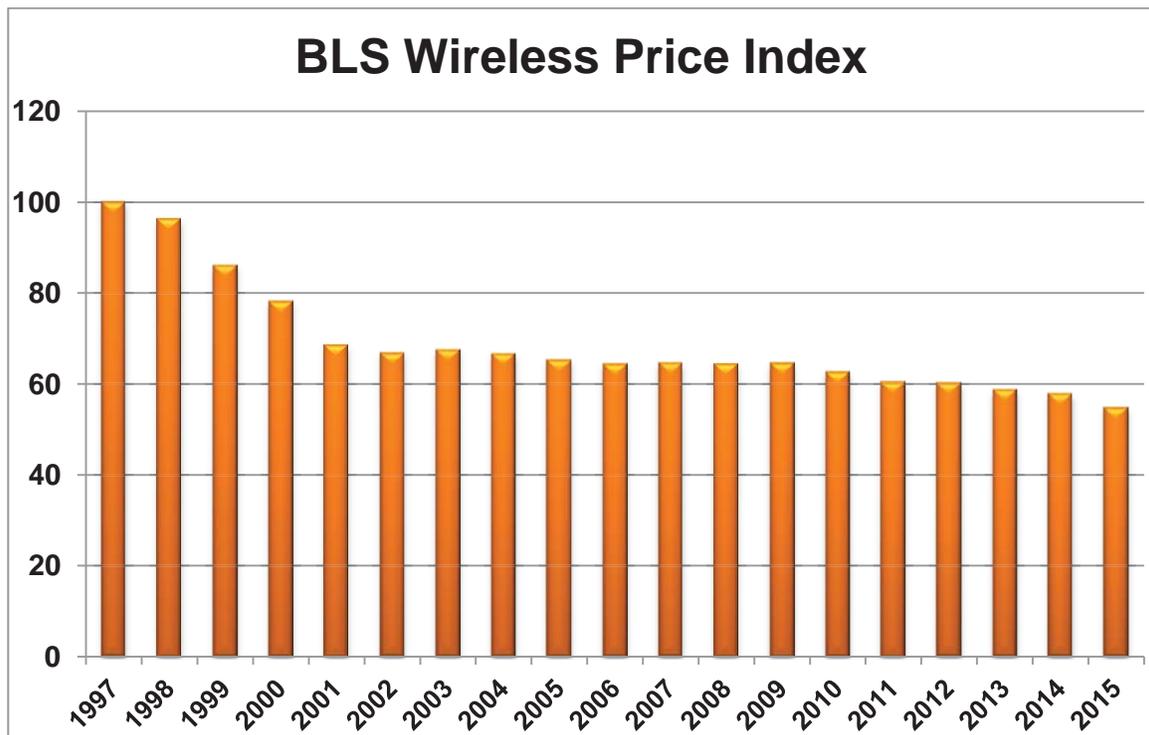
⁸² Tammy Parker, *Small Cells Forum Eyes Rural Applications as well as Virtualization*, FIERCEWIRELESSTECH (June 22, 2014), <http://www.fiercewireless.com/tech/story/small-cell-forum-eyes-rural-applications-well-virtualization/2014-06-22>; *Release Five: The Challenge and Benefits of Small Cell Deployment in Rural and Remote Areas*, SMALL CELL HUB (June 21, 2014), <http://www.smallcellhub.com/articles/91010/release-five-the-challenge-and-benefits-of-small-c/>; Joan Engebretson, *Rural Small Cells Begin to See Deployment*, TELECOMPETITOR.COM (Dec. 3, 2014), <http://www.telecompetitor.com/rural-small-cells-begin-see-deployment/>.

⁸³ Dan Meyer, *#CCAExpo: Small Cells Remain Challenge for Smaller Operators*, RCR WIRELESS (Mar. 25, 2015), <http://www.rcrwireless.com/20150325/carriers/cca-global-expo-15-small-cells-remain-challenge-for-smaller-operators-tag2>.

IV. THE COMPETITIVE WIRELESS MARKETPLACE IS DRIVING INNOVATION IN PRICING, PLANS, DEVICES, AND NETWORKS.

A. Competition and Price Wars Are Spurring Innovation in Voice, Data, and Device Plan Offerings.

Vigorous and growing competition in the wireless ecosystem is spurring wireless carriers of all sizes to lower prices and offer consumers more for their money. Since December 1997, when data was first collected for the Consumer Price Index for Wireless Service, the wireless price index has declined by 45%, as the below chart drawn from the data on their website shows. Indeed, looking at just May 2010 to May 2015 alone, the wireless price index fell 13%, while the consumer price index for all items rose 9% in that same period.⁸⁴



Competition is not only driving down prices, but it is also incentivizing carriers to customize plans to meet the individualized needs of consumers. As the FCC recognized in the *Thirteenth Competition Report*, the “continued rollout of differentiated pricing plans” was

⁸⁴ See Consumer Price Index Database, U.S. Bureau of Labor Statistics, <http://www.bls.gov/cpi/data.htm> (last visited June 26, 2015).

indicative of a competitive market.⁸⁵ Moreover, wireless carriers are changing the landscape for device plans, making it easier for customers to pay for devices over time and for customers to upgrade to new devices more frequently.

1. Voice Plan Innovations.

Wireless carriers recognize that one size may not fit all and are evolving to meet the needs of diverse consumers. As a result, carriers are offering voice plan promotions targeting specific demographics, such as Hispanic consumers. For example, in October 2014, Sprint released a promotion offering new customers who switched to any eligible Sprint plan 500 free minutes of calling every month to mobile phones and landlines in ten Hispanic and Latin American countries, including Mexico, Spain, and Brazil.⁸⁶ Meanwhile, both Sprint and T-Mobile have announced the availability of new voice calling plans to Cuba,⁸⁷ AT&T allows Mobile Share Value plan customers to add a World Connect Value plan for \$5/month for unlimited calling to Mexico,⁸⁸ and Verizon similarly offers specialty nationwide plus Mexico calling plans.⁸⁹

Carriers are also competing for wireless market share by promoting wireless plans with lower prices and fewer restrictions than other plans available in the marketplace. T-Mobile, for instance, is aggressively promoting its “Un-carrier” plans, which do not require two-year

⁸⁵ *Thirteenth Competition Report* ¶ 111.

⁸⁶ *Sprint Gives Customers 500 More Reasons to Switch; FREE Calling to Mexico and Select Hispanic and Latin American Countries through 2015*, SPRINT NEWSROOM (Oct. 3, 2014), <http://newsroom.sprint.com/news-releases/sprint-gives-customers-500-more-reasons-to-switch-free-calling-to-mexico-and-select-hispanic-and-latin-american-countries-through-2015.htm>.

⁸⁷ Scott Webster, *¡Aló! Sprint and T-Mobile open calling plans to Cuba*, CNET (June 15, 2015), <http://www.cnet.com/news/sprint-t-mobile-intro-calling-options-for-cuba/>.

⁸⁸ *See Unlimited Calling to Mexico, AT&T*, <http://www.att.com/shop/wireless/international/long-distance.html> (last visited June 26, 2015).

⁸⁹ *See Nationwide Plus Mexico Plans, Verizon Wireless*, <http://www.verizonwireless.com/b2c/splash/mexicoplusplan.jsp> (last visited June 26, 2015).

contracts or charge coverage fees.⁹⁰ These plans are spurring the other large carriers to lower prices and release additional promotions to compete.⁹¹ For instance, AT&T just this month announced plans to eliminate two-year contracts through third-party partner retailers, instead allowing customers to pay a lower monthly service fee in exchange for covering the cost of the device over time through the company's Next program.⁹² Meanwhile, Sprint is offering a "cut your plan in half" promotion, promising a 50% reduction in plan rates for customers that switch from other carriers.⁹³

2. Data Plan Innovations.

As mentioned above, carriers are lowering prices in reaction to robust competition in the wireless marketplace. These "price wars" are pushing carriers to offer more monthly data for less money. For example, in April 2015, Verizon lowered the price for a plan with 8 GB of data from \$100 to \$80,⁹⁴ and in October 2014, AT&T began offering 3 GB of data for \$40 a month or 6 GB for \$70 month. Additionally, a variety of large and small carriers allow customers to roll over their unused data.⁹⁵ And some carriers – including Sprint and T-Mobile – offer unlimited

⁹⁰ See generally Simple Choice Plan, T-Mobile, <http://www.t-mobile.com/cell-phone-plans/individual.html> (last visited June 26, 2015).

⁹¹ Justin Diaz, *Verizon and AT&T Admit T-Mobile's Aggressive Industry Shake Ups Are Affecting Their Churn*, ANDROID HEADLINES (Dec. 9, 2014), <http://www.androidheadlines.com/2014/12/verizon-att-admit-t-mobiles-aggressive-industry-shake-ups-affecting-churn.html>.

⁹² Roger Cheng, *Apple, Best Buy, other retailers will drop AT&T phone subsidies*, CNET (June 1, 2015), <http://www.cnet.com/news/apple-best-buy-other-retailers-drop-at-t-phone-subsidies/>.

⁹³ Sean Kinney, *Promotions show Sprint really wants your business*, RCR WIRELESS NEWS (Apr. 15, 2015), <http://www.rcrwireless.com/20150415/carriers/sprint-really-wants-your-business>.

⁹⁴ Phil Goldstein, *Verizon reintroduces promotional \$80/10 GB and \$100/15 GB shared data plans*, FIERCEWIRELESS (Apr. 24, 2015), <http://www.fiercewireless.com/story/verizon-reintroduces-promotional-8010-gb-and-10015-gb-shared-data-plans/2015-04-24>.

⁹⁵ See, e.g., Rollover Data, AT&T, <http://www.att.com/shop/wireless/rollover-data.html> (last visited June 26, 2015); *Bluegrass Cellular Announces New Way to Save Unused Data*, BLUEGRASS CELLULAR (June 1, 2015), http://bluegrasscellular.com/about/news/bluegrass_cellular_announces_new_way_to_save_unused_data;

data plans to their customers.⁹⁶ In the prepaid space, all four national carriers have offered customers the ability to roll over their monthly unused data.⁹⁷

3. Device Plan Innovations.

Competition in the mobile marketplace has also spurred carrier innovation in device payment plans. Most of the larger carriers now offer equipment installment plans (“EIPs”) wherein customers pay for new devices in installments over the course of a two-year service contract, instead of paying up front. Under Verizon’s Edge plan, customers can pay off the cost of the new handset over the course of two years. Customers can also upgrade to a new device as soon as the old device is paid off.⁹⁸ AT&T offers a similar EIP, called Next, and all of T-Mobile’s Simple Choice plans have EIPs.⁹⁹ Consumers are increasingly choosing these new EIPs in lieu of signing two-year contracts that offer device subsidies.¹⁰⁰ T-Mobile also recently introduced its new “JUMP! On Demand” plan, which allows customers to pay a monthly device fee along with phone service costs to switch to a new phone model up to three times a year.¹⁰¹

Data Stash, T-Mobile, <http://www.t-mobile.com/offer/data-stash-data-roll.html> (last visited June 26, 2015).

⁹⁶ See Sprint, <http://www.sprint.com/> (last visited June 26, 2015); Simple Choice Plan, T-Mobile, <http://www.t-mobile.com/cell-phone-plans/individual.html> (last visited June 26, 2015).

⁹⁷ Dan Meyer, *Sprint counters T-Mobile US, AT&T with prepaid data rollover*, RCRWIRELESS NEWS (June 3, 2015), <http://www.rcrwireless.com/20150603/carriers/sprint-counters-t-mobile-us-att-with-prepaid-data-rollover-tag2>.

⁹⁸ Phil Goldstein, *Verizon: Edge customer now must pay off smartphone before upgrading, but get to keep old phone*, FIERCEWIRELESS (May 26, 2015), <http://www.fiercewireless.com/story/verizon-edge-customers-now-must-pay-smartphone-upgrading-get-keep-old-phone/2015-05-26>.

⁹⁹ Phil Goldstein, *Verizon, AT&T, Sprint and T-Mobile likely to finance \$37B in devices this year, analysts say*, FIERCEWIRELESS (Feb. 13, 2015), <http://www.fiercewireless.com/story/verizon-att-sprint-and-t-mobile-likely-finance-37b-devices-year-analysts-sa/2015-02-13>.

¹⁰⁰ David Goldman, *The death of the \$200 iPhone*, CNN MONEY (June 3, 2015), <http://money.cnn.com/2015/06/03/technology/200-dollar-iphone/>.

¹⁰¹ See Malathi Nayak, *T-Mobile to kick off new phone leasing plan for upgrades*, REUTERS (June 25, 2015), <http://www.reuters.com/article/2015/06/25/t-mobile-us-smartphone-idUSL1N0ZB18L20150625>.

In short, the highly competitive wireless marketplace continues to give consumers more choices for voice, data, and devices. This not only encourages wireless carriers to think of more innovative ways to promote their services, but also benefits consumers' bottom line.

B. Potential New Entry and Continued Growth of Innovative MVNO Service Providers Highlight the Dynamic and Competitive Nature of the Wireless Market.

MVNOs continue to increase competition in the wireless marketplace and provide alternatives for wireless customers. The variety of service providers in the wireless ecosystem also continues to increase, as carriers leverage new technologies to provide service to wireless devices. New opportunities for Wi-Fi/cellular hybrid networks, as well as MSS, are drawing new providers into the marketplace, increasing both innovation and competition. This increased number and variety of service providers in the ecosystem demonstrates a market structure indicative of competition.¹⁰²

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

Over the last several years, dozens of MVNOs have entered – and continue to enter – the wireless marketplace, increasing competition and the diversity of offerings for wireless consumers. Recent estimates show that at any given time there are 60-80 MVNOs operating in the U.S.¹⁰³ According to the FCC's most recent Local Telephone Competition Report, as of December 2013, MVNOs provide service to 12% of U.S. mobile telephone subscribers.¹⁰⁴ MVNOs emphasize flexibility and affordability in their plans, and many MVNOs have chosen to

¹⁰² See *Thirteenth Competition Report* ¶ 12 (finding that similar diversity in the core CMRS market supported the FCC's finding of effective competition).

¹⁰³ See, e.g., *The Big MVNO List: 83 MVNO Providers Saving Phone Charges in the USA*, AMGOO (Dec. 10, 2014), <http://www.amgoo.com/blog/the-big-mvno-list-83-mvno-providers-in-usa>.

¹⁰⁴ *Local Telephone Competition: Status as of December 31, 2013*, Industry Analysis and Technology Division, Wireline Competition Bureau, Federal Communications Commission (Oct. 2014), available at https://apps.fcc.gov/edocs_public/attachmatch/DOC-329975A1.pdf.

target niche market segments to differentiate themselves and avoid direct competition with the larger carriers, all while bringing new options to consumers.¹⁰⁵

Some MVNOs, including Total Wireless, now offer plans allowing customers to roll over unused data from month to month, providing a flexible option for customers.¹⁰⁶ Further, like some larger carriers, some MVNOs are focusing on meeting the demand from the Hispanic market.¹⁰⁷ For example, in May 2014, Univision and T-Mobile announced a partnership to launch Univision Mobile, an MVNO aiming to meet the consumer demand from Hispanic customers. All Univision Mobile plans include unlimited international texting from the U.S. to 200 countries, including certain Latin American countries and other international destinations.¹⁰⁸

Because of the flexible plan options available from MVNOs, customers rate MVNOs highly in customer service surveys. In a 2014 survey regarding postpaid carriers conducted by Consumer Reports, small carriers such as Consumer Cellular and Ting stood out for high ratings on value, data service, and customer support.¹⁰⁹ The foregoing demonstrates the tremendous

¹⁰⁵ *Mobile Virtual Network Operator (MVNO) Market is Expected to Reach \$73.20 Billion by 2010: New Report by Grand View Research, Inc.*, NASDAQ GLOBAL NEWSWIRE (Mar. 18, 2015), <http://globenewswire.com/news-release/2015/03/18/716280/10125346/en/Mobile-Virtual-Network-Operator-MVNO-Market-Is-Expected-To-Reach-73-20-Billion-By-2020-New-Report-By-Grand-View-Research-Inc.html>.

¹⁰⁶ See Phil Goldstein, *Total Wireless, likely a Verizon MVNO, sells rollover data offerings through Walmart*, FIERCEWIRELESS (Mar. 17, 2015), <http://www.fiercewireless.com/story/total-wireless-likely-verizon-mvno-sells-rollover-data-offerings-through-wa/2015-03-17>.

¹⁰⁷ Phil Goldstein, *T-Mobile MVNO Solavei plans to expand to Mexico, launch new social commerce tools this year*, FIERCEWIRELESS (Mar. 19, 2015), <http://www.fiercewireless.com/story/t-mobile-mvno-solavei-plans-expand-mexico-launch-new-social-commerce-tools/2015-03-19>.

¹⁰⁸ Phil Goldstein, *T-Mobile, Univision partner to launch Univision Mobile MVNO aimed at Hispanics*, FIERCE WIRELESS (May 15, 2014), <http://www.fiercewireless.com/story/t-mobile-univision-partner-launch-univision-mobile-mvno-aimed-hispanics/2014-05-15>.

¹⁰⁹ *Small carriers outrank the big ones in Consumer Reports' latest cell phone service survey*, CONSUMER REPORTS (Nov. 20, 2014), <http://www.consumerreports.org/cro/news/2014/11/small-carriers-outrank-the-big-ones-in-consumer-reports-latest-cell-phone-service-survey/index.htm>.

impact MVNOs continue to have on the wireless market, both reflecting and driving the intense competition therein.

2. Hybrid Wi-Fi/Cellular Networks Have the Potential to Provide Meaningful Competition to Traditional Carriers.

Carriers utilizing a combination of Wi-Fi and cellular networks are the newest players to push the expansion and evolution of the mobile wireless ecosystem. Small MVNOs such as Republic Wireless allow consumers to take advantage of “hybrid” calling, which automatically converts cellular calls to Wi-Fi VoIP calls when the consumer has access to a Wi-Fi network.¹¹⁰ While this innovation provides considerable benefits for consumers in terms of both enhanced connectivity and lower costs, and for providers by reducing the load on their networks, it does not eliminate the need for more spectrum.¹¹¹

Wi-Fi/cellular hybrid companies like Republic, Scratch, and FreedomPop promise to reduce wireless costs for customers, offering plans for as little as \$5 per month. Scratch Wireless offers free unlimited Wi-Fi calls and texts once customers purchase a device from Scratch. When a Wi-Fi network is not available, Scratch customers can use the Sprint network, under a Sprint partnership with Scratch, for unlimited text messaging.¹¹² Customers can also purchase cellular passes for as little as \$1.99 per day.¹¹³ These companies report that the model has

¹¹⁰ See Republic Wireless, <https://republicwireless.com/> (last visited June 26, 2015); Alan Henry, *Five Best Pre-Paid Cellphone Carriers*, LIFEHACKER.COM (Nov. 10, 2013), <http://lifehacker.com/five-best-pre-paid-cellphone-carriers-1461230147>; Brian X. Chen, *Google Confirms Plans for Wireless Service*, N.Y. TIMES (Mar. 2, 2015), <http://bits.blogs.nytimes.com/2015/03/02/google-confirms-plans-for-wireless-service/> (“*Google Confirms Plans for Wireless Service*”).

¹¹¹ Lynn La & Andrew Hoyle, *What You Need to Know About Wi-Fi Calling*, CNET (Apr. 22, 2015), <http://www.cnet.com/news/what-you-need-to-know-about-wifi-calling/>.

¹¹² Ryan Knutson, *Ditching Your Smartphone Bill and Going Wi-Fi Only*, WALL STREET JOURNAL (Mar. 1, 2015), <http://www.wsj.com/articles/do-you-really-need-a-wireless-phone-carrier-1425077991>.

¹¹³ Cellular Passes, Scratch Wireless, <http://www.scratchwireless.com/> (last visited June 19, 2015).

already been profitable in the first years of operation.¹¹⁴ In an interview with the New York Times, Stephen Stokols, the chief executive of FreedomPop, called Wi-Fi a “massive disrupter” to the traditional cost structure of the wireless industry.¹¹⁵ In February 2015, FreedomPop said its customer base doubles every four to six months, and Republic Wireless reported a 13% monthly customer growth.¹¹⁶

Large telecommunications companies like Cablevision and Google are also capitalizing on consumers’ growing access to Wi-Fi networks to provide affordable hybrid options. Cablevision announced a phone service powered entirely by Wi-Fi networks for \$30 per month¹¹⁷ and Google is developing systems to allow wireless customers to toggle between cellular and Wi-Fi connections, even while maintaining a single phone call.¹¹⁸ The Google Hangouts and Google Voice applications already offer Wi-Fi network alternatives to traditional texting and voice service.¹¹⁹ Further actions by the FCC and industry to deploy more and broader Wi-Fi nationwide will continue to spur the development of these hybrid networks and spark more competitors and innovation in the wireless market, all to the ultimate benefit of consumers.

¹¹⁴ Brian X. Chen, *Cellphone Start-Ups Use Wi-Fi First to Handle Calls and Take On Rivals*, N.Y. TIMES (Feb. 15, 2015), http://www.nytimes.com/2015/02/16/technology/small-phone-companies-use-wi-fi-to-punch-above-their-weight.html?_r=1 (“*Cellphone Start-Ups Use Wi-Fi First*”).

¹¹⁵ *Id.*

¹¹⁶ *Id.*

¹¹⁷ *Id.*

¹¹⁸ See Cade Metz, *How Google’s New Wireless Service Will Change the Internet*, WIRED (Mar. 3, 2015), <http://www.wired.com/2015/03/googles-new-wireless-service-will-change-internet/>; *Google Confirms Plans for Wireless Service*.

¹¹⁹ *Cellphone Start-Ups Use Wi-Fi First*.

3. Mobile Satellite Service Providers Have the Potential to Provide Additional Competition.

Although the MSS market has traditionally involved satellite-based voice and narrowband data services, a number of MSS providers are taking steps to provide terrestrial broadband services using their licensed satellite spectrum. Other MSS providers, through their next-generation satellites, have either expanded existing broadband service capabilities or expect to do so soon. All of these factors support the conclusion that the FCC should consider MSS providers as potential competitors to facilities-based carriers, resellers, and MVNOs.

DISH Network Corporation. Most notable among the MSS providers is DISH Network Corporation (“DISH”). DISH holds MSS licenses for all 40 megahertz of spectrum in the 2 GHz MSS band (2000-2020 MHz and 2180-2200 MHz).¹²⁰ In 2012, the FCC adopted flexible terrestrial use rules for this spectrum, referred to as the AWS-4 band with respect to terrestrial service, and granted DISH a license for use of all 40 megahertz of the AWS-4 band.¹²¹ Further, in 2013, DISH received a waiver of the FCC’s rules, allowing DISH the option to use the lower portion of the AWS-4 band (2000-2020 MHz) either for downlink or uplink operations and enhancing the technical flexibility of the AWS-4 band.¹²² DISH is required under its AWS-4

¹²⁰ See *New DBSD Satellite Service G.P., Debtor-in-Possession, and TerreStar Licensee Inc., Debtor-In-Possession, Request for Rule Waivers and Modified Ancillary Terrestrial Component Authority*, Order, 27 FCC Rcd 2250 (2012).

¹²¹ See *Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands et al.*, Report and Order and Order of Proposed Modification, 27 FCC Rcd 16102 ¶ 162 (2012); see also *Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands et al.*, Order of Modification, 28 FCC Rcd 1276 (2013).

¹²² *In the Matter of DISH Network Corporation, Petition for Waiver of Sections 27.5(j) and 27.53(h)(2)(ii) and Request for Extension of Time*, Memorandum Opinion and Order, 28 FCC Rcd 16787 (2013).

license to meet an interim build-out requirement of March 2017 and a final build-out requirement by March 2021.¹²³

In addition to this MSS spectrum, in 2014 DISH (through a subsidiary) won all the licenses for the 10 megahertz of H-block spectrum (1915-1920 MHz and 1995-2000 MHz), which is adjacent to the AWS-4 band, at a cost of \$1.564 billion.¹²⁴ In 2015, two separate entities, in which DISH has 85% equity interests and with which DISH has executed management services agreements, won a combined \$13.327 billion (gross) worth of licenses for AWS-3 spectrum (1695-1710 MHz, 1755-1780 MHz and 2155-2180 MHz), representing approximately 27.73 megahertz of the AWS-3 spectrum nationwide.¹²⁵ DISH also holds 4.6 megahertz of the 700 MHz spectrum on a nationwide basis.¹²⁶ Thus, in total, DISH has available approximately 82.33 megahertz of spectrum nationwide with which it, or entities with whom DISH partners, could deploy a new, nationwide terrestrial mobile broadband network, with raw spectrum capacity comparable to that of existing nationwide carriers.¹²⁷

LightSquared Subsidiary LLC. LightSquared Subsidiary LLC (“LightSquared”) is another MSS operator that could offer terrestrial or a hybrid terrestrial/MSS service. LightSquared was granted authority in 2004 to deploy a hybrid service in the 1.5 GHz and 1.6

¹²³ See, e.g., Gamma Acquisition L.L.C., AWS-4 License, Call Signs T060430001 to T060430176 (granted Mar. 7, 2013).

¹²⁴ See *Auction of H Block Licenses in the 1915 - 1920 MHz and 1995 2000 MHz Bands Closes; Winning Bidder Announced for Auction 96*, Public Notice, 29 FCC Rcd 2044 (2014).

¹²⁵ See DISH Network Corporation Current Report (Form 8-K) at 3 (Feb. 20, 2015). Because both entities qualified for 25-percent bidding credits, the total net amount of the combined licenses won was \$10.43 billion.

¹²⁶ See *Seventeenth Competition Report* ¶ 104.

¹²⁷ *Id.*

GHz bands (1525-1559 MHz and 1626.5-1660.5 MHz).¹²⁸ Prior to deployment, however, the Global Positioning System (“GPS”) community raised serious interference concerns.¹²⁹ To address these concerns, LightSquared proposed relinquishing the right to use the 1545-1555 MHz band for terrestrial downlinks in exchange for authority to operate terrestrial downlinks in the 1670-1680 MHz band.¹³⁰ Since May 14, 2012, LightSquared has been involved in a contentious bankruptcy proceeding, but that proceeding was recently resolved.¹³¹ If LightSquared’s plan is adopted, its spectrum holdings could be used to introduce additional facilities-based competition in the terrestrial mobile wireless industry.

Other MSS Providers. Historically, MSS operators have served niche markets or remote areas where terrestrial networks were limited or unavailable. Recent advances in satellite and antenna technology, however, have allowed for the introduction of more sophisticated devices and faster broadband services at lower costs. For example, Iridium is scheduled to launch its next-generation Iridium NEXT MSS constellation beginning in 2015, which will support powerful new devices with enhanced voice quality and truly global coverage.¹³² Similarly, another MSS operator, Inmarsat, recently launched the second satellite of its Global Xpress system, which provides high-speed voice and data services in the Americas and over the Atlantic

¹²⁸ See *Mobile Satellite Ventures Subsidiary LLC, Application for Minor Modification of Space Station License for AMSC-1*, Order and Authorization, 19 FCC Rcd 22144 (2004).

¹²⁹ See *International Bureau Invites Comment on NTIA Letter Regarding LightSquared Conditional Waiver*, Public Notice, 27 FCC Rcd 1596 (2012).

¹³⁰ See Modification Application of LightSquared Subsidiary LLC, IBFS File Nos. SAT-MOD-20120928-00160, SAT-MOD-20120928-00160, SES-MOD-20121001-00872 (filed Sep. 28, 2012 and Oct. 1, 2012); see also *Federal Communications Commission Invites Comment on LightSquared Request to Modify its ATC Authorization*, Public Notice, 27 FCC Rcd 14290 (2012).

¹³¹ See *Pleading Cycle Established for Applications Filed by LightSquared Subsidiary LLC, Debtor-in-Possession, and LightSquared Subsidiary, LLC, for FCC Consent to Assign Licenses and Other Authorizations and Request for Declaratory Ruling on Foreign Ownership*, Public Notice, IB Docket No. 15-126, DA 15-653 (June 1, 2015).

¹³² See *Iridium Next: Powerful Innovation, Iridium*, <https://www.iridium.com/about/IridiumNEXT/Innovation.aspx> (last visited June 22, 2015).

Ocean.¹³³ These expanded service offerings can provide competition in the provision of mobile voice, data, and safety services, especially for large corporate and government customers.

C. Competition in the Wireless Marketplace Propels the Development of New and Innovative Wireless Devices, as Well as Lower Prices for Wireless Devices.

1. There is Robust Competition in the Wireless Device Market.

In addition to variety in service providers, the U.S. wireless device market offers consumers a broad range of choices for device pricing and design. Intense competition among device manufacturers has resulted in a wide array of wireless device options with a range of capabilities and price points. The marketplace has also remained fluid, allowing for rapid market share fluctuations within a relatively short period of time due to changing consumer preferences and a short product life cycle for most wireless devices.

There are currently at least 22 different device manufacturers offering more than 1,168 different handsets and devices.¹³⁴ The original equipment manufacturers (“OEMs”) with the higher overall mobile device market shares in 2014 are shown below. However, the relative OEM market shares over the past several years show that these market shares are volatile due to competition, shifting consumer preferences, the fast pace of the wireless device life cycle, and the presence – or potential entrance – of numerous new and well-funded OEMs seeking to carve out market share from the established OEMs.¹³⁵

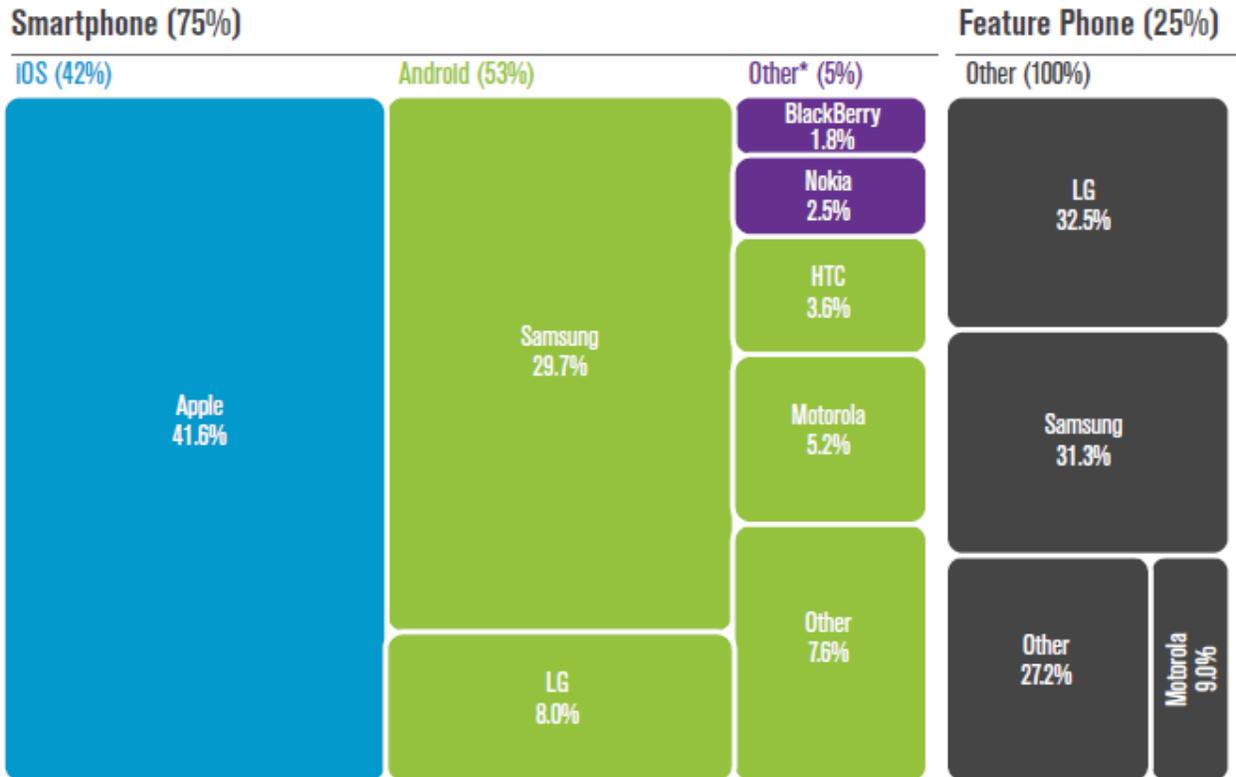
¹³³ See Global Xpress, Inmarsat, <http://www.inmarsat.com/service/global-xpress/> (last visited June 22, 2015).

¹³⁴ *Device Manufacturers Handset Totals by Manufacturer as of June 30, 2014*, FCC, available at https://apps.fcc.gov/edocs_public/attachmatch/DOC-330002A1.pdf.

¹³⁵ Aaron Tilley, *Chinese Phone Maker Xiaomi Dips Toes In U.S. Market With Accessories And Sells Out*, FORBES (May 22, 2015 <http://www.forbes.com/sites/aarontilley/2015/05/22/xiaomi-dips-toes-in-u-s-market-with-accessories-and-sells-out/>) (“Xiaomi is using its Mi store as a way to test the appeal of its brand in the West well before it attempts to sell phones to U.S. and European consumers.”).

U.S. Smartphone and Feature Phone OEM Market Share

Source: comScore MobiLens, U.S., Age 13+, 3 Mo. Avg. Ending Dec 2014



* While not pictured in the above chart, 1.1 percent of smartphone subscribers use a non-Nokia, non-BlackBerry OEM device that does not run on iOS or Android.

Smartphones are rapidly taking over the wireless handset market. As of October 2014, 64% of all U.S. adults owned a smartphone,¹³⁶ and by the end of 2014, 57% of all wireless connections were smartphone connections.¹³⁷ Indeed, total reported smartphones numbered

¹³⁶ *Mobile Technology Fact Sheet*, PEW RESEARCH CENTER, <http://www.pewinternet.org/fact-sheets/mobile-technology-fact-sheet/> (last visited June 22, 2015) (“*Pew Fact Sheet*”).

¹³⁷ *VNI Mobile Forecast*, Device Growth Traffic Profiles.

more than 208 million by the end of last year, up 19% from 175 million in 2013.¹³⁸ Smartphone penetration continues to grow at an annual rate of 16%.¹³⁹

This impressive growth was fueled by a host of major new smartphone product launches in the past year. For example, in the fall of 2014, Apple released the iPhone 6 and 6 Plus, two versions of its flagship smartphone, with a new, lighter design and upgraded performance, including two larger screen variations than previous iPhone releases. Samsung also released the Galaxy S5 in 2014, which offered a fingerprint scanner security feature,¹⁴⁰ and then the Galaxy S6 and S6 Edge in 2015, all of which offered powerful processor upgrades. Additionally, the S6 offered a new industrial design and the S6 Edge model featured a curved glass notification display.¹⁴¹ Meanwhile, HTC unveiled the One H9 in early 2015, as a follow-up to the One H8, both of which featured an industrial unibody aluminum design with a signature speaker system;¹⁴² Microsoft introduced the Lumia 930 in 2014;¹⁴³ and Google released the next iteration of its signature smartphone, the Nexus 6, made by Motorola, in October of 2014.¹⁴⁴

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.

¹³⁸ *CTIA Survey Report*.

¹³⁹ *U.S. Digital Future in Focus*, COMSCORE, at 9 (2015), <http://www.comscore.com/Insights/Presentations-and-Whitepapers/2015/2015-US-Digital-Future-in-Focus>.

¹⁴⁰ Donna Tam, *Galaxy S5 Unveiled with Fingerprint Sensor, Bigger Screen*, CNET (Feb. 24, 2014), <http://www.cnet.com/news/galaxy-s5-unveiled-with-fingerprint-sensor-bigger-screen/>.

¹⁴¹ Zach Epstein, *Samsung Galaxy S6 Hands-On: Meet The Smartphone to Beat in 2015*, BGR (Mar. 1, 2015), <http://bgr.com/2015/03/01/samsung-galaxy-s6-review-pt-1-hands-on/>.

¹⁴² Aaron Souppouris, *This Is the HTC One M9*, ENGADGET (Mar. 1, 2015), <http://www.engadget.com/2015/03/01/htc-one-m9-announcement/>.

¹⁴³ Carly Page, *Lumia 930 Release Date, Price, Specs, and Availability*, THE INQUIRER (July 21, 2014), <http://www.theinquirer.net/inquirer/news/2338018/nokia-lumia-930-release-date-specs-price-and-availability>.

¹⁴⁴ Chris Velazco *Google reveals the \$649 Nexus 6, pre-orders begin on October 29th*, ENGADGET (Oct. 15, 2015), <http://www.engadget.com/2014/10/15/nexus-6-official/>.

Various other OEMs that have achieved success in international markets are either entering or contemplating entrance into the U.S. market in the near term.¹⁴⁵

Consumers are increasingly choosing smartphones over feature phones: at year-end 2014, 75% of users owned smartphones, compared to 25% owning feature phones, and Chetan Sharma recently reported that smartphones comprised 95% of handsets sold in the first quarter of 2015.¹⁴⁶ That being said, many Americans still rely on non-smartphones for their daily communications, and the wireless industry is continuing to provide options for this demographic. In June 2015, for instance, Microsoft released the new Nokia 105 geared toward “first-time mobile phone buyers, as well as people looking for a reliable backup device for their smartphone.” The basic phone comes with storage for up to 2,000 contacts, enhanced audio, increase talk time for up to 15 hours, and extended battery life.¹⁴⁷ Similarly, the Kyocera Kona provides a compact, easy-to-use design and the Kyocera DuraXT provides dustproof, shockproof, and waterproof durability and a convenient push-to-talk feature that is ideal for people working in tough environments.¹⁴⁸

The OEM market share positions are highly fluid as new entrants seek to leverage success in international markets and target budget-minded consumers with lower-cost prepaid device options. For example, ZTE began ramping up its entry into the U.S. prepaid market in

¹⁴⁵ Evelyn Cheng, *The Chinese smartphone that's ramping up in the US*, CNBC (Nov. 13, 2014), <http://www.cnn.com/id/102174506> (“*The Chinese smartphone that’s ramping up in the US*”); David Goldman, *Xiaomi just took over China - is the U.S. next?*, CNN MONEY (Aug. 5, 2014), <http://money.cnn.com/2014/08/05/technology/mobile/xiaomi-united-states/>.

¹⁴⁶ Chetan Sharma, *US Mobile Market Update – Q1 2015*, CHETAN SHARMA CONSULTING (2015), <http://www.chetansharma.com/usmarketupdateq12015.htm>.

¹⁴⁷ *The new Nokia 105 and Nokia 105 Dual SIM help give the world a voice*, MICROSOFT (June 3, 2015), <https://news.microsoft.com/2015/06/03/the-new-nokia-105-and-nokia-105-dual-sim-help-give-the-world-a-voice/>.

¹⁴⁸ *Best basic phones of 2015*, CNET (June 24, 2015), <http://www.cnet.com/topics/phones/best-phones/basic/>.

late 2014 and by April 2015 claimed 21% of the prepaid smartphone market.¹⁴⁹ Carriers continue to focus on prepaid phones and are moving to compete more vigorously with more prepaid smartphone options from a wider variety of OEMs.¹⁵⁰

2. Wireless Device Quality is Improving Rapidly While Prices are Dropping.

Competition among device manufacturers is driving innovative advances in device quality at the same time prices have generally fallen by virtue of a wider range of device price points and innovative device financing options.

On a technical basis, wireless device performance has continued to improve. For example, a comparison of the Samsung Galaxy S4, released in 2013, as compared to the Samsung S6, launched in 2015, shows enhanced capabilities along every metric, including display resolution, battery life, processor capabilities, system memory, hard drive size, and camera quality.¹⁵¹ 4G-capable phones are now the market standard, which can take advantage of the ubiquitous 4G LTE networks deployed by most wireless broadband carriers.¹⁵² Fully 98% of Americans have access to 4G LTE networks.¹⁵³ In 2014 there were 459 million 4G connections worldwide, and that number is expected to grow to 3 billion by 2019.¹⁵⁴ At year-end 2014, the U.S. accounted for almost a third of global LTE connections, a share that is narrowing as 4G

¹⁴⁹ See *The Chinese smartphone that's ramping up in the US*; Kishalaya Kundu, *ZTE Claims 21% U.S. Market Share In Pre-Paid Handsets*, ANDROID HEADLINES (Apr. 24, 2015), <http://www.androidheadlines.com/2015/04/zte-claims-21-u-s-market-share-pre-paid-handsets.html>.

¹⁵⁰ See, e.g., Kishalaya Kundu, *ZTE Claims 21% U.S. Market Share In Pre-Paid Handsets*, ANDROID HEADLINES (Apr. 24, 2015), <http://www.androidheadlines.com/2015/04/zte-claims-21-u-s-market-share-pre-paid-handsets.html>.

¹⁵¹ The Next Big Thing is Here, Samsung, <http://www.samsung.com/us/explore/galaxy-s-6-features-and-specs/> (last visited June 26, 2015).

¹⁵² *Mobile Data Demand* at 4; see also, *infra*, Section VII.A.1.

¹⁵³ *Id.*

¹⁵⁴ *VNI Mobile Forecast*.

networks are increasingly deployed around the world.¹⁵⁵ By 2019, North America is expected to have 42% of the mobile devices and connections with 4G capability.¹⁵⁶

Customer selection of wireless devices is driven by a wide variety of factors. Confronted with an across-the-board increase in technical sophistication of wireless devices on the market from mobile wireless device manufacturers, customers rely on various factors in making their purchasing decisions. For smartphones, customers report primarily weighing four factors: performance (29%); features (26%); physical design (23%); and ease of operation (22%).¹⁵⁷ For traditional wireless devices, customers look at: features (31%); physical design (24%); performance (23%); and ease of operation (22%).¹⁵⁸

Given this increased sophistication of devices and consumer demand for lower-priced devices, OEMs have sought to emphasize design, device variations, and a variety of price points to entice consumers to choose their devices.¹⁵⁹ Lower income consumers are increasingly

¹⁵⁵ *Year-End 12014: Nearly Half a Billion LTE Connections Worldwide, 4G Americas reports substantial gains for LTE in North America*, 4G AMERICAS (Mar. 11, 2015), <http://www.4gamericas.org/en/newsroom/press-releases/year-end-2014-nearly-half-billion-lte-connections-worldwide/>; *1Q2015: LTE Connections Worldwide Increase by 150 Percent, North America achieves 44% LTE market share – highest in the world and Latin America boasts greatest LTE growth rate*, 4G AMERICAS (June 5, 2015), <http://www.4gamericas.org/en/newsroom/press-releases/1q2015-lte-connections-worldwide-increase-150-percent/>.

¹⁵⁶ *VNI Mobile Forecast*.

¹⁵⁷ *J.D. Power Reports: Operating System Is Increasingly Important for the Selection, User Experience And Brand Satisfaction with Wireless Smartphones*, J.D. POWER & ASSOCIATES, at 2 (Oct. 16, 2014), http://www.jdpower.com/sites/default/files/2014196%20U%20S%20%20Wireless%20Smartphone-Traditional%20Mobile%20Phone%20Satisfaction%20Studies-V2_Final.pdf.

¹⁵⁸ *Id.*

¹⁵⁹ *U.S. Smartphone Sales among Consumers Earning Less than \$30,000 Grow More Than 50 Percent, According to The NPD Group*, NPD GROUP (Apr. 21, 2015), <https://www.npd.com/wps/portal/npd/us/news/press-releases/2015/us-smartphone-sales-among-consumers-earning-less-than-30000-grow-more-than-50-percent-according-to-the-npd-group/> (“We are seeing Apple react with increased distribution, lower priced products, and more device choices in order to appeal to a wider audience. Samsung continues to provide a wide range of choices for its customer and channel base, which continues to be broader in scope than its main competitor. Samsung hopes to deliver increased penetration into the more affluent demographics with its updated and more premium Galaxy S6

participating in the smartphone market and OEMs are reacting with a wider variety of low-cost devices.¹⁶⁰ For example, Apple, which had traditionally focused on a single screen size and a consistent price bracket, now offers three different screen sizes, including the iPhone 6 Plus with a 5.5 inch screen, with subsidized price points that range from \$0 to \$499, and unsubsidized price points from \$450 to \$949, depending on model, screen size, and storage.¹⁶¹ Similarly, Samsung now offers screen sizes that vary from the 4.5 inch Samsung Galaxy Mini to the Samsung Galaxy Note 4 with a 5.7 inch screen, with carrier subsidized prices that also vary from \$0 to \$299.¹⁶²

Meanwhile, the wireless industry is developing innovative solutions for consumers that require enhanced accessibility features.¹⁶³ Wireless service providers continue to offer a wide range of service plans that offer people with disabilities choice and value among voice, text, and data services. Wireless OEM's are also committed to achieving accessibility, leading to the development of innovative feature phones, smartphones, and tablets with built-in accessibility solutions such as screen readers, captioning software, hearing aid compatibility ("HAC") and, increasingly, personal assistant programs that ease everyday tasks and operations of mobile devices for all consumers, including those with hearing-, vision-, cognitive-, and dexterity-related disabilities. Accessibility support is also being addressed throughout the wireless

line. Apple continues to see success in providing a range of devices, but still has a way to go to match Samsung's strength with entry level consumers.").

¹⁶⁰ *Id.*

¹⁶¹ See Compare iPhone Models, Apple, <http://store.apple.com/us/iphone/compare> (last visited June 20, 2015).

¹⁶² See Smartphones, All Products, Samsung, <http://www.samsung.com/us/mobile/cell-phones/all-products> (last visited June 20, 2015).

¹⁶³ Comments of CTIA – The Wireless Association[®], CG Docket No. 10-213 (filed July 15, 2014).

ecosystem, including by ensuring compatibility with assistive technologies and developing innovative applications to meet the needs of people with disabilities.

3. OEMs are Launching Complementary Wearable Wireless Devices, Including Smartwatches.

The wireless device market has begun to expand beyond smartphones and tablets as OEMs begin to launch complementary wearable wireless devices, a market that is expected to see 750 million units shipped during the period from 2013 to 2020.¹⁶⁴ For example, in recent months, Apple, Motorola, LG, Sony, Samsung, and other OEMs have all launched smartwatches that offer integration with smartphones and increased functionality, such as biometric monitoring.¹⁶⁵ Other industry participants have made moves toward developing a market for other wireless wearable devices as OEMs seek to provide new functionalities and create new experiences for consumers.¹⁶⁶

D. Smartphone Operating Systems Continue to Compete for the Lead in Market Share.

Apple's iOS and Google's Android operating systems continue to compete for the lead in market share, with Apple's iOS capturing 41.9% and Google Android 52.3%.¹⁶⁷ Other entrants –

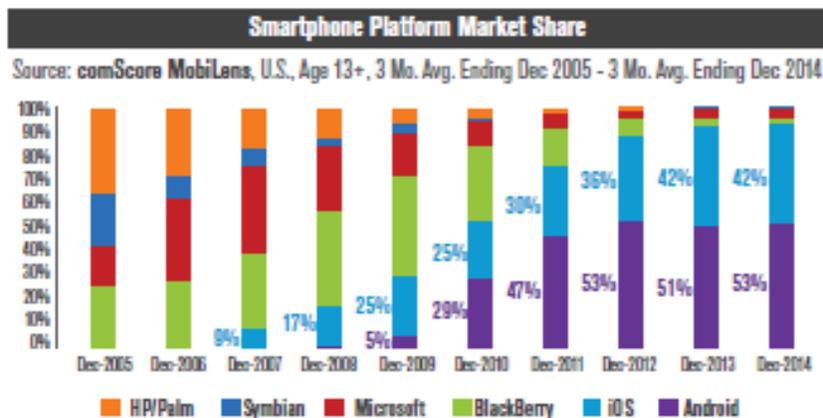
¹⁶⁴ *Cumulative Wearable Device Shipments to Surpass 750 Million Units by 2020, According to Tractica*, BUSINESS WIRE (June 22, 2015), <http://www.businesswire.com/news/home/20150622005210/en/Cumulative-Wearable-Device-Shipments-Surpass-750-Million#.VYwn7mfJC71>.

¹⁶⁵ See John McCann and Lily Prasuethsut, *Best smartwatch 2015: what's the best wearable tech for you?* TECHRADAR (June 4, 2015), <http://www.techradar.com/us/news/wearables/best-smart-watches-what-s-the-best-wearable-tech-for-you--1154074>.

¹⁶⁶ Nick Lavars, *Intel's Recon Instruments grab: The chip-maker continues to hedge its bets on wearables*, GIZMAG (June 19, 2015), <http://www.gizmag.com/heads-up-intel-purchases-recon-instruments/38099/> (discussing Intel's acquisition of wearable device manufacturer Recon Instruments).

¹⁶⁷ U.S. Digital Future in Focus, COMSCORE, at 9 (2015).

including Windows Phone, Blackberry, and variations of Android (including Amazon FireOS) – have or are investing significant resources in developing competing operating systems.¹⁶⁸



The tablet market remains a driver of platform integration. Continuing the trend of consumers relying on wireless devices, consumers remain enthusiastic purchasers of wireless-enabled tablets.¹⁶⁹ As of October 2014, 32% of American adults own an e-reader and 42% of American adults own a tablet computer.¹⁷⁰ Likewise, smartphone operating systems continue to converge with other mobile and wireless-enabled devices, including tablets, wearable devices, PCs, and over-the-top (“OTT”) streaming devices.

E. The Number and Relevance of Applications is Skyrocketing in the Competitive Wireless Marketplace.

Increased competition and usage in the mobile wireless market is driving a growing applications market, supporting hundreds of thousands of jobs and generating competition among carriers and developers. The number of total apps was 5.6 million in 2014.¹⁷¹ According

¹⁶⁸ See e.g., Devindra Hardawar, *Amazon launches Fire OS 5 dev preview, based on Android Lollipop*, ENGADGET (June 20, 2015), <http://www.engadget.com/2015/06/19/amazon-fire-os-5-dev/>.

¹⁶⁹ *Pew Fact Sheet*.

¹⁷⁰ *Id.*

¹⁷¹ *Mobile Data Demand* at 6.

to appFigures, the Google Play app store offers more than 1.43 million apps, while Apple's iTunes store offers 1.21 million apps.¹⁷² Additionally, the open source nature of Google's Android has led other OEMs to design competing app stores, including the Amazon app store and Blackberry's implementation of the Android app store.¹⁷³ These applications support three quarters of a million jobs. For instance, Google has 388,000 developers working on its platform, Apple has 282,000, and Amazon has 48,000.¹⁷⁴ By contrast, in 2007, the "app economy" employed virtually zero employees.¹⁷⁵ Moreover, consumers spend more and more time using apps as well, rising to 37 hours and 28 minutes per month as of the end of 2014, up from an average of 30 hours per month in the last quarter of 2013, which in turn was up from 18 hours per month in the fourth quarter of 2011.¹⁷⁶ Developers are expected to speed development of apps in future months and years to meet the rapidly increasing demand from consumers for more apps, as well as to beat competition in the app marketplace.¹⁷⁷

As competition in this industry flourishes, consumers benefit from a plethora of free apps and companies benefit by earning additional revenue from the sale of apps and app features. By

¹⁷² Greg Sterling, *Report: Google Play Finally Passes iOS App Store in Number of Apps, Developers*, MARKETING LAND (Jan. 13, 2015), <http://marketingland.com/report-google-play-finally-passes-ios-app-store-number-apps-developers-114115>.

¹⁷³ See e.g., Devindra Hardawar, *Amazon launches Fire OS 5 dev preview, based on Android Lollipop*, ENGADGET (June 20, 2015), <http://www.engadget.com/2015/06/19/amazon-fire-os-5-dev/>; Amazon Appstore now available for your BlackBerry 10 smartphone, Blackberry, <http://us.blackberry.com/apps/amazon-appstore.html> (last visited June 20, 2015).

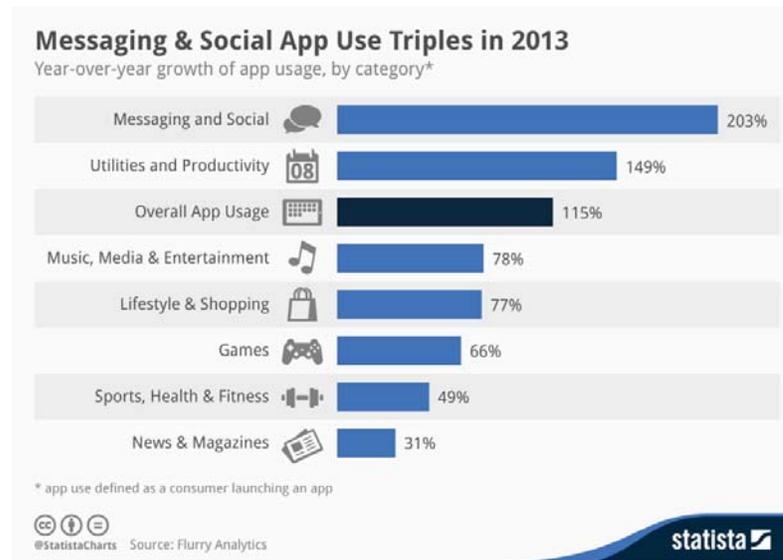
¹⁷⁴ *Id.*

¹⁷⁵ *Mobile Data Demand* at 6.

¹⁷⁶ Sarah Perez, *Time Spent In Apps Up 63 Percent Over Past Two Years, But Apps Used Monthly Show Little Change*, TECHCRUNCH (June 11, 2014), <http://techcrunch.com/2015/06/11/time-spent-in-apps-up-63-percent-over-past-two-years-but-apps-used-monthly-shows-little-change/>; Sarah Perez, *An Upper Limit for Apps? New Data Suggests Consumers Only Use Around Two Dozens Apps Per Month*, TECHCRUNCH (July 1, 2014), <http://techcrunch.com/2014/07/01/an-upper-limit-for-apps-new-data-suggests-consumers-only-use-around-two-dozen-apps-per-month/>.

¹⁷⁷ *15 Mobile App Development Trends to Look Out For In 2015*, JULY SYSTEMS (Dec. 24, 2014), <http://julysystems.com/15-mobile-app-development-trends-look-2015/>.

2016, it is predicted that 94.5% of all mobile apps will be free apps.¹⁷⁸ Despite that, Apple reported that customers spent \$10 billion on apps in 2013.¹⁷⁹ Year-over-year, consumers are increasingly turning to a variety of messaging and social media apps for everyday use:



F. Increasing Mobile Advertising Spending Demonstrates Continued Competition for Wireless Consumers.

In addition to competing on device offerings and applications, wireless companies and manufacturers of mobile devices also compete for customers through increasing advertising spending. In advertising dollars, telecom companies spent more than all but two other industries in the first quarter of 2015, and telecom advertising is one of the fastest-growing categories among the top 10 advertising industries.¹⁸⁰ Mobile advertising services are expected to hit two

¹⁷⁸ Connie Guglielmo, *Mobile Apps Won't Lead to Riches for Most Developers*, FORBES (Jan. 13, 2014), <http://www.forbes.com/sites/connieguglielmo/2014/01/13/mobile-apps-may-not-pave-the-way-to-developer-riches-sales-average-less-than-1250-a-day/>.

¹⁷⁹ *Id.*

¹⁸⁰ *Kantar Media Reports Q1 2015 U.S. Advertising Expenditures Decreased 4.0 Percent from Q1 2014 Olympic Spend Levels*, BUSINESS WIRE (June 29, 2015), <http://www.businesswire.com/news/home/20150629005133/en/Kantar-Media-Reports-Q1-2015-U.S.-Advertising#.VZFgEmfJC70>; Michael Learmouth, *Advertising Trends and The Smartphone War: Why Don Draper Would Want a Wireless Account*, INTERNATIONAL BUSINESS TIMES (July 30, 2014), <http://www.ibtimes.com/advertising-trends-smartphone-war-why-don-draper-would-want-wireless-account-1644194>.

milestones in 2016: (1) surpass \$100 billion in spending and accounting for the very first time (a 430% increase from 2013); and (2) account for 50% of all digital ad expenditures.¹⁸¹ E-Marketer forecasts that mobile ad spending will account for 72% of all U.S. digital ad expenditures by the year 2019.¹⁸² Furthermore, 80% of all companies are predicted to increase their digital marketing budgets in the next 12-18 months.¹⁸³

Mobile service providers continue to increase overall advertising spending. For example, by year-end 2014, Sprint's marketing expenses were \$5.3 billion, a 102% increase compared to 2013. Verizon, T-Mobile, and AT&T similarly reported advertising expense increases.¹⁸⁴

V. WIRELESS COMPETITION IS INCREASING TRANSPARENCY AND PUBLIC SAFETY FEATURES FOR WIRELESS CUSTOMERS.

A. Consumers Have Access to Copious Information Regarding Wireless Products, Services, and Network Coverage.

There are a multitude of resources available to help consumers understand their wireless options and determine which carriers, devices, plans, and network coverage will meet their needs. Sources of information for consumers include, among other things: CTIA's "Consumer

¹⁸¹ *Mobile Ad Spend to Top \$100 Billion Worldwide in 2016, 51% of Digital Market*, EMARKETER (Apr. 2, 2015), <http://www.emarketer.com/Article/Mobile-Ad-Spend-Top-100-Billion-Worldwide-2016-51-of-Digital-Market/1012299>.

¹⁸² *Mobile Will Account for 72% of US Digital Ad Spend by 2019*, EMARKETER (Mar. 24, 2015), www.emarketer.com/Article/Mobile-Will-Account-72-of-US-Digital-Ad-Spend-by-2019/1012258.

¹⁸³ *80% of Companies to Increase Digital Marketing Budgets in 2015*, MONDO (Jan. 28, 2015), www.mondo.com/press/80-companies-increase-digital-marketing-budgets-2015-mondo-reports/.

¹⁸⁴ AT&T Inc., Annual Report (Form 10-K) (Feb. 20, 2015) (AT&T reported advertising costs in 2012 as \$2,910 million, costs in 2013 as \$3,268 million, and costs in 2014 as \$3,272 million); Sprint Corporation, Annual Report (Form 10-K) (May 26, 2015) (Sprint reported sales and marketing expense was \$5.3 billion for the year ended Mar. 31, 2015 representing an increase of \$2.7 billion, or 102%, compared to the year ended December 31, 2013); T-Mobile US Inc., Annual Report (Form 10-K) (Feb. 19, 2015) (T-Mobile reported advertising expense included in selling, general and administrative expenses as \$1.4 billion, \$1.0 billion and \$0.9 billion for the years ended December 31, 2014, 2013 and 2012, respectively); United States Cellular Corporation, Annual Report (Form 10-K) (Feb. 25, 2015) (U.S. Cellular reported advertising costs in 2012 as \$227 million, advertising costs in 2013 as \$119.9 million, and advertising costs in 2014 as \$204.9 million); Verizon Communications Inc., Annual Report (Form 10-K) (Feb. 23, 2015) (Verizon reported advertising expenses at \$2,381 million in 2012, \$2,438 million in 2013, and \$2,526 million in 2014).

Code for Wireless Services” (“CTIA Consumer Code”), wireless provider websites, device manufacturer websites, third-party resources, carrier websites, and other independent sources. These resources ensure that the wireless market remains innovative and competitive by providing consumers with pertinent information on a full range of topics, from mobile plans and devices to customer service. As the FCC recognized in the *Thirteenth Competition Report*, readily available consumer information supports the consumer behavior indicator of competition in the core CMRS market: if enough consumers are “sufficiently well-informed to take prices and other non-price factors into account when choosing their service provider,” then providers “will have an incentive to compete on price and non-price factors.”¹⁸⁵

1. CTIA’s Consumer Code.

Since 2003, CTIA and wireless carriers that are signatories to the CTIA Consumer Code have provided consumers with detailed information regarding rates, additional taxes, fees, surcharges, terms of service, and coverage maps in order to assist consumers in the selection of mobile wireless service providers.¹⁸⁶ All four nationwide carriers, as well as a number of regional providers, have committed voluntarily to adhere to the CTIA Consumer Code.¹⁸⁷

Signatories to the CTIA Consumer Code are committed to helping consumers make informed choices when selecting wireless providers. As part of its service to consumers, the CTIA Consumer Code provides that participating carriers will make available maps showing where they provide coverage, which are available at physical points of sale in addition to the

¹⁸⁵ *Thirteenth Competition Report* ¶ 177.

¹⁸⁶ Consumer Code for Wireless Service, CTIA - The Wireless Association®, <http://www.ctia.org/policy-initiatives/voluntary-guidelines/consumer-code-for-wireless-service> (last visited June 18, 2015) (“*CTIA Consumer Code*”).

¹⁸⁷ *Id.* The following wireless providers are signatories to the CTIA Consumer Code: AT&T, Bluegrass Cellular, Cellcom, Sprint Corporation, T-Mobile USA, U.S. Cellular, and Verizon Wireless.

carrier's website.¹⁸⁸ These carrier-provided resources ensure that consumers can find relevant information and compare wireless plans and services, stimulating competition among carriers to provide faster and stronger coverage across more locations. Other carriers similarly make coverage maps available on their websites and some carriers provide tools to allow consumers to determine the types of coverage offered in their area (e.g., 4G LTE, 3G data, voice services, roaming).¹⁸⁹ Such coverage maps allow consumers to make informed decisions when selecting carriers.

2. Wireless Provider Websites.

In addition to network coverage maps, the websites of wireless carriers display information about the products and services offered by each carrier. This includes information such as: the locations of physical retail stores;¹⁹⁰ the selection of mobile devices and accessories available for purchase, including technical and functional specifications for such equipment;¹⁹¹

¹⁸⁸ See *id.*; see also, e.g., AT&T Maps, AT&T, <http://www.att.com/maps/wireless-coverage.html> (last visited June 26, 2015); Coverage Map, Bluegrass Cellular, http://bluegrasscellular.com/plans_features/coverage_map (last visited June 26, 2015); Coverage Map, Cellcom, http://www.cellcom.com/coverage_map.html (last visited June 26, 2015); Sprint Coverage, Sprint, <https://coverage.sprint.com/IMPACT.jsp> (last visited June 26, 2015); Coverage, T-Mobile, <http://www.t-mobile.com/coverage.html> (last visited June 26, 2015); Coverage Indicator, U.S. Cellular, <http://www.uscellular.com/coverage-map/coverage-indicator.html> (last visited June 26, 2015); Coverage Locator, Verizon Wireless, <http://www.verizonwireless.com/landingpages/4g-lte/> (last visited June 26, 2015).

¹⁸⁹ See e.g., nTelos Wireless 4G LTE Network, <https://www.ntelos.com/shop/ntelos-wireless-4g-lte-network> (last visited June 26, 2015); Coverage, Carolina West Wireless, <https://www.carolinawest.com/coverage/> (last visited June 26, 2015); Coverage Map, SouthernLINC, <https://www.southernlinc.com/service-plans/business-coverage/> (last visited June 26, 2015); Wireless Coverage, Union Wireless, <http://www.unionwireless.com/WirelessCoverage.aspx> (last visited June 26, 2015).

¹⁹⁰ See, e.g., Find A Location, Cellcom, <http://www.cellcom.com/location.html> (last visited June 25, 2015); Find A Store, Cellular One, <http://www.cellularoneonline.com/find-a-store> (last visited June 25, 2015); Find a Store, T-Mobile, <http://www.t-mobile.com/store-locator.html> (last visited June 25, 2015); Find a Store, AT&T, <http://m.att.com/shopmobile/find-a-store.html> (last visited June 25, 2015).

¹⁹¹ See, e.g., Shop, Bluegrass Wireless, <https://store.bluegrasscellular.com/devices/list/all> (last visited June 25, 2015); Our Devices, Appalachian Wireless, <http://www.appalachianwireless.com/?page=devices> (last visited June 25, 2015).

details of the carrier's voice, data, and messaging plans;¹⁹² applications available for download;¹⁹³ and availability and methods of obtaining customer service support.¹⁹⁴ Additionally, carriers provide direct, secure tools that enable customers to check their data, text, and message usage, as well as change or update account plans or features.¹⁹⁵

3. Device Manufacturer Websites.

Device manufacturers distribute information about the features and capabilities of their devices through their websites and advertising materials.¹⁹⁶ Such information includes: frequency bands used; networks and technologies supported; screen size; camera quality; operating system; and available applications.¹⁹⁷ With access to this type of information, consumers are better able to select the wireless devices that best suit their particular communications needs.

¹⁹² See, e.g., The Best Value in Wireless, Sprint, http://www.sprint.com/landings/datashare/index_c.html?view=unlimitedtalk&INTNAV=LeftNav:Shop:OtherPlans#!/ (last visited June 18, 2015); Choose The Best In Wireless With Ultra Freedom Plans, Carolina West Wireless, <https://www.carolinawest.com/ultra-freedom/> (last visited June 18, 2015); Wireless Plans, Cricket Wireless, <http://www.mycricket.com/cell-phone-plans/unlimited-mobile-plan-guide> (last visited June 18, 2015).

¹⁹³ See, e.g., Apps, U.S. Cellular, <http://www.uscellular.com/apps/index.html> (last visited June 18, 2015).

¹⁹⁴ See, e.g., Contact Us, Verizon, <http://www.verizon.com/Support/Residential/contact-us/index.htm> (last visited June 18, 2015).

¹⁹⁵ See, e.g., Log On to Check Usage, MTA Solutions, <https://usageinfo.mtaonline.net/Account/LogOn?ReturnUrl=%2f> (last visited June 18, 2015).

¹⁹⁶ See, e.g., iPhone 6, Apple, <http://www.apple.com/iphone-6/> (last visited June 21, 2015); Cell Phones, LG, <http://www.lg.com/us/cell-phones> (last visited June 18, 2015); HTC, HTC One M9, <http://www.htc.com/us/smartphones/htc-one-m9/>; Find the Phone That's Right for You, Samsung, <http://www.samsung.com/us/topic/our-galaxy-smartphones> (last visited June 18, 2015).

¹⁹⁷ See, e.g., iPhone 6, Apple, <http://www.apple.com/iphone-6/cameras> (last visited June 18, 2015); Galaxy S, Samsung, <http://www.samsung.com/us/mobile/cell-phones/all-products?filter=galaxy-s> (last visited June 21, 2015); All Lumia phones, Microsoft, <http://www.microsoft.com/en-us/mobile/phones/all/> (last visited June 21, 2015).

4. Social Networking Websites.

Carriers and device manufacturers provide consumers with information about their products/services via a host of social networking sites, including Facebook,¹⁹⁸ Twitter,¹⁹⁹ and Pinterest.²⁰⁰ Carriers utilize social networking platforms in order to showcase a wide variety of devices, advertise or offer special promotions, provide customer support, and interact with consumers. For example, some major carriers have Twitter accounts and monitor for customer complaints.²⁰¹ Additionally, some carriers utilize Twitter in order to gain new customers by approaching users who tweet complaints of their current carriers, such as poor service or high fees.²⁰² By opening the door for communications with consumers via social networking platforms, carriers and device manufacturers are able to highlight new and innovative products and services and quickly respond to consumer questions and needs.

5. Third-Party Resources.

In addition to carrier and device manufacturer websites and outreach, numerous third-party resources provide consumers with a wealth of information regarding carrier networks, service plans, mobile devices, network speeds, and customer services. Among countless others, these third-party sources include: Ars Technica,²⁰³ Best Buy,²⁰⁴ CNET,²⁰⁵ Consumer Reports,²⁰⁶

¹⁹⁸ See, e.g., Verizon Wireless, Facebook, <https://www.facebook.com/verizon> (last visited June 18, 2015).

¹⁹⁹ See, e.g., T-Mobile, Twitter, <https://twitter.com/TMobile> (last visited June 18, 2015).

²⁰⁰ See, e.g., AT&T, Pinterest, <http://pinterest.com/attinc> (last visited June 18, 2015).

²⁰¹ See, Lucy Wallis, *Why it pays to complain via Twitter*, BBC NEWS (May 21, 2015), <http://www.bbc.com/news/business-27381699>; ATTCares, Twitter, <https://twitter.com/ATTCares/>.

²⁰² Kashmir Hill, *Verizon is Twitter-Stalking Competitors' Angry Customers*, FORBES (July 12, 2014), <http://www.forbes.com/sites/kashmirhill/2014/07/12/verizon-twitter-beast/>.

²⁰³ Ars Technica, <http://arstechnica.com> (last visited June 20, 2015).

²⁰⁴ Cell Phones, Best Buy, <http://www.bestbuy.com/site/electronics/mobile-cell-phones/abcat0800000.c?id=abcat0800000> (last visited June 18, 2015).

²⁰⁵ Wireless, CNET, <http://www.cnet.com/search/?query=wireless> (last visited June 18, 2015).

engadget,²⁰⁷ Mountain Wireless,²⁰⁸ MyRatePlan,²⁰⁹ and Phone Scoop, among others.²¹⁰ Additionally, the FCC provides consumers with a Consumer Help Center that allows the public to submit carrier complaints, report issues online, or view a catalogue of the most common issues.²¹¹

Such third-party online resources and mobile applications also offer details about carriers' coverage. For example, MyRatePlan.com allows consumers to compare carrier coverage maps for the four largest carriers by state, city, or zip code, or even for a specific address.²¹² Users can also filter their searches by the type of coverage they prefer (*e.g.*, 4G LTE data, prepaid roaming).²¹³ Opensignal.com is another online source that enables consumers to compare wireless carrier coverage in a given location, though it does so via crowd-sources.²¹⁴ OpenSignal's research tool allows consumers to search for a given location and ranks the carriers based on their coverage in that location.²¹⁵ 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.

²⁰⁶ Consumer Reports, Cell phones & Services, ConsumerReports.org, <http://www.consumerreports.org/cro/cell-phones-services.htm> (last visited June 18, 2015).

²⁰⁷ engadget, <http://www.engadget.com> (last visited June 18, 2015).

²⁰⁸ Mountain Wireless, <http://www.mountainwireless.com/> (last visited June 18, 2015).

²⁰⁹ MyRatePlan, <http://www.myrateplan.com/> (last visited June 18, 2015).

²¹⁰ Phone Scoop, <http://www.phonescoop.com> (last visited June 18, 2015).

²¹¹ Consumer Help Center, FCC, <https://consumercomplaints.fcc.gov/hc/en-us> (last visited June 18, 2015).

²¹² Compare Carrier Coverage Maps, MyRatePlan, http://www.myrateplan.com/cell_phone_coverage_maps (last visited June 18, 2015).

²¹³ Compare Cell Phone Plans, MyRatePlan, http://www.myrateplan.com/wireless_plans?field_associated_plans_nid=All&field_talk_minutes_value=200&messages=200&field_plan_data_value=500&additional_lines=1&plan=500&spend=&src=homepag e& (last visited June 18, 2015).

²¹⁴ OpenSignal, <http://opensignal.com> (last visited June 18, 2015).

²¹⁵ OpenSignal for iPhone, OpenSignal, <http://opensignal.com/iphone/> (last visited June 18, 2015).

While the FCC suggests²¹⁶ that consumers utilize the Dead Cell Zones website²¹⁷ to find specific dead cell phone coverage spots, mobile applications also offer users information on the coverage provided by wireless carrier networks. Mosaik Solutions' CellMaps Mobile Coverage application, for example, enables Android and iOS phone users to view the 4G (as well as 2G and 3G) footprints of the nation's four largest wireless carriers, in addition to their coverage areas in specific locations.²¹⁸ RootMetrics has also developed an application called CoverageMap, which lets users see the wireless coverage in their locations, also based on crowd-sourcing.²¹⁹ 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, painting a picture of the coverage as measured by users of the carriers' networks.²²⁰

Today, consumers have a wealth of information at their fingertips to measure mobile broadband speeds through a variety of applications. For example, Ookla offers a mobile app, SpeedTest.net, designed to accurately test the performance of mobile cellular connections, including LTE, 4G, 3G, EDGE, and EVDO networks.²²¹ Additionally, SpeedChecker Ltd. offers a mobile app for quickly checking Internet speeds and is specifically optimized for mobile

²¹⁶ *Understanding Wireless Telephone Coverage Areas*, FCC, <https://www.fcc.gov/guides/understanding-wireless-telephone-coverage-areas> (last visited June 18, 2015).

²¹⁷ Dead Cell Zones, <http://www.deadcellzones.com> (last visited June 18, 2015).

²¹⁸ CellMaps Mobile, Mosaik Solutions, <http://www.mosaik.com/marketing/cellmaps-mobile> (last visited June 18, 2015).

²¹⁹ RootMetrics Coverage Map, RootMetrics, <http://webcoveragemap.rootmetrics.com/us> (last visited June 18, 2015).

²²⁰ Products, RootMetrics, <http://www.rootmetrics.com/us/products> (last visited June 18, 2015).

²²¹ *See* Ookla Speedtest Mobile Apps, Ookla, <http://www.speedtest.net/mobile/> (last visited June 26, 2015).

devices,²²² while SpeedTest Light helps consumers measure the downlink speed, uplink speed, and delays in the transmission of packets.²²³ Similarly, OpenSignal offers the 3G/4G/WiFi Maps & Speed Test that will show consumers coverage maps for mobile carriers and allow consumers to conduct speed tests²²⁴ and Sensorly offers an app that allows consumers to instantly check their download and upload speed along with their ping time.²²⁵ Third-party websites and applications such as these provide consumers with an additional layer of information to help them make informed decisions about their wireless products and services.

B. Wireless Providers Continue to Develop Consumer-Friendly Applications to Support Wireless Functionality and Improve the Public Safety Offerings of Wireless Service.

Competition is the best motivation for carriers to adapt their practices to meet consumer demand. Today, many consumer-friendly mechanisms such as theft prevention and voluntary free usage notification have been developed because consumers have shown that they value receiving this information from their carriers.

1. Theft Prevention.

The wireless industry has taken active measures to combat device thefts. In April 2014, CTIA – with support from industry – developed anti-theft guidelines, the “Smartphone Anti-Theft Voluntary Commitment,” that will be implemented for phones manufactured after July

²²² See, e.g., Internet Speed Test 3G, 4G, WiFi, Google Play, <https://play.google.com/store/apps/details?id=uk.co.broadbandspeedchecker&hl=en> (last visited June 26, 2015).

²²³ SpeedTest Light, Google Play, <https://play.google.com/store/apps/details?id=eu.vspeed.android&hl=en> (last visited June 26, 2015).

²²⁴ 3G 4G WiFi Maps and Speed Test, Google Play, <https://play.google.com/store/apps/details?id=com.staircase3.opensignal&hl=en> (last visited June 26, 2015).

²²⁵ Sensorly–Speedtests & 4G/LTE, CDMA, GSM, Wifi coverage & speed maps, Apple iTunes, <https://itunes.apple.com/us/app/sensorly-speedtests-4g-lte/id544269103?mt=8> (last visited June 26, 2015).

2015.²²⁶ Pursuant to these guidelines, a baseline anti-theft tool is downloaded or preloaded onto a smartphone. The tool will have the capabilities to: (1) remotely “wipe” the phone’s data (*i.e.*, erase personal information such as photos, emails, contacts); (2) render the phone inoperable by an unauthorized user; (3) prevent reactivation of the phone without permission from the authorized user; and (4) reverse inoperability if the smartphone is recovered by the authorized user.²²⁷

2. Voluntary Free Usage Notifications.

In October 2011, CTIA and wireless providers (in cooperation with the FCC and Consumers Union) announced a voluntary initiative to provide consumers with free usage alerts to help them avoid unexpected overage charges.²²⁸ This initiative covers approximately 97% of all U.S. mobile subscribers. The four alerts specified by the initiative (for voice, data, messaging, and international service) were added to the CTIA Consumer Code.²²⁹ They have been available to consumers since April 2013, providing valuable information that can help wireless subscribers easily manage their device usage.²³⁰

²²⁶ Smartphone Anti-Theft Voluntary Commitment, CTIA – The Wireless Association® (Apr. 14, 2014), <http://www.ctia.org/docs/default-source/default-document-library/smartphone-anti-theft-voluntary-commitment.pdf>. The signatories are: Apple Inc.; Asurion; AT&T; Google Inc.; HTC America, Inc.; Huawei Device USA; LG Electronics MobileComm USA, Inc.; Motorola Mobility LLC; Microsoft Corporation; Nokia, Inc.; Samsung Telecommunications America, L.P.; Sprint Corporation; T-Mobile USA; U.S. Cellular; Verizon Wireless; and ZTE USA, Inc.

²²⁷ *Id.*

²²⁸ CTIA, *Federal Communications Commission and Consumers Union Announce Free Alerts to Help Consumers Avoid Unexpected Overage Charges*, CTIA – The Wireless Association® (Oct. 17, 2011), <http://www.ctia.org/resource-library/press-releases/archive/ctia-federal-communications-commission-consumers-union-announce-free-alerts>.

²²⁹ *Id.*

²³⁰ See FCC, Bill Shock Alerts, <https://www.fcc.gov/bill-shock-alerts>.

C. Wireless Providers Are Working Toward Improving the Public Safety Offerings of Wireless Service.

On January 29, 2015, the FCC adopted expanded 9-1-1 rules – supported by a number of the major wireless carriers, the National Emergency Number Association, and the Association of Public-Safety Communications Officials – to include location accuracy requirements for indoor wireless callers and provide a timeline for implementing those new requirements.²³¹ Such enhanced location information will help facilitate the provision of emergency services to the millions of Americans who place 9-1-1 calls from wireless devices. Since the rules were adopted, CTIA – along with public safety organizations, consumer groups, industry representatives, and other stakeholders – have worked diligently to put these new rules into action. On June 5, 2015, CTIA announced the formation of an Advisory Group and a Working Group to provide guidance on the implementation of key elements of the new rules.²³² The groups are moving forward to evaluate location technologies, national emergency address databases, Z-axis location information, and other standards that are necessary to implement the order.²³³ The announcement continues CTIA’s and its member companies’ long-standing support and commitment to providing public safety and first responders with the most accurate information possible about emergency calls made from wireless devices.

²³¹ *FCC Adopts Rules To Help Emergency Responders Better Locate Wireless 911 Callers*, News Release, PS Docket No. 07-114 (Jan. 29, 2015), available at https://apps.fcc.gov/edocs_public/attachmatch/DOC-331757A1.pdf.

²³² *CTIA Announces Key Progress Toward Enhanced 9-1-1 Location Accuracy*, CTIA – The Wireless Association® (June 5, 2015), <http://www.ctia.org/resource-library/press-releases/archive/ctia-announces-key-progress-toward-enhanced-9-1-1-location-accuracy>.

²³³ *Id.*

VI. THE INCREASING DEPLOYMENT OF HIGH-SPEED WIRELESS NETWORKS CONTINUES TO PRODUCE CONSUMER BENEFITS, INCLUDING DEVELOPMENTS IN THE INTERNET OF THINGS.

IoT has become an extremely important development affecting the broader mobile ecosystem since Ericsson's original 2009 estimate that as many as 50 billion devices might be connected to the Internet by 2020.²³⁴ In fact, predictions range from 26 to 100 billion total Internet connected devices worldwide, including both human and machine, over the next five to ten years.²³⁵ A large percentage of such devices will be connected via wireless networks, which should continue to drive competition and innovation in the wireless sector for many years to come. Given this growth, the FCC is appropriately seeking comment specifically on market developments related to IoT.²³⁶ As detailed below, the continued, aggressive deployment of high-speed wireless networks has produced tremendous benefits for a wide range of critical U.S. industry sectors, including healthcare, education, transportation, banking and finance, and energy.

A. Healthcare.

The mobile health ("mHealth") industry is currently estimated to be a \$13 billion industry and is rapidly growing.²³⁷ By the end of this year, mHealth could deliver up to \$290 billion in

²³⁴ See *CEO to shareholders: 50 billion connections 2020*, ERICSSON (Apr. 13, 2010), <http://www.ericsson.com/news/1403231>.

²³⁵ See *Ericsson Mobility Report*, ERICSSON, at 6 (June 2015), <http://www.ericsson.com/res/docs/2015/ericsson-mobility-report-june-2015.pdf> ("*Ericsson Mobility Report*"); Dave Evans, *The Internet of Things: How the Next Evolution of the Internet Is Changing Everything*, CISCO, at 3 (Apr. 2011), available at https://www.cisco.com/web/about/ac79/docs/innov/IoT_IBSG_0411FINAL.pdf; Mike Dano, *Huawei predicts 100B connections by 2025, producing 175 zettabytes per year*, FIERCE WIRELESS (Sept. 16, 2014), <http://www.fiercewireless.com/story/huawei-predicts-100b-connections-2025-producing-175-zettabytes-data-year/2014-09-16>.

²³⁶ *Public Notice* at 6.

²³⁷ *The Mobile Healthcare (mHealth) Bible: 2015 - 2020 - Analysis of the \$13 Billion Market Featuring 750+ Vendors*, SNS RESEARCH (Apr. 2, 2015), <http://www.prnewswire.com/news-releases/the->

annual healthcare cost savings worldwide.²³⁸ Furthermore, the McKinsey Global Institute estimates that the economic impact of IoT deployments through healthcare applications could be as much as \$1.6 trillion by 2025.²³⁹ These promising developments are occurring because of significant improvements in computing power, storage and the provision of cloud services, as well as the emergence of more advanced data analytics, less expensive and lower-power wireless sensors, and the development of a peripheral device ecosystem that makes wireless healthcare monitoring more reliable and efficient. For example, consumers can now use wireless sensors and their own smartphones to generate personal medical data in real-time, including blood-oxygen, glucose, blood pressure, and heart rhythm measurements.²⁴⁰ Apps like PulsePoint activate a response from nearby users qualified to perform CPR or use a defibrillator when someone is in cardiac arrest.²⁴¹ The New England Journal of Medicine recently reported that using a mobile app like PulsePoint to find and alert people nearby who have CPR training when someone in their vicinity is having a cardiac arrest more than doubles the chances of the victim surviving the incident.²⁴² Even much simpler mHealth technology has demonstrated great benefits. For example, the U.S. Department of Health and Human Services has found that “[t]he rapid expansion of [mHealth] programs through text messaging provides an opportunity to

mobile-healthcare-mhealth-bible-2015---2020---analysis-of-the-13-billion-market-featuring-750-vendors-300061917.html (last visited June 17, 2015).

²³⁸ *Id.*

²³⁹ James Manyika, et al., *Unlocking the Potential of the Internet of Things*, MCKINSEY GLOBAL INSTITUTE (June 2015), available at http://www.mckinsey.com/insights/business_technology/the_internet_of_things_the_value_of_digitizing_the_physical_world.

²⁴⁰ Eric J. Topol, *The Future of Medicine Is in Your Smartphone*, THE WALL STREET JOURNAL (Jan. 9, 2015), <http://www.wsj.com/articles/the-future-of-medicine-is-in-your-smartphone-1420828632>.

²⁴¹ See PulsePoint, <http://www.pulsepoint.org/> (last visited June 26, 2015).

²⁴² Robert Gebelhoff, *Mobile app improves rates of CPR in cardiac arrest cases, studies find*, THE WASHINGTON POST (June 23, 2015), <http://www.washingtonpost.com/news/to-your-health/wp/2015/06/23/mobile-app-improves-rates-of-cpr-in-cardiac-arrest-cases-studies-find/>.

improve health knowledge, behaviors, and clinical outcomes, particularly among hard-to-reach populations.²⁴³

Below are a few examples of the revolutionary changes taking place in the way healthcare is being delivered via mobile technology:

- AT&T Virtual Care, which delivers end-to-end telehealth solutions (including the necessary hardware, software, and network infrastructure) to allow for the evaluation, diagnosis and treatment of patients in remote locations by specialists.²⁴⁴
- Verizon Wireless-serviced SoloHealth health and wellness kiosks, which offer free interactive healthcare services at almost 2,500 retail locations (including Walmart and Sam’s Club locations) across the country.²⁴⁵
- Sprint Fit Live, which delivers instant, customizable access to a customer’s health and activity apps in one easy-to-read place.²⁴⁶

B. Education.

Mobile communication is also revolutionizing education, making available the vast content of the Internet wherever and whenever students and teachers desire it. For example, 68% of high school students now have Internet access via a mobile phone, greatly benefitting students

²⁴³ U.S. Department of Health and Human Services, Health Resources and Services Administration, “Using Health Text Messages to Improve Consumer Health Knowledge, Behaviors, and Outcomes: An Environmental Scan,” Abstract (May 2014), *available at* <http://www.hrsa.gov/healthit/txt4tots/environmentalscan.pdf> (“*HHS Report*”).

²⁴⁴ See Telehealth, AT&T, <http://www.corp.att.com/healthcare/telehealth/> (last visited June 18, 2015).

²⁴⁵ See *Connected Machines Provide SoloHealth a Healthy Performance Diagnosis*, VERIZON, http://www.verizonenterprise.com/resources/casestudies/cs_connected-machines-provide-solohealth-a-healthy-performance-diagnosis_en_xg.pdf (last visited June 18, 2015).

²⁴⁶ See Samsung Galaxy S 5 Sport – Sprint Fit Live, Sprint, http://www.sprint.com/landings/samsung_galaxy_s5_sport/ (last visited June 18, 2015).

who do not have a dedicated broadband connection at home or who otherwise would have to share access to a home computer with others.²⁴⁷ Smartphone apps allow books to come to life and help children learn about history, languages, and numerous other topics in entertaining and engaging ways.²⁴⁸ Apps are also used to help with teacher training and support, especially with new teachers.²⁴⁹ Some prominent programs in which wireless carriers are promoting educational innovations include: Verizon’s Innovation Learning Schools (“VILS”) Program;²⁵⁰ Sprint’s Wireless Campus Manager;²⁵¹ T-Mobile’s “Connecting the Classroom” initiative with Christel House Academy;²⁵² and AT&T’s Aspire Accelerator.²⁵³

C. Transportation.

The emergence of ubiquitous high-speed wireless networks has also created tremendous opportunity for innovation in the transportation sector. A wide range of automobile-related services and applications are now being provided over these wireless networks, and it is

²⁴⁷ *HHS Report.*

²⁴⁸ See, e.g., *Best Apps for Teaching & Learning 2014*, AMERICAN ASSOCIATION OF SCHOOL LIBRARIANS, <http://www.ala.org/aasl/standards-guidelines/best-apps/2014> (last visited June 17, 2015).

²⁴⁹ Darrell M. West, *Mobile Learning: Transforming Education, Engaging Students, and Improving Outcomes*, CENTER FOR TECHNOLOGY INNOVATION AT BROOKINGS (September 2013), available at http://www.brookings.edu/~media/research/files/papers/2013/09/17-mobile-learning-education-engaging-students-west/brookingsmobilelearning_final.pdf.

²⁵⁰ See *Professional Learning with Mobile Technology: Positive Findings from the Verizon Innovative Learning Schools (VILS) Program*, VERIZON, <http://www.verizon.com/about/sites/default/files/VILS-Results-Overview.pdf> (last visited June 22, 2015).

²⁵¹ See *Sprint Solutions by Industry – Wireless Campus Manager*, SPRINT, http://shop.sprint.com/mysprint/services_solutions/details.jsp?detId=k12_education_wcm&catId=industry_k12_education&catName=K-12%20Education&detName=Wireless%20Campus%20Manager&specialCat=true (last visited June 22, 2015).

²⁵² *T-Mobile helps K-12 charter school boost academic performance and transform the lives of underserved students by using mobile technology solutions*, T-MOBILE, <http://how-to.t-mobile.com/christel-house-academy-case-study/> (last visited June 22, 2015).

²⁵³ See *AT&T Aspire Launches Ed-Tech Accelerator Focused on Social Impact*, AT&T (Jan. 22, 2015), http://about.att.com/story/att_aspire_launches_ed_tech_accelerator.html.

predicted that more than 60% of U.S. cars will have wireless connections by 2017.²⁵⁴ As AT&T recently explained, connected cars go beyond “just managing and streaming music in your car or retrieving diagnostic information” like connected vehicle telematics, safety and entertainment services,²⁵⁵ but instead include a variety of consumer- and safety-centric services like traffic management and emergency alert services, ticketing services, mobile parking management applications, roadside assistance, and many more. Indeed, even apps like Uber are revolutionizing the way we get around, making transportation safer and more efficient.

The FCC seeks comment specifically on developments with respect to “connected cars, that use embedded wireless devices.”²⁵⁶ Below are a few examples of the offerings currently available in the connected car sector that rely on ubiquitously deployed wireless networks:

- GM MyLink/IntelliLink/CUE, an advanced suite of vehicle-based technology and entertainment services available on GM vehicles.²⁵⁷
- Ford SYNC, a voice-activated connectivity portal available in Ford vehicles.²⁵⁸
- OnStar with 4G LTE, which offers 4G connectivity for a wide range of data and entertainment services in OnStar-equipped vehicles.²⁵⁹

²⁵⁴ Scott Bergmann, *In-Car Wireless Benefits the Connected Life Users on the Move*, CTIA BLOG (Oct. 29, 2014), <http://blog.ctia.org/2014/10/29/in-car-wireless/>.

²⁵⁵ Chris Penrose, *Internet of Things: Making Life and Work Effortless* (Apr. 9, 2015), <http://blogs.att.net/consumerblog/story/a7798209>.

²⁵⁶ *Public Notice* at 6.

²⁵⁷ *See* Innovation: Design & Technology, General Motors, http://www.gm.com/vision/design_technology/in-vehicle_infotainment.html (last visited June 17, 2015).

²⁵⁸ *See* Ford SYNC and MyFord Touch, Ford Motor Company, <http://www.ford.com/technology/sync/> (last visited June 17, 2015).

²⁵⁹ *See* OnStar with 4G LTE, OnStar, *available at* <https://www.onstar.com/us/en/4glte/> (last visited June 17, 2015).

D. Banking/Finance.

The emergence of high-speed wireless networks has fostered the development of a wide range of mobile banking and financial services apps that help consumers make purchases and track their finances online. Mobile commerce in the U.S. is projected to rise to \$149 billion by 2019 from \$52 billion in 2014, with consumers increasingly relying upon their mobile devices.²⁶⁰ A majority of e-commerce is expected to be conducted via mobile devices by 2017.²⁶¹ According to recent metrics by Criteo, mobile apps generate almost 50 percent of mobile transactions for some of the largest e-commerce players, and some 40 percent of e-commerce transactions today involve more than one device, including a combination of smartphones, tablets, and desktop computers.²⁶² In its analysis of 1.4 billion individual e-commerce transactions – totaling more than \$160 billion of annual sales globally – Criteo found that U.S. mobile transactions accounted for more than 30% of all e-commerce transactions by the end of the first half of 2015 and are expected to reach 33% by the end of the year.²⁶³ Last holiday season alone, IBM found that mobile accounted for 45% of all online traffic, and online sales from mobile devices accounted for 22.6% of the 2014 holiday total.²⁶⁴ A number of innovative

²⁶⁰ Denée Carrington, *US Mobile Payments will Reach \$142B By 2019*, FORRESTER BLOG (Nov. 17, 2014), http://blogs.forrester.com/denee_carrington/14-11-17-us_mobile_payments_will_reach_142b_by_2019.

²⁶¹ *Mobile engagement to drive half of US digital commerce revenue*, BUSINESS REPORTER (Feb. 4, 2015), <http://business-reporter.co.uk/2015/02/04/mobile-engagement-drive-half-us-digital-commerce-revenue/> (citing Gartner research).

²⁶² *The Mobile Mandate: Criteo Q2 State of Mobile Commerce Report Highlights Powerful Role that Apps and Cross Device Play in Purchasing Cycle*, Criteo Press Release (June 24, 2014), <http://www.marketwatch.com/story/the-mobile-mandate-criteo-q2-state-of-mobile-commerce-report-highlights-powerful-role-that-apps-and-cross-device-play-in-purchasing-cycle-2015-06-24>.

²⁶³ *Id.*

²⁶⁴ *Holiday Benchmark Data Alert*, IBM (Jan. 5, 2015), http://www-01.ibm.com/software/marketing-solutions/benchmark-hub/alert.html?ce=ism0432&ct=swg&cmp=ibmsocial&cm=h&cr=scom&ccy=us&cm_mc_uid=21996450384314210653646&cm_mc_sid_50200000=1421065364.

mobile e-commerce applications have contributed to this trend, including Apple Pay, which allows for in-app purchases at stores across the country,²⁶⁵ and T-Mobile's Mobile Money, a personal finance product that customers can use in lieu of a traditional checking account.²⁶⁶ Additionally, a number of mobile applications also exist to help consumers manage their day-to-day finances, including apps made available by individual banks as well as third-party apps that make it easier to pay bills, keep a record of expenses, and share finances with family members.²⁶⁷

E. Energy.

The emergence of ubiquitous, high-speed wireless networks has also ushered in a wide array of applications and services focused on the energy sector. For example, as the FCC knows, smart grids (electrical grids that incorporate communications technology) are an important means of facilitating improved energy efficiency throughout the grid. By the Department of Energy's estimate, broad deployment of smart grid technologies could result in a direct reduction of 12% in power production and the resulting CO₂ emissions, with another 6% reduction from indirect effects.²⁶⁸ In the U.S., total penetration of smart meters to homes, the first phase in the deployment of a nationwide smart electrical grid system, was already at 43% by July 2014 (consisting of over 50 million smart meters), and is expected to increase significantly in the

²⁶⁵ Apple, Apple Pay, <https://www.apple.com/apple-pay/> (last visited June 25, 2015).

²⁶⁶ Money Services, T-Mobile, <http://www.t-mobile.com/landing/moneyservices.html> (last visited June 25, 2015).

²⁶⁷ See, e.g., MJ Knoblock, *Top 10 Mobile Banking Apps to Boost Fiscal Fitness in 2015*, NERDWALLET (Jan. 27, 2015), <http://www.nerdwallet.com/blog/current-events-and-banking-industry-news/top-10-mobile-banking-apps-2015/>.

²⁶⁸ *The Smart Grid: An Estimation of the Energy and CO₂ Benefits*, U.S. DEPARTMENT OF ENERGY (Jan. 2010), http://energyenvironment.pnnl.gov/news/pdf/PNNL-19112_Revision_1_Final.pdf.

coming years.²⁶⁹ New groundbreaking energy and environment-related applications and services enabled by the ubiquitous deployment of high-speed wireless networks include: AT&T Smart Grid solutions²⁷⁰ and connected water pipes;²⁷¹ Verizon Wireless-serviced BigBelly Solar smart trash and recycling receptacles²⁷² and other smart cities and smart agricultural support services that rely on wireless networks and IoT technologies;²⁷³ and smartphone apps that allow users to conserve energy.²⁷⁴ Companies like Sprint, T-Mobile, and U.S. Cellular have also adopted handset recycling programs, which provide “big change . . . one small device at a time.”²⁷⁵

VII. THE U.S. LEADS THE WORLD IN THE AVAILABILITY AND ADOPTION OF NEW MOBILE TECHNOLOGIES, BUT INADEQUATE SPECTRUM RESOURCES THREATEN TO SHRINK THIS LEAD.

A. The U.S. Remains a World Leader in the Deployment and Use of High-Speed Mobile Networks and Devices.

1. The U.S is a Leader in 4G Deployment.

As established above, wireless connectivity is about more than voice – mobile data is growing rapidly as a prime functionality for wireless consumers. The U.S. wireless ecosystem is

²⁶⁹ *Utility-Scale Smart Meter Deployments: Building Block of the Evolving Power Grid*, THE EDISON FOUNDATION INSTITUTE FOR ELECTRIC INNOVATION (Sept. 2014), http://www.edisonfoundation.net/iei/Documents/IEI_SmartMeterUpdate_0914.pdf.

²⁷⁰ See AT&T Smart Grid Solutions, AT&T, <http://about.att.com/mediakit/smartgrid> (last visited June 18, 2015).

²⁷¹ Aaron Tilley, *AT&T and IBM Team Up To Connect Water Pipes To The Internet*, FORBES (June 1, 2015), <http://www.forbes.com/sites/aarontilley/2015/06/01/att-ibm-water-leaks/>.

²⁷² See Applying innovative technology to energy management, Verizon, <http://www.verizon.com/about/sites/default/files/Energy-Management.pdf> (last visited June 18, 2015).

²⁷³ Matt Hamblen, *Verizon boosts role in smart cities and farms services*, COMPUTERWORLD (May 1, 2015), <http://www.computerworld.com/article/2917932/internet-of-things/verizon-boosts-role-in-smart-cities-and-farms-services.html>.

²⁷⁴ See, e.g., 5 Smartphone Apps to Green Your Life, Provider Power, <http://providerpower.com/power-to-help/5-energy-efficiency-smartphone-apps-green-life/> (last visited June 18, 2015).

²⁷⁵ Sprint, Device Recycling, <http://goodworks.sprint.com/product/device-recycling/> (last visited June 25, 2015); T-Mobile, About T-Mobile, Community & Sponsorships, http://www.t-mobile.com/company/community.aspx?tp=Abt_Tab_PhoneRecyclingProgram (last visited June 22, 2015); U.S. Cellular, Trade-In & Recycling Programs, <http://www.uscellular.com/tradein/index.html> (last visited June 25, 2015).

one of the best in the world, making this explosion of mobile data usage possible.²⁷⁶ A prerequisite for robust mobile data is advanced networks, and North America is the only region in the world where virtually 100% of mobile subscriptions are at 3G or above; Western Europe trails in second place at 75%.²⁷⁷ North America also has the world's highest percentage of 4G network availability, with 98% of the population covered.²⁷⁸ LTE penetration in the U.S. is now at nearly 50%, with 158 million LTE connections for the country's population of 318 million.²⁷⁹ By comparison, LTE penetration is about 13% in Western Europe and 10% in the Asia Pacific region.²⁸⁰ Moreover, 4G traffic accounted for 72% of all mobile data traffic in the U.S. at the end of 2014, compared to Western Europe where it only accounted for 31%.²⁸¹

2. The U.S. is a Leader in Smart Device Adoption.

The presence of advanced mobile networks facilitates the use of advanced devices that can best take advantage of the higher data speeds. It is no surprise, then, that North America, has one of the highest adoption rates for smartphones – 72%, compared to 51% in Western

²⁷⁶ As one senior FCC official aptly put it, the U.S. “mobile broadband networks are the envy of the world.” Remarks of Gigi B. Sohn, Counselor to FCC Chairman Wheeler, “Moving Towards a Gigabit State” (May 4, 2015), *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2015/db0505/DOC-333311A1.pdf.

²⁷⁷ *Ericsson Mobility Report* at 8.

²⁷⁸ *FACT SHEET: Next Steps in Delivering Fast, Affordable Broadband*, The White House, Press Release (Mar. 23, 2015), <https://www.whitehouse.gov/the-press-office/2015/03/23/fact-sheet-next-steps-delivering-fastaffordable-broadband>; *see also The Mobile Economy 2015*, GSMA INTELLIGENCE, at 12 (Mar. 2, 2015), http://www.gsmamobileeconomy.com/GSMA_Global_Mobile_Economy_Report_2015.pdf (“*The Mobile Economy 2015*”) (citing a similar LTE coverage of 97%); *see also, supra*, Section IV.C.2 (noting that, at year-end 2014, the U.S. accounted for almost a third of global LTE connections)

²⁷⁹ *Year-End 2014: Nearly Half a Billion LTE Connections Worldwide*, 4G AMERICAS (Mar. 11, 2015), <http://www.4gamericas.org/en/newsroom/press-releases/year-end-2014-nearly-half-billion-lte-connections-worldwide>.

²⁸⁰ *Id.*

²⁸¹ *VNI Mobile Forecast, Accelerating Network Speeds: 4G Traffic*.

Europe.²⁸² By the end of 2019, Cisco predicts that 89% of the North American installed base will be converted to smart devices and connections, while Western Europe will trail at 78%.²⁸³ U.S. smartphone consumers also seem more satisfied with their carriers compared to consumers in most other G7 countries: 69% of U.S. consumers report a high level of satisfaction with their mobile carrier, whereas only 38% of Japanese consumers indicate high satisfaction with their wireless carrier.²⁸⁴

The high smartphone adoption rate – and the related increase in mobile data usage – is due in part to the short device cycle in the U.S. On average, U.S. consumers replace their devices every two years, compared to European consumers, who replace their devices only about every four to six years.²⁸⁵ Use of smartphones and 4G technology has also grown quickly in the U.S. because, unlike in most of the other G7 countries, U.S. carriers do not charge more for 4G than for 3G, thus eliminating a barrier to 4G service adoption.²⁸⁶

3. The U.S. is a Leader in Mobile Data Usage.

Given the aggressive deployment of high-speed, high-capacity LTE technology, it is not surprising that mobile data consumption figures are much higher in the U.S. than in other regions of the world. In 2014, the average U.S. mobile-connected end-user device generated 1,503 MB

²⁸² *The Mobile Economy 2015* at 13.

²⁸³ *Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2014-2019*, CISCO, at 9 (Feb. 3, 2015), http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white_paper_c11-520862.pdf.

²⁸⁴ Roger Entner, *Spectrum Fuels Speed and Prosperity*, RECON ANALYTICS, at 34 (September 2014), <http://reconanalytics.com/wp-content/uploads/2014/09/Spectrum-Fuels-Speed-and-Prosperity.pdf> (“*Spectrum Fuels Speed*”).

²⁸⁵ Roger Entner, *Roger’s Recon: State of Wireless Union 2014, Part Two*, RECON ANALYTICS (Feb. 13, 2014), <http://reconanalytics.com/2014/02/rogers-recon-state-of-wireless-union-2014-part-two/> (“*State of Wireless 2014*”).

²⁸⁶ *Spectrum Fuels Speed* at 25.

of mobile data traffic per month.²⁸⁷ In other regions, this number was only 645 MB for Western Europe, 373 MB for Central and Eastern Europe, and 273 MB for Asia-Pacific.²⁸⁸ Moreover, U.S. consumers tend to be ahead in using mobile data for advanced applications. For example, in early 2014, the U.S. had the highest percentage of users among G7 countries that have used their devices for watching TV or videos (45%) and for making video calls (22%).²⁸⁹

4. The U.S. is a Leader in Network Investment.

These continuing advances in the deployment – and intense usage – of advanced networks in the U.S. compared to the rest of the world has only been possible as a result of heavy investment by the industry. In 2013, AT&T and Verizon alone spent more on their networks than all 58 European wireless carriers combined; additional investments by T-Mobile, Sprint, and other carriers push the U.S. investment total far beyond that in Europe.²⁹⁰ In 2014, U.S. carriers invested 78% more than the EU5 carriers, and the equivalent of twice as much per subscriber.

B. The U.S. Continues to be One of the Least Concentrated Mobile Wireless Marketplaces in the World.

Relatively low HHI concentration values can be part of a market structure that is indicative of a competitive market.²⁹¹ Compared to other developed countries, the U.S. continues to have one of the least concentrated wireless markets based on HHI values.²⁹² The

²⁸⁷ VNI Mobile Forecast at 2014 Year in Review: 2014 Mobile Data Traffic.

²⁸⁸ *Id.*; see also Ericsson Mobility Report at 12 (forecasting that by 2020, monthly smartphone data consumption per active subscription in North America will be 1.5 times that in Western Europe and 3.5 times that in the Asia Pacific region).

²⁸⁹ Spectrum Fuels Speed at 16.

²⁹⁰ State of Wireless 2014.

²⁹¹ See Thirteenth Competition Report ¶ 12.

²⁹² The HHI is a measure of concentration, but it is not a measure of competition as such. 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

table below shows that the HHI value for the U.S. is 2,575, which is the second lowest among all OECD member countries. Only Poland has a slightly lower value at 2,477, which is less than a 100 point difference. By contrast, 20 out of the 28 countries have values exceeding 3,000.

Wireless Mobile Competition in OECD Countries, 4Q 2014									
HHI Values									
Number of Operators	1	2	3	4	5	6	7	Others	HHI Sum
Australia	2,778.38	913.80	291.06	0.00	0.00	0.00	0.00	0.00	3,983.24
Austria	1,728.56	949.51	762.31	0.00	0.00	0.00	0.00	0.00	3,440.38
Belgium	1,648.24	607.37	1,208.02	0.00	0.00	0.00	0.00	0.00	3,463.63
Canada*	1,106.22	816.47	812.73	7.93	4.95	4.73	2.87	0.56	2,756.65
Chile	1,616.21	1,451.44	470.89	0.00	0.00	0.00	0.00	0.00	3,538.55
Czech Republic***	1,726.27	1,231.63	502.76	0.00	0.00	0.00	0.00	0.00	3,460.65
Denmark***	1,512.40	664.43	436.76	207.60	0.00	0.00	0.00	0.00	2,821.20
Finland	1,669.73	1,149.27	636.89	0.00	0.00	0.00	0.00	0.00	3,455.90
France	1,468.46	1,074.57	229.25	189.28	0.00	0.00	0.00	0.00	2,961.56
Germany	1,398.88	1,198.35	782.95	0.00	0.00	0.00	0.00	0.00	3,380.18
Greece	1,917.52	922.70	667.43	0.00	0.00	0.00	0.00	0.00	3,507.64
Hungary***	2,078.20	893.56	601.24	0.00	0.00	0.00	0.00	0.00	3,573.00
Israel	1,140.65	1,042.88	866.51	20.22	0.00	0.00	0.00	0.00	3,070.26
Italy	1,202.99	849.69	609.72	131.65	0.00	0.00	0.00	0.00	2,794.05
Japan	1,884.64	794.38	618.75	12.45	0.00	0.00	0.00	0.00	3,310.21
Korea	2,501.57	917.45	387.89	0.00	0.00	0.00	0.00	0.00	3,806.91
Mexico	4,619.31	424.87	75.25	7.55	0.00	0.00	0.00	0.00	5,126.97
Netherlands***	2,058.17	971.40	550.64	0.00	0.00	0.00	0.00	0.00	3,580.21
New Zealand	1,617.17	1,331.23	542.89	0.00	0.00	0.00	0.00	0.00	3,491.29
Norway	3,014.59	745.24	316.68	0.00	0.00	0.00	0.00	0.00	4,076.52
Poland***	734.44	727.72	563.75	450.73	0.90	0.00	0.00	0.00	2,477.54
Portugal	2,229.52	964.42	472.07	0.00	0.00	0.00	0.00	0.00	3,666.00
Spain	1,130.11	802.60	582.06	59.83	38.34	0.00	0.00	0.00	2,612.93
Sweden	2,012.53	632.27	292.79	165.97	0.00	0.00	0.00	0.00	3,103.55
Switzerland	3,001.18	732.96	329.20	0.00	0.00	0.00	0.00	0.00	4,063.34
Turkey	2,345.22	827.04	520.48	0.00	0.00	0.00	0.00	0.00	3,692.75
United Kingdom**	937.92	1,002.84	616.93	165.60	0.00	0.00	0.00	0.00	2,723.30
United States**	1,150.32	926.83	247.59	239.59	0.00	1.71	0.00	9.73	2,575.76

*Per CWTA

**Recalculated by CTIA

*** Per Informa WCIS+, Telepolis, and carrier sources

exists, and on the other of which competition does not exist. See Horizontal Merger Guidelines at 19 (Aug. 19, 2010), available at <https://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf> (last visited June 18, 2015).

In-country consolidation of mobile providers has been on the rise in Europe for the past few years. Several European countries have seen the number of wireless carriers in their markets fall from four to three.²⁹³ To date, in Western Europe, only the UK, France, Spain, Italy, Denmark, and Sweden continue to have at least four mobile networks remaining.²⁹⁴ The continued consolidation in Europe will further increase market concentration compared to the U.S.

C. Inadequate Spectrum Availability Threatens U.S. Leadership in the Wireless Sector.

In light of its advanced network deployments and policies that promote the adoption of 4G service and devices, the U.S. wireless industry has become a victim of its own success: mobile broadband demand is outstripping the industry's supply of spectrum. The consequences of this threaten to shrink the current role of the U.S. as a leader of the global wireless sector.

Among the G7 countries, the U.S. has by far the lowest quantity of deployed LTE spectrum per LTE subscriber, at 0.65 Hz/LTE subscriber.²⁹⁵ Obviously, not all of a carrier's spectrum can be devoted to LTE, as legacy technologies such as GSM, CDMA, and HSPA must still be supported, but more total spectrum would allow carriers to devote more to advanced services. By contrast, Japanese carriers have been able to devote four times more spectrum per

²⁹³ See, e.g., Jonathan Nadler and Cathal Flynn, *The Trans-Atlantic Divide: Differences between Europe and the United States in their Approaches to Consolidation in the Mobile Sector*, Telecoms, Media and Internet Laws and Regulations 2015, Section 5, available at <http://www.iclg.co.uk/practice-areas/telecoms-media-and-internet-laws/telecoms,-media-and-internet-laws-and-regulations/the-trans-atlantic-divide-differences-between-europe-and-the-united-states-in-their-approaches-to-consolidation-in-the-mobile-sector> (last visited June 18, 2015) (noting the “growing acceptance of the logic of in-country consolidation” in the European mobile sector and concluding that “the fact that the [European] Commission has consecutively cleared three four-to-three mergers in already highly concentrated markets is significant ...,” and that “[i]t is expected that the Commission’s decisions on the Austrian, Irish and German mergers will lead to further attempts at in-country consolidation in the European telecommunications sector.”).

²⁹⁴ Glen Campbell, *et al.*, *Global Wireless Matrix 1Q15*, BANK OF AMERICA MERRILL LYNCH, at 25 (Apr. 30, 2015).

²⁹⁵ *Spectrum Fuels Speed* at 8.

LTE subscriber, Canada has 37 times more, and the other four G7 countries each have at least 19 times more.²⁹⁶ The fact that U.S. carriers have such a small quantity of spectrum to serve LTE subscribers compared to their counterparts indicates that the spectrum is already being used very efficiently, but also helps to explain why connection speeds are not keeping pace with those in other countries.

In addition to having a higher quantity of LTE spectrum per LTE subscriber, other countries have tended to allocate 4G spectrum in larger channel sizes, which makes it easier and cheaper to offer higher network speeds.²⁹⁷ This allows carriers in countries like France to spend far less per subscriber and still achieve comparable or superior download speeds.²⁹⁸

A 2014 report by Deloitte warns that, if the quality and quantity of spectrum available to U.S. carriers is not increased, the U.S.'s leadership position in the global wireless sector is poised to shrink.²⁹⁹ Specifically, Deloitte developed a Mobile Communications National Achievement Index (the "Index"), which is based on 15 indicators that measure end-user benefits and the health of the wireless industry. The U.S. has always held the top position in this Index, but Deloitte's report notes that "there are limits to how much more industry can accomplish with a finite amount of spectrum."³⁰⁰ Deloitte states that, if the spectrum supply remains inadequate,³⁰¹ by 2020 "the U.S. lead [in the Index] would be modest at best, with increasing challenges from

²⁹⁶ *Id.*

²⁹⁷ *Id.* at 9.

²⁹⁸ *Id.* at 10.

²⁹⁹ *United States expands global lead in mobile broadband; How policy actions could enhance or imperil America's mobile broadband competitiveness*, DELOITTE (September 2014), available at <http://www2.deloitte.com/content/dam/Deloitte/us/Documents/technology-media-telecommunications/us-tmt-mobile-index-09262014.pdf>.

³⁰⁰ *Id.* at 10.

³⁰¹ In addition to spectrum quantity, spectrum quality is also an issue. For example, the report notes that new spectrum that is shared, located at higher frequencies, allocated in smaller blocks, or that is not aligned with international allocations could still result in an "insufficient" supply. *See id.* at 14.

competing countries that are gaining ground with positive trends in their mobile broadband performance.”³⁰²

VIII. THE FCC MUST PROVIDE ADDITIONAL SPECTRUM FOR MOBILE BROADBAND TO ENSURE CONTINUED COMPETITION IN THE WIRELESS MARKETPLACE.

A. Demand for Spectrum Continues to Outpace Supply.

In 2010, the FCC released a report that estimated mobile broadband data demand through 2014.³⁰³ As CTIA’s recent paper, *Mobile Data Demand*, illustrates, today we can look back and see that the FCC’s 2010 estimates were remarkably accurate.³⁰⁴ For 2014, the FCC estimated that mobile broadband data demand would be 35 times higher than 2009 levels, and according to Cisco’s Visual Networking Index (“VNI”), 2009 data demand in the U.S. was at about 16 petabytes (“PB”) per month.³⁰⁵ Thus, the FCC predicted in 2010 that data demand in 2014 would be about 562 PB per month. Remarkably, actual U.S. mobile broadband data demand in 2014 was 563 PB per month.³⁰⁶

Based on the growing demand for broadband data over mobile networks, the FCC’s report concluded that a spectrum shortfall was imminent. The reasoned analysis in the 2010 report bolstered the conclusion in the National Broadband Plan that the FCC should make 300 megahertz of additional spectrum available for mobile broadband by 2015 and 500 megahertz by 2020. At the time of the report’s release, several naysayers claimed the FCC’s analysis was “biased” and its conclusions were “preordained.” However, the accuracy of the demand

³⁰² *Id.*

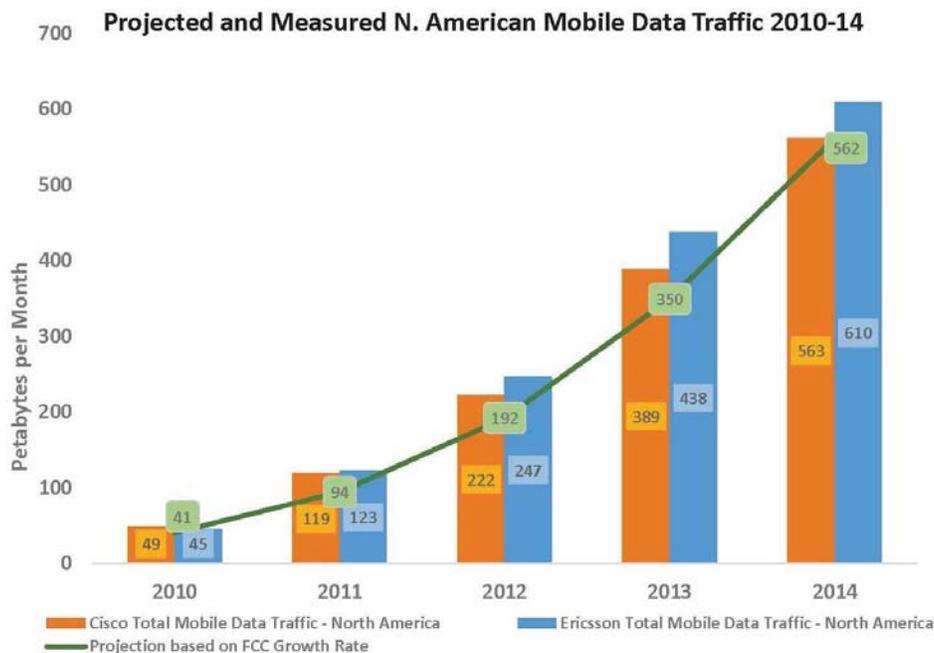
³⁰³ *Mobile Broadband: The Benefits of Additional Spectrum*, FCC Staff Technical Paper (Oct. 2010), <http://download.broadband.gov/plan/fcc-omnibus-broadband-initiative-%28obi%29-technical-paper-mobile-broadband-benefits-of-additional-spectrum.pdf>.

³⁰⁴ *See Mobile Data Demand* at 1.

³⁰⁵ *VNI Mobile Forecast*.

³⁰⁶ *Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2009-2014*, CISCO (Feb. 9, 2010).

predictions upon which the report’s conclusions were based is undeniable, and mobile data usage over the past five years confirms that consumers’ appetite for mobile broadband data is on an ever-upward trajectory. Indeed, there are no signs that mobile data demand is slowing.



It is therefore all the more disappointing that, to date, less than half of the National Broadband Plan’s 300 megahertz spectrum goal has been met.³⁰⁷

According to Cisco’s latest VNI report, mobile data and Internet traffic in the United States will grow seven-fold from 2014 to 2019, reaching 3,600 PB/month by 2019 – a Compound Annual Growth Rate (“CAGR”) of 47%.³⁰⁸ Video will comprise 75% of this traffic in 2019, compared to 60% in 2014. In addition, traffic from wireless and mobile devices will account for 66% of all IP traffic by 2019.³⁰⁹ Ericsson predicts slightly less growth than Cisco

³⁰⁷ See *Mobile Data Demand* at 8-9.

³⁰⁸ See *VNI Mobile Forecast*.

³⁰⁹ See *Cisco Visual Networking Index: Forecast and Methodology, 2014-2019*, CISCO (2015), http://www.cisco.com/c/en/us/solutions/collateral/service-provider/ip-ngn-ip-next-generation-network/white_paper_c11-481360.pdf.

and estimates that mobile traffic in 2019 will be five times the traffic of 2014.³¹⁰ An average of the two estimates results in 2019 traffic that is six times 2014 levels, and a recent report prepared for CTIA predicts the same increase.³¹¹

In addition to the combined effects of more mobile broadband users, more mobile-connected devices, and more data-hungry applications and services, mobile broadband consumption is also increasing due to the development of new, innovative business models. For example, in the recent past, machine-to-machine (“M2M”) communications were confined to a limited set of relatively low-bandwidth applications. However, the advent and current ubiquity of broadband LTE, along with technical innovations that improve M2M efficiency, have enormously expanded the universe of possibilities for applications that can utilize M2M communications. Because of this, the number of M2M devices in the U.S. is expected to double the number of smartphones by 2019 and M2M connections will represent 27% of all mobile connections in North America by the end of 2020.³¹²

As the *June 2015 Brattle Report* makes clear, the spectrum available today and in the pipeline for the future is not enough to satisfy the growing demand. In fact, the wireless industry needs more than 350 megahertz of additional licensed spectrum by 2019 to meet growing demand.³¹³ Although the wireless industry is working to increase capacity through technical advances that improve spectral efficiency as well as infrastructure advances (*e.g.*, DAS and small cells) that enhance capacity, this will not be enough to meet the projected demand at the macro level. The wireless industry cannot build its way out of the problem. Thus, the need for

³¹⁰ See *Ericsson Mobility Report*.

³¹¹ See *June 2015 Brattle Report*.

³¹² See *VNI Mobile Forecast*.

³¹³ See *June 2015 Brattle Report*.

additional spectrum for mobile broadband will continue into the foreseeable future. This is a global issue for which the United States must assume a leadership role.³¹⁴

B. The Economic Benefits of Spectrum Are Well Established.

Spectrum is a proven driver of economic growth, and numerous reports argue the substantial economic benefits of spectrum worldwide, including in both developing and developed countries.³¹⁵

For instance, a recent report by the Brattle Group quantifies the benefits of mobile broadband spectrum in the U.S. This report estimates that the economic value of the 645.5 megahertz of spectrum that is available to the mobile wireless industry is almost \$500 billion.³¹⁶ The report further explains that the value of licensed spectrum goes well beyond its economic value because customers generally value the service they buy more than they pay for it.³¹⁷ The fierce competitiveness of the U.S. wireless market enhances customer welfare and ensures this truth. Thus, the report estimates that the total social benefits of licensed spectrum are 10 to 20

³¹⁴ See, e.g., *Suitable new bands for IMT at WRC-15: A Graphic Guide*, GSMA (2014) http://www.gsma.com/spectrum/wp-content/uploads/2014/11/ENG_BookletWRC15_WEB3.pdf.

³¹⁵ See, e.g., *Report for GSMA: Assessment of economic impact of wireless broadband in South Africa*, ANALYSIS MASON (Nov. 2010), <http://www.analysismason.com/PageFiles/16954/AML-GSMA-spectrum-benefits-in-South-Africa-10-11-03.pdf>; Phillipa Marks, et al., *The benefits of releasing spectrum for mobile broadband in Sub-Saharan Africa: A report for the GSMA*, PLUM CONSULTING (2011), <http://www.gsma.com/spectrum/wp-content/uploads/2012/07/Spectrum-Plum-Report-The-benefits-of-releasing-spectrum-for-mobile-broadband-in-sub-Saharan-Africa.pdf>; David Lewin, Phillipa Marks, and Stefano Nicoletti, *Valuing the use of spectrum in the EU: An independent assessment for GSMA*, PLUM CONSULTING (April 2013), http://www.plumconsulting.co.uk/pdfs/Plum_June2013_Economic_Value_of_spectrum_use_in_Europe.pdf; *Socio-Economic Benefits of 3G and 4G Spectrum in Pakistan*, MORE MAG (Mar. 31, 2014), <http://www.moremag.pk/2014/03/31/socio-economic-benefits-of-3g-and-4g-spectrum-in-pakistan/>.

³¹⁶ Coleman Bazelon and Giulia McHenry, *Mobile Broadband Spectrum: A Vital Resource for the American Economy*, THE BRATTLE GROUP, at 1 (May 11, 2015) (“*May 2015 Brattle Report*”).

³¹⁷ *Id.*

times the direct economic value, or \$5 to \$10 trillion.³¹⁸ Clearly, the pursuit of spectrum for mobile broadband is well-rewarded and critical to our economic future.

C. Although the Commission Continues to Execute on Spectrum Recommendations Made in the National Broadband Plan, There is No Traditional Mobile Broadband Spectrum in the Pipeline Following the 600 MHz Incentive Auction.

Although the FCC has had great success over the past six years executing recommendations in the National Broadband Plan – including substantial efforts to free up WCS, AWS-4, AWS-3, and 600 MHz spectrum for mobile broadband – there is no plan on the horizon to continue these important efforts after the 600 MHz incentive auction, which is slated for next year. Given that forecasts of mobile broadband demand show no signs of slowing, and the fact that it typically takes six to thirteen years to repurpose spectrum,³¹⁹ planning for the next set of mobile broadband frequencies should be occurring now. Recent reports indicate that 350 MHz of additional licensed spectrum must be made available by 2019 to meet demand.³²⁰ The growth in demand that lies ahead cannot be accommodated with engineering, infrastructure investment, and offloading alone. Instead, more spectrum is necessary in order to bring significant benefits to both wireless consumers and the U.S. economy. This is not the time to throttle back efforts to identify new bands that may be repurposed, rebranded, or re-allocated to mobile broadband. Although spectrum below 3 GHz is limited, there are still many opportunities to utilize spectrum that is allocated to other purposes more efficiently, and thus increase the amount of spectrum that can be utilized for mobile broadband.

³¹⁸ *Id.* at 1.

³¹⁹ *Connecting America: The National Broadband Plan* at 79, Exhibit 5-C (Mar. 17, 2010).

³²⁰ *See June 2015 Brattle Report* at 1.

IX. THE FCC’S *OPEN INTERNET ORDER* IMPOSES NEW BURDENS AND OBLIGATIONS ON WIRELESS PROVIDERS THAT WILL DETER INVESTMENT AND INNOVATION.

The regulatory burdens of the FCC’s *Open Internet Order* threaten to stifle the dynamic and competitive wireless industry. As demonstrated above, the mobile wireless industry has long flourished under a regulatory light touch allowing investment and innovation. Chairman Wheeler has noted that “[t]here is no doubt” regulation “imposes costs. Especially in a fast-moving sector, it is important that companies be free to develop better networks and to attract the investment necessary to do so.”³²¹ Before the FCC imposed these onerous obligations on the wireless industry, mobile wireless providers devoted significant financial resources to developing new products, better networks, and innovative services to meet consumer demand. These investments are now threatened under the new Title II regulatory regime. As Commissioner O’Rielly recently noted, “there are direct and indirect costs to every burden placed on Internet activities.”³²²

The financial strength of the mobile wireless market is a direct measure of the benefits of a regulatory light touch. In 2013, the mobile wireless market was a \$172 billion business based on consumer and business spending.³²³ This type of spending generates an additional \$400 billion in benefits for the economy when accounting for money spent by wireless service employees, wireless companies, their suppliers, and suppliers’ employees.³²⁴ A flourishing

³²¹ Remarks of Chairman Tom Wheeler at 1776 Headquarters, Washington, DC, *The Facts and Future of Broadband Competition*, at 5 (Sept. 4, 2014).

³²² Remarks of Commissioner Michael O’Rielly Before the Internet Innovation Alliance, *What is the Appropriate Role for Regulators in an Expanding Broadband Economy?* (June 25, 2015), available at http://transition.fcc.gov/Daily_Releases/Daily_Business/2015/db0625/DOC-334113A1.pdf.

³²³ *May 2015 Brattle Report* at 2.

³²⁴ *Id.*

mobile wireless industry creates jobs and benefits other industries. Simply put, “employing 1 person in the wireless industry results in an additional 6.5 people finding employment.”³²⁵

The mobile market has unique technical and operational characteristics that require cutting-edge technologies and rapid management of user demand.³²⁶ As such, the mobile market requires flexible network management that will be stifled by the new *Open Internet Order*. For example, the extremely detailed transparency requirements and the nebulous general conduct standard are likely to chill development of new innovative products and processes.³²⁷ In addition, the FCC’s decision to impose monopoly-era Title II regulation on mobile broadband – a highly competitive, innovative and evolving market – will impose significant costs, burdens, and uncertainty to providers. Furthermore, the wireless industry faces substantial uncertainty under the new *Open Internet Order* due to the pending appeals, as well as the possibility that future Commissions could change course on the current forbearance from some of Title II’s more draconian obligations.³²⁸ The FCC’s Title II approach runs the risk of curbing the competitiveness and vibrancy of the current wireless market and creating a market that favors uniformity and commoditization of service.³²⁹ In addition to removing the flexibility wireless industry needs to innovate and evolve, wireless service providers simply will not have the resources to innovate in the same way under the new *Open Internet Order* without diverting resources to comply with the restrictive obligations and grapple with the uncertainty the rules introduce into the wireless marketplace.

³²⁵ *Id.*

³²⁶ Reply Comments of CTIA – The Wireless Association[®], GN Dockets No. 14-28, 10-127, at 4 (Sept. 15, 2015) (“*CTIA Open Internet Reply Comments*”).

³²⁷ *Id.* at 49-50.

³²⁸ Comments of CTIA – The Wireless Association[®], GN Dockets No. 14-28, 10-127, 49-50 (July 18, 2014) (“*CTIA Open Internet Comments*”).

³²⁹ *Id.* at 48.

X. COSTLY AND VARIABLE TAXES AND FEES CHARGED BY THE FEDERAL GOVERNMENT AND STATES ON WIRELESS GOODS AND SERVICES NEGATIVELY AFFECT GROWTH IN THE WIRELESS INDUSTRY.

Disparate treatment of wireless carriers and services from a tax perspective negatively affects competition and growth in the wireless industry. Wireless customers pay high taxes on wireless goods and services, and those taxes and fees vary depending on the state in which a customer lives. On average, Americans pay 17.05% in combined federal, state, and local taxes and fees on wireless service.³³⁰ This includes the 5.82% federal rate and the average 11.23% state rate.³³¹

The states with the highest state taxes and fees are Washington, with taxes and fees totaling 18.6%, and Nebraska, with taxes and fees totaling 18.48%. Oregon and Nevada have the lowest rates of state taxes and fees, at 1.76% and 1.86% respectively.³³² The wireless taxes levied on these goods and services are higher than taxes on other kinds of goods and services in those states. In fact, the average combined taxes and fees is more than two times higher than the average sales tax rates that apply to other types of goods and services.³³³ These taxes and fees could discourage consumer purchase and use of wireless goods and services and therefore discourage growth in the wireless industry. CTIA, therefore, encourages legislation that protects wireless consumers from new taxes and new fees on wireless goods and services.

³³⁰ Scott Mackey and Joseph Henchman, *Wireless Taxation in the United States 2014*, TAX FOUNDATION (Oct. 8, 2014), available at <http://taxfoundation.org/article/wireless-taxation-united-states-2014>.

³³¹ *Id.*

³³² *Id.*

³³³ *Id.*

XI. THE FCC SHOULD CONTINUE TO AVOID DATA COLLECTION FROM WIRELESS CARRIERS WHILE COLLECTING RELEVANT THIRD-PARTY DATA AND INFORMATION ON THE COMPETITIVE NATURE OF THE WIRELESS ECOSYSTEM.

In the *Public Notice*, the Bureau seeks data to “enhance [its] analysis of competition in the mobile wireless marketplace.” CTIA submits that the FCC should refrain from imposing onerous data collections on wireless providers in order to ensure that carriers’ time and energy can be directed toward improving networks and offerings to the benefit of wireless consumers. The FCC should limit all data collections to data that in fact enhances the analyses of the FCC in its proceedings.³³⁴

For example, the FCC should avoid requesting data that, if reported publicly and in the aggregate, could allow individuals to learn proprietary and sensitive information about the operations of the wireless providers. Further, the FCC should restrict its requests to data that measures relevant features of the wireless marketplace, and not all data the FCC finds potentially interesting. For example, the FCC seeks comment on the collection of EBITDA,³³⁵ but this has limited utility as a measure of profitability for wireless carriers. The *Public Notice* also seeks comment on HHI, but, as explained above, HHI measures a specific market condition, and is not a general measure of competition.³³⁶

Wireless carriers should be focusing their time and attention on the creation of innovative plans, strong networks, better devices and applications, and customer service, and not on excessive and onerous data collections. As such, the FCC should continue to avoid data collection from wireless carriers while continuing to collect relevant third-party data, such as that

³³⁴ *Eighteenth Mobile Competition Report Public Notice* at 1.

³³⁵ *Id.* at 4.

³³⁶ *See, supra*, n.295.

presented in these comments, and other information on the competitive nature of the wireless ecosystem that will truly enhance its analysis of competition in the mobile wireless market.

XII. THE FCC SHOULD FIND THAT THE MOBILE MARKET IS SUBJECT TO EFFECTIVE COMPETITION.

In 2009, the FCC determined that the core CMRS market is competitive; the FCC should now reaffirm this determination. The time is also ripe for the FCC to conclude that the mobile wireless market is subject to “effective competition.”

A. The FCC Should Reaffirm its Previous Finding that the Core CMRS Market is Competitive.

In the *Thirteenth Competition Report*, the FCC analyzed the mobile wireless market and determined that there was competition in the core CMRS market, based on an analysis of market structure, provider conduct, consumer behavior, and market performance.³³⁷ The metrics used by the FCC to evaluate competition in the most recent *Seventeenth Mobile Wireless Competition Report* confirmed that the core CMRS market remains competitive and that the broader mobile wireless market is competitive.³³⁸ Since 2009, vigorous competition has continued in the core CMRS market and mobile wireless service plays a significant role in the lives of American consumers. And as outlined in detail above, the available data demonstrate that the mobile wireless market is experiencing explosive growth. The increasingly competitive market of today therefore supports a reaffirmation that the core CMRS market is subject to effective competition.

Furthermore, consumers rely more heavily upon their mobile wireless service for a broader range of needs, including Internet access, and many consumers have replaced their wireline telephone service and broadband service with mobile wireless service. The mobile

³³⁷ *Thirteenth Competition Report* ¶ 1 (2009) (concluding “that there is effective competition in the CMRS market and demonstrate the increasingly significant role that wireless services play in the lives of American consumers”).

³³⁸ *See Seventeenth Competition Report*.

wireless market supports new subscribers and incorporates new technology to meet the increasing demands on mobile wireless networks. The mobile wireless market also supports cutting edge technology, new and novel devices, varied content, and numerous applications. New carriers continue to enter the mobile wireless market and provide niche services to meet consumer demand. These characteristics all confirm the FCC’s earlier finding that there is effective competition in the core CMRS market. In the *Thirteenth Competition Report*, the FCC stated that “lower prices, higher quality and greater choice of services” are “the ultimate test of effective competition.”³³⁹ The characteristics of the core CMRS market and the broader mobile wireless market exceed the FCC’s requirement for a finding that there is effective competition in both markets.

B. Similar to the FCC’s Finding of a Rebuttable Presumption of Effective Competition in the MVPD Market, the FCC Should Conclude that the Mobile Market is Subject to Effective Competition.

The FCC 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.³⁴⁰ The metrics supporting the FCC’s recent proposal to adopt a presumption that cable operators are subject to effective competition, however, apply equally to mobile wireless providers and support a finding that the mobile wireless market is subject to effective competition.³⁴¹

³³⁹ *Thirteenth Competition Report* ¶ 187.

³⁴⁰ *See Seventeenth Mobile Wireless Competition Report*.

³⁴¹ *Amendment to the Commission’s Rules Concerning Effective Competition; Implementation of Section 111 of the STELA Reauthorization Act*, Notice of Proposed Rulemaking, 30 FCC Rcd 2561 (2015) (“*Effective Competition NPRM*”).

The FCC adopted a notice of proposed rulemaking earlier this year seeking comment on “how to improve the effective competition process” and asking if it “should adopt a rebuttable presumption that cable operators are subject to effective competition.”³⁴² The Cable Act of 1992 established a burdensome regulatory framework for cable operators, but included an exception from that framework if the FCC determined that cable operators were subject to “effective competition.”³⁴³ The statute includes several different tests for determining effective competition, each of which turns on the extent to which competing video services are available and/or have been adopted in the cable service area.³⁴⁴ A cable operator that can demonstrate the presence of effective competition under any one of these tests earns an exemption from onerous regulation.

In the *Effective Competition NPRM*, the FCC proposed reversing its default approach to cable regulation. Instead of having to demonstrate effective competition to escape regulation, a cable operator would be exempt from regulation by default, with the burden of showing an absence of effective competition falling on the relevant state or local franchising authority.³⁴⁵ Only upon such a showing would the cable operator be subject to regulation. The FCC’s proposal was based on changed market conditions in the video marketplace, particularly the emergence and growth of direct broadcast satellite (“DBS”) and landline phone companies as competitors to cable. The FCC explained that “nearly all homes in the U.S. have access to at least three. And many areas [34% of households, according to the FCC] have access to at least

³⁴² *Id.* ¶ 1.

³⁴³ *Id.* ¶ 3.

³⁴⁴ *Id.*

³⁴⁵ *Id.* ¶ 1.

four.”³⁴⁶ Earlier this month, the FCC determined to adopt its proposed rebuttable presumption that cable operators are subject to effective competition, basing its decision on the “[s]light increase in DBS subscribership;” “[s]ignificant increase in telephone MVPD subscribership;” “[w]idespread availability of DBS service;” and “[c]onsumer access to multiple MVPDs.”³⁴⁷

Based on consideration of the same factors, the FCC should determine that the mobile wireless market is subject to effective competition. In the *Effective Competition NPRM*, the test from the Cable Act of 1992, as interpreted by the FCC, for determining if cable operators are subject to effective competition is (1) the franchise area is serviced by at least two unaffiliated multichannel video programming distributors that service at least 50% of the households in the franchise area, and (2) the number of subscribers that subscribe to cable from a competing, non-incumbent provider in the franchise area exceeds 15%.³⁴⁸ The FCC found in the *Effective Competition Report and Order* that approximately 99.7% of homes in the U.S. have access to at least three MVPDs, and nearly 35% have access to at least four MVPDs.³⁴⁹ Applying these tests to the wireless industry demonstrates the robust nature of competition for wireless consumers. As of January 2014, nearly 97% of Americans have the ability to choose from among three or more mobile voice providers, while more than 91% can choose from among four or more mobile voice providers.³⁵⁰ Thus, consumers in the nationwide mobile wireless market are served by more than two unaffiliated providers and the FCC should determine that the mobile wireless

³⁴⁶ *Id.* ¶ 10.

³⁴⁷ *Amendment to the Commission’s Rules Concerning Effective Competition; Implementation of Section 111 of the STELA Reauthorization Act*, Report and Order, FCC 15-62, MB Docket No. 15-53 (rel. June 3, 2015) (“*Effective Competition Report and Order*”).

³⁴⁸ *Id.* ¶ 6.

³⁴⁹ *Id.* ¶ 4 (citing *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, Sixteenth Report, 30 FCC Rcd 3253 (2015)).

³⁵⁰ *Seventeenth Competition Report* ¶ 48.

market is subject to effective competition. If the FCC can conclude that the MVPD market is presumptively competitive, there is no reason for it not to find the same in the mobile marketplace.

XIII. CONCLUSION.

As the foregoing comments demonstrate, there exists today a dynamic, vigorously competition mobile wireless market. Consumers are benefitting from the increased functionality, lower prices, and improved devices brought about by robust competition in the marketplace. Further, the data show wireless carriers ceaselessly investing in networks, leveraging technological developments to increase efficiency, and continuing to deploy more and more reliable networks throughout the country.

The data and developments discussed herein can only stem from a truly competitive marketplace. As demonstrated throughout these comments, the same factors that the FCC examined in the *Thirteenth Competition Report* in finding effective competition in the core CMRS market – market structure, provider conduct, consumer behavior, and market performance – also support a finding that today’s mobile wireless market is competitive.

More spectrum availability continues, however, to be an urgent need in the industry. No amount of increased efficiency or new technology will make up for the demand from consumers for more access, more speed, more functionality, more reliability, and more devices. CTIA hopes the information it has provided here will spur the FCC to both find the mobile market is subject to effective competition and to make more spectrum available for use by the wireless industry as soon as possible.

Respectfully submitted,

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