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

In the Matter of)
)
Fostering Innovation and Investment in the) GN Docket No. 09-157
Wireless Communications Market)
)
A National Broadband Plan For Our Future) GN Docket No. 09-51

REPLY COMMENTS OF CTIA-THE WIRELESS ASSOCIATION[®]

Michael F. Altschul
Senior Vice President, General Counsel

Christopher Guttman-McCabe
Vice President, Regulatory Affairs

Robert F. Roche, Ph.D.
Vice President, Research

Brian M. Josef
Director, Regulatory Affairs

CTIA-THE WIRELESS ASSOCIATION[®]
1400 16th Street, NW, Suite 600
Washington, DC 20036
(202) 785-0081

November 5, 2009

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SUMMARY

Commenters overwhelmingly confirm that the U.S. wireless marketplace is teeming with innovation in all parts of the wireless ecosystem. The record makes clear that, to keep pace with the astonishing growth in wireless broadband, more commercial spectrum must be allocated. It also confirms that exclusive-use, flexible rights licensing is critical to an operating environment with sufficient certainty to drive continued innovation and investment in wireless networks.

The virtuous cycle of wireless innovation and investment. As commenters make abundantly clear, the mobile wireless market is a vibrant and robust ecosystem with each segment – service providers, infrastructure suppliers, device manufacturers, operating system developers, and application developers – contributing to a virtuous cycle of innovation and investment.

In the last 18 months, the wireless ecosystem has embraced the evolution of networks to 3G and now 4G technologies, the explosion of innovative devices, the emergence of application stores, and new machine-to-machine communications. CTIA's most recent data confirms that, notwithstanding these challenging economic times, wireless carriers continue to invest and innovate in their networks while consumers continue to adopt and demand the latest wireless services, devices, and applications. This aggressive consumer adoption only serves to fuel the continued virtuous cycle of the wireless ecosystem. Highlights include:

- 3G technology has been deployed to more than 92 percent of the U.S. population;
- More than 85 percent of all devices on carriers' networks are Web-capable;
- 20 percent of new devices are equipped with Wi-Fi capability;
- Well over 100,000 mobile-specific applications have come to the market from six different stores;
- The subscriber growth rate from June 2008 to June 2009 was 5.3 percent;
- Reported minutes of use ("MOUs") amounted to 1.16 trillion for the six months ending in June 2009;
- Reported SMS messages for the six-month period totaled more than 740 billion, nearly doubling the 385 billion reported for the same period in 2008;
- Reported web-capable devices on carriers' networks rose from 210.6 million in June 2008 to 237.1 million as of June 2009;
- The number of wireless-enabled laptops, aircards, and wireless modems reported was 10.8 million;
- For the twelve months ending June 2009, providers reported making capital investments totaling \$19.5 billion;
- Providers added over 25,000 new cell sites, up 11.5 percent over the prior year.

Contrary to the unsupported claims of a few commenters, innovation and investment is driven across all key elements of the virtuous cycle by existing providers large and small, as well as new entrants.

For Continued Innovation and Investment, the Wireless Industry Needs More Exclusive-Use Flexible Spectrum. Although mobile wireless service providers are constantly investing and innovating in their networks, the capacity limits of existing spectrum allocations will not keep pace with expected demand. Thus, to support 4G networks and services, additional commercial wireless spectrum will be essential. CTIA has called for the Commission to identify and allocate a significant amount of spectrum – at least 800 MHz below 3 GHz – for licensed commercial wireless services within the next six years.

The Commission should work with NTIA to identify underutilized spectrum bands, and, in the short term, to allocate the 1755-1780 MHz band for commercial wireless use and pair it with the readily-available 2155-2180 MHz band for licensed commercial wireless use as quickly as possible. CTIA also urges the Commission to consider reallocating valuable broadcast and satellite spectrum to services better able to serve the needs of U.S. consumers. At the same time, the Commission should examine relocating fixed wireless spectrum below 3 GHz and identifying additional spectrum over 4 GHz that can be allocated for fixed wireless uses. Such relocations would free up a significant amount of spectrum for mobile wireless services that can only be accommodated in spectrum below 3 GHz.

To ensure the nation's limited spectrum resources are used effectively and efficiently, there is substantial agreement in the record that the Commission should continue to employ the exclusive-use, flexible rights licensing model that has attracted billions of dollars in investment in infrastructure necessary to create large-scale mobile networks. While unlicensed spectrum will continue to have a complementary role to the mobile broadband network, there must be a Government focus on making licensed spectrum available.

Proposals for third-party access to licensed spectrum independent from the permissive use, secondary markets framework would convert exclusive-use spectrum into non-exclusive, shared spectrum and undermine the very purpose of the instant proceeding. Underlays and overlays will simply limit a provider's ability to make efficient use of its spectrum to the detriment of its customers, who will experience more dropped calls, more blocked calls, reduced voice quality and decreased data throughput. Ultimately, controlling the noise (or interference) that is present on a frequency channel is critical if high broadband data rates, and the associated innovative services and applications, are to be ubiquitously offered to consumers.

Similarly, the Commission should be very cautious about loosening its existing interference standards, or removing adjacent channel protections without any technical analysis to support these positions. Rather, more commenters agree that the investment in infrastructure needed to deploy advanced mobile networks requires the certainty that protection from interference makes possible.

Unnecessary Conditions Will Limit Innovation and Investment but Steps to Facilitate Deployment Will Have a Significant Positive Impact. Finally, the Commission should be aware

that uncertainty regarding the recently adopted *Open Internet NPRM* likely will slow innovation in the mobile wireless ecosystem as companies balance whether investment in new technologies may be undermined by regulation of next generation network features. Additionally, the Commission can take significant steps to promote wireless broadband deployment and innovation by (1) adopting CTIA's "shot clock" tower siting petition, and (2) establishing a unified pole attachment rate for providers of broadband service (to be set at a rate as low as possible for utility companies to receive just compensation), and establish that pole-tops are "usable space" for wireless attachments.

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REPLY COMMENTS OF CTIA-THE WIRELESS ASSOCIATION[®]

INTRODUCTION

The overwhelming majority of comments submitted in response to the *Innovation NOI*¹ confirms what CTIA-The Wireless Association[®] (“CTIA”) detailed in its initial comments² – namely, a virtuous cycle of innovation and investment characterizes the wireless ecosystem.³ Moreover, this innovation and investment continues apace, as the U.S. mobile ecosystem is a remarkably vibrant and robust marketplace. In the last 18 months, the wireless ecosystem has embraced the evolution of networks to 3G and now 4G technologies, the explosion of innovative handsets, the emergence of application stores and new machine-to-machine communications. Consumers have aggressively taken advantage of the innovation and investment in the

¹ Fostering Innovation and Investment in the Wireless Communications Market; A National Broadband Plan For Our Future, *Notice of Inquiry*, 24 FCC Rcd 11322 (2009) (“*Innovation NOI*”).

² See generally Comments of CTIA (filed Sept. 30, 2009) (“CTIA Comments”).

³ See generally Comments of the American Legislative Exchange Council (filed Sept. 30, 2009); Comments of the American Telemedicine Association (filed Oct. 19, 2009); Comments of AT&T Inc. (filed Sept. 30, 2009) (“AT&T Comments”); Comments of Clearwire Corporation (filed Sept. 30, 2009) (“Clearwire Comments”); Comments of Ericsson Inc. (filed Sept. 30, 2009); Comments of the GSM Association (filed Sept. 30, 2009); Comments of Motorola, Inc. (filed Sept. 30, 2009) (“Motorola Comments”); Comments of the Mobile Marketing Association (filed Sept. 30, 2009); Comments of Qualcomm Incorporated (filed Sept. 30, 2009) (“Qualcomm Comments”); Comments of Sprint Nextel Corporation (filed Sept. 30, 2009) (“Sprint Nextel Comments”); Comments of T-Mobile USA, Inc. (filed Sept. 30, 2009) (“T-Mobile Comments”); Comments of the CDMA Development Group (filed Sept. 30, 2009); Comments of Verizon Wireless (filed Sept. 30, 2009) (“Verizon Wireless Comments”).

ecosystem, which will only serve to fuel the continued virtuous cycle of the ecosystem. The Commission should do all it can to facilitate – and not harm – this exploding ecosystem.

In that vein, it is clear that, in light of the growing consumer and enterprise demand for wireless broadband capabilities, the Commission must identify and allocate additional spectrum to ensure that the U.S. mobile wireless market remains the world’s leader. Moreover, the exclusive-use, flexible rights licensing regime provides the certainty to invest in infrastructure necessary for more extensive buildout, greater capabilities, and innovative new services, devices and applications. No facts or data exist to warrant disturbing this approach. Calls to revitalize the *Interference Temperature* proceeding⁴ or impose onerous network management limits on wireless networks will only serve to inhibit innovation and investment in a market that depends on licensed spectrum to provide services that subscribers expect and demand.

DISCUSSION

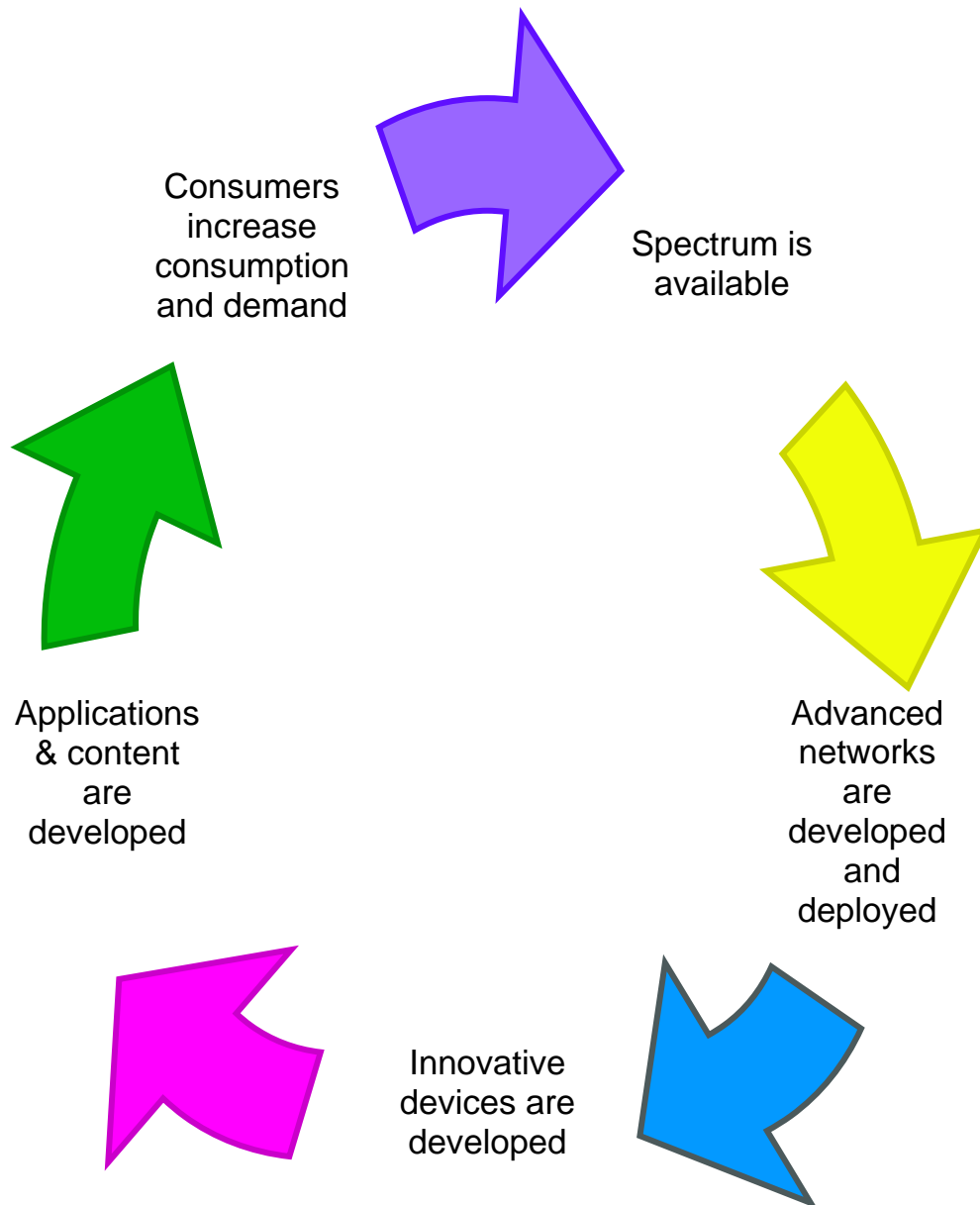
I. INNOVATION ABOUNDS IN THE WIRELESS MARKETPLACE

A. The Comments Confirm the Virtuous Cycle of Innovation and Investment

As numerous commenters make clear, the mobile wireless market has developed into a complex ecosystem with each of the five segments of the ecosystem – service providers, infrastructure suppliers, device manufacturers, operating system developers, and application developers – contributing to a virtuous cycle of innovation and investment.⁵ Innovation and investment occur independently within these five elements, but at the same time, developments in each element spur innovation and investment in others.

⁴ Establishment of an Interference Temperature Metric to Qualify and Manage Interference and to Expand Available Unlicensed Operation in Certain Fixed, Mobile and Satellite Frequency Bands, *Order*, 22 FCC Rcd 8938, 8938 (2007) (“*Interference Temperature Order*”).

⁵ See *supra* note 3.



The Virtuous Cycle of the Mobile Wireless Ecosystem

Thus, as spectrum is made available, service providers invest and innovate in more advanced networks and operating systems. These advanced capabilities and capacity then lead to innovations in devices, with a greater percentage of new phone sales being smartphones. With the increased capability of the handsets and the increased capacity and capability of networks comes an explosion of applications development. These innovations, in turn, lead to an increase in consumption and demand for services, which then creates a need for more spectrum. The imminent deployment of 4G networks is certain to push this cycle through another rotation,

leading to remarkable innovation and a significant increase in investment.

As discussed in greater detail below, service providers continue to experience tremendous growth, as more than 276 million consumers access services over commercial mobile wireless networks, an increase of 6.3 million from the end of 2008.⁶ These numbers are particularly impressive in light of the economic challenges during the first part of this year. With carriers looking to expand and further develop their networks even in this significant economic downturn, investment continues at a tremendous pace with providers reporting almost \$20 billion in capital investments in the twelve months ending in June 2009.⁷ This investment only serves to drive further innovation in all elements of the wireless virtuous cycle.

Indeed, the transformation of the network over the past 30 years from voice-centric to multi-media confirms the significant levels of innovation and investment that have occurred in the network, as well as at the edges. Mobile wireless networks with 3G technology have been deployed to more than 92 percent of the U.S. population, using a variety of technologies including HSDPA (“High Speed Downlink Packet Access”), HSUPA (“High Speed Uplink Packet Access”), Evolved High Speed Packet Access (“HSPA+”) and EV-DO and EV-DO Rev. A.⁸ U.S. carriers also are leading the world in the development and deployment of next generation technologies, including 4G networks relying on WiMAX and LTE technologies.⁹

Moreover, CTIA has noted that at least 32 companies manufacture devices for the U.S. market, leading to more than 630 unique device models – more than any other country in the

⁶ See *infra* Section I.B (detailing the growth in wireless subscribership over the first six months of 2009).

⁷ *Id.*; see also Mobile Future, WELCOME TO THE MOBILE FUTURE: HOW WIRELESS INNOVATION IS TRANSFORMING OUR ECONOMY & OUR LIVES at 2 (filed Sept. 30, 2009) attached as White Paper to Comments of Mobile Future (“Throughout the 25+-year wireless evolution, the government has taken a balanced approach that protects consumers and has fueled more than \$325 billion in capital investment in the domestic wireless infrastructure.”).

⁸ See CTIA Comments at 46.

⁹ See *id.* at 62-65.

world.¹⁰ More than 85 percent of all devices on carriers' networks are Web-capable and 20 percent of new devices are equipped with Wi-Fi capability.¹¹ As state-of-the-art mobile devices have processing power more like that of a computer, the U.S. is becoming the hotbed for smartphone deployment, particularly as service providers continue to implement openness initiatives.¹²

In the operating system developer space, at least nine increasingly powerful mobile operating systems – with fluid market shares for each – are battling to deliver today's sophisticated wireless platforms.¹³ Two of the newest systems, iPhoneOS and Android, hold more than 15 percent of the market already. It should also be noted that two platforms (Android and Symbian) also are open-source initiatives, which allows users to not only run their choice of third-party applications, but also to modify and run different versions of the operating system.¹⁴

As for application developers, the initial success of the Apple iTunes App Store has led to an explosion in mobile phone applications and competing application development and distribution strategies. In the 16 months since the launch of the iTunes App Store, more than 100,000 mobile-specific applications have come to the market from six different stores on six

¹⁰ See *id.* at 28.

¹¹ See CTIA's Wireless Industry Indices: Semi-Annual Data Survey Results: A Comprehensive Report from CTA Analyzing the U.S. Wireless Industry, Mid-Year 2009 Results at 10 ("CTIA's Wireless Industry Indices Report").

¹² See Press Release, The NPD Group, *Feature Phones Comprise Overwhelming Majority of Mobile Phone Sales in Q2 2009* (Aug. 19, 2009), available at http://www.npd.com/press/releases/press_090819.html ("The NPD Group Press Release") (detailing the increasing popularity in smartphones and that they now account for 28 percent of all handset sales). See also CTIA Comments at 33-34.

¹³ See CTIA Comments at 34-37 (noting the operating systems that are operational in the U.S.: Android, Symbian, PalmOS, Palm WebOS, RIM BlackBerry, Windows Mobile, Qualcomm BREW, Sun Java, open source Linux for Mobile, and Apple iPhone OS); see also Comments of Mercatus Center at George Mason University, at 7 (filed Sept. 30, 2009) ("Mercatus Center Comments") (noting the "abundance of mobile device platforms from which consumers can choose").

¹⁴ Mercatus Center Comments at 7.

differentiated platforms.¹⁵

B. New Data from CTIA's Semi-Annual Wireless Industry Survey Demonstrate Continued Growth of the Wireless Ecosystem

Since the filing of initial comments, the mid-year results of CTIA's Semi-Annual Wireless Industry Survey have been released, reflecting data as of June 30, 2009. These more recent data continue to confirm the expansion of the virtuous cycle of innovation and investment in the wireless marketplace.

In its initial comments, CTIA reported that there were an estimated 270.3 million wireless subscribers as of year-end 2008. Six months later, that figure continues to rise, climbing to 276.6 million, a 6.3 million increase.¹⁶ This represents an average of more than 34,800 net new wireless subscriptions *per day, every day* during the past six months. The subscriber growth rate from June 2008 to June 2009 was 5.3 percent, a very notable achievement considering that it occurred during the most economically challenging 12-month period since the Great Depression. Indeed, overall real consumer spending fell 3.3 percent during the last two quarters of 2008 and edged down another 0.3 percent in the first two quarters of 2009.¹⁷ Maintaining healthy growth rates during a severe economic downturn indicates that consumers view wireless service as offering good value.

¹⁵ See CTIA Comments at 37-39. See also Mercatus Center Comments at 8 (“In the last year, Microsoft, Google, RIM, and Palm have all announced or launched their own app store initiatives. What’s key to note about this is that while consumers could always download and install third-party applications on open platforms such as Windows Mobile, BlackBerry, and Symbian, the process was difficult. The unified app store innovation has created an explosion in mobile application development and consumer use.”).

¹⁶ For the June 30, 2009 installment of the semi-annual survey, CTIA received responses from companies serving 95.9 percent of wireless subscribers. Because not all systems respond, CTIA develops an estimate of total subscribership. The number of actual *reported* subscribers was 265.3 million, up 5.5 million from the reported numbers at year-end 2008. For more information on the estimation methodology used by the survey, see CTIA Semi-Annual Wireless Industry Survey, *available at* <http://www.ctia.org/advocacy/research/index.cfm/aid/10316> (“CTIA Survey Summary”) (last visited Nov. 3, 2009).

¹⁷ See Press Release, U.S. Department of Commerce, Statement from ESA Under Secretary Blank on June Personal Income (Aug. 4, 2009), *available at* http://www.commerce.gov/NewsRoom/PressReleases_FactSheets/PRO D01_008256 (last visited Nov. 3, 2009).

Not only did millions of new subscribers sign-up for wireless service, but the total quantity of services consumed also continued to increase. Reported minutes of use (“MOUs”) amounted to 1.16 trillion for the six months ending in June 2009, up 3.1 percent from 1.12 trillion for the six-month period ending June 2008.¹⁸ Significantly, messaging services continued along their dramatic growth trajectory. Reported SMS messages for the six-month period totaled more than 740 billion, nearly doubling the 385 billion reported for the same period in 2008.¹⁹

U.S. consumers also continued to embrace wireless services as a means to access the Internet, using a variety of devices. Reported web-capable devices on carriers’ networks rose from 210.6 million in June 2008 to 237.1 million as of June 2009.²⁰ The number of smartphones and wireless-enabled PDAs reported on carriers’ networks as of June 2009 was 40.7 million, and the number of wireless-enabled laptops, aircards, and wireless modems reported was 10.8 million.²¹ That number is only expected to continue to increase.²²

Finally, despite the economic crisis, wireless providers continued to spend significant amounts to improve the capacity and coverage of their networks. For the twelve months ending June 2009, providers reported making capital investments totaling \$19.5 billion, without including investment made in non-operational spectrum.²³ As the chart below indicates, the industry continues to invest and innovate despite current economic challenges.

¹⁸ See CTIA’s Wireless Industry Indices Report at 2.

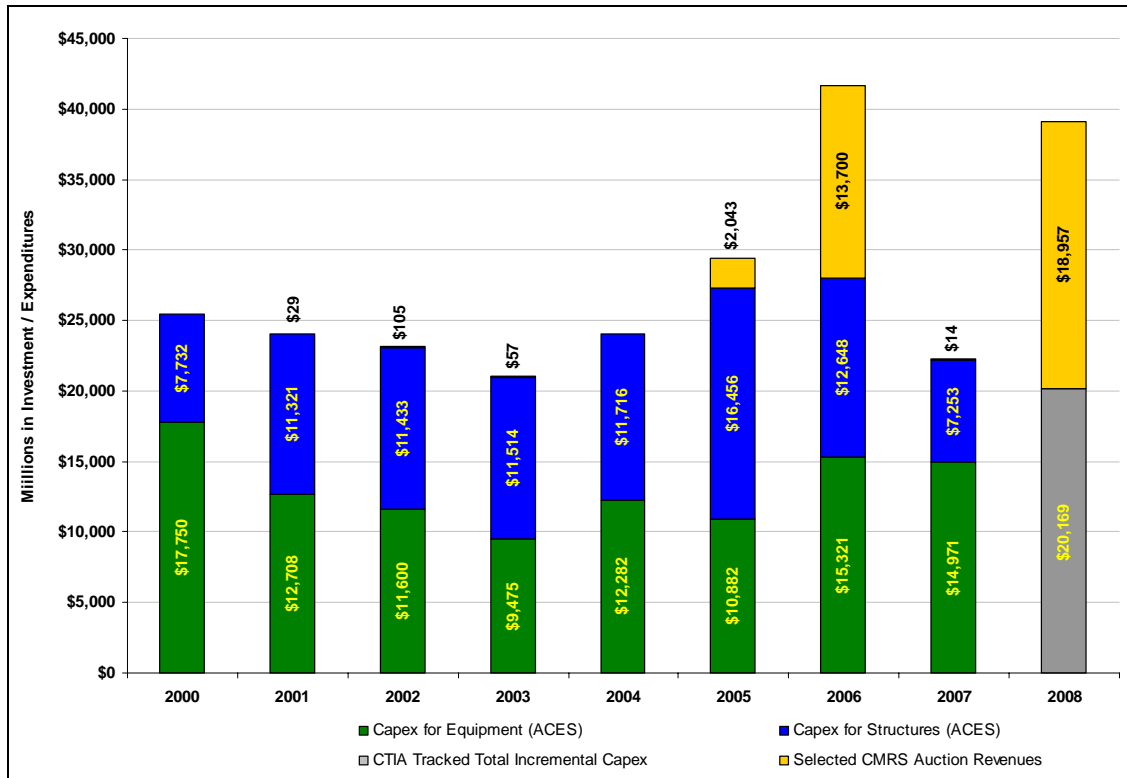
¹⁹ *Id.*

²⁰ *Id.* at 10.

²¹ *Id.*

²² See The NPD Group Press Release.

²³ See CTIA’s Wireless Industry Indices Report at 8.



Source: US Census "Annual Census of Expenditures" and CTIA Research

That investment translated into over 25,000 new cell sites, up 11.5 percent over the prior year and representing the largest growth in new sites in the past five years.²⁴ The total number of reported operational sites stands at 245,912 as of June 30, 2009.²⁵ This level of expansion, especially given the economic climate, reflects an astounding record of innovation and investment in the mobile ecosystem. Indeed, the wireless virtuous cycle is as strong as ever.

²⁴ See CTIA's Survey Summary at 2.

²⁵ *Id.*

C. Innovation Is Occurring Across All Segments of the Ecosystem

Contrary to the claims of a few commenters,²⁶ the record demonstrates that innovation and investment is driven across all key elements of the virtuous cycle by numerous entities – existing providers large and small, as well as new entrants. Along any vector of innovation and investment, existing providers are creating new opportunities. For example, with respect to expanding the reach and capabilities of wireless broadband, existing providers are continuing to build out and upgrade systems to the latest 3G technologies and introducing new 4G networks.²⁷ With respect to openness, existing providers are finding new ways to provide consumers and enterprises access to non-licensee, third-party provided devices and applications.²⁸ Developments like machine-to-machine (“M2M”) communications are improving communications and efficiencies in numerous fields including healthcare, energy, the

²⁶ See Comments of Green Flag Wireless, LLC, at 5 (filed Sept. 30, 2009) (“Green Flag Comments”) (“[Incumbents] innovate cumbersomely, if at all, because there is so much investment both financial and psychological, in the old way of doing things. By contrast, new entrants into the broadband field can dare to innovate, to bring fresh ideas to the marketplace and let them be tested.”); Comments of Spectrum Bridge, Inc., at 9 (filed Sept. 30, 2009) (“Spectrum Bridge Comments”) (“Much of the innovation in the wireless industry comes from small companies or those outside the wireless industry, neither of which can compete in a high stakes auction for large swaths of spectrum against entrenched incumbents.”).

²⁷ See T-Mobile Comments at 12 (“T-Mobile will have HSPA+ up and running on a *nationwide* basis by 2010, which could make it the operator with the highest data speeds in the largest footprint.”) (emphasis in original); Verizon Wireless Comments at 12-13 (describing its 3G network coverage to over 284 million Americans, and its plans to deploy 4G LTE services to approximately 100 million consumers in 2010); AT&T Comments at 26-27 (“AT&T will spend between \$11 and \$12 billion in the next year and a half within the current 3G framework to increase available bandwidth by deploying new cell sites, adding spectrum and upgrading to HSPA 7.2 Mbps. . . . 4G/LTE networks that AT&T and others are preparing to deploy will be all-IP networks capable of theoretical peak download speeds of 326 Mbps and peak upload speeds of 86 Mbps.”); Clearwire Comments at 4 (“By the end of 2010, Clearwire’s 4G WiMAX network is expected to be available in more than 80 markets covering up to 120 million people.”).

²⁸ See Sprint Nextel Comments at 28 (“Sprint Nextel is embracing an open ecosystem that encourages application developers to use Sprint Nextel’s tools and programs to develop many applications for a wide range of Sprint devices.”); T-Mobile Comments at 13 (T-Mobile is a “founding member of the Open Handset Alliance, a group of 47 technology and mobile companies with the shared goal of accelerating innovation in the wireless market and offering consumers a richer, less expensive wireless experience.”); Verizon Wireless Comments at 84-90 (describing its Open Development Initiative and other openness efforts); Clearwire Comments at 5 (“Openness is in Clearwire’s DNA. Our company has built its network based on an open standard . . .”).

environment, education, manufacturing efficiency, and workforce productivity.²⁹ These are but a few of the *documented* innovations and investments that are occurring in the wireless marketplace every day by incumbents and new entrants alike. Indeed, the wireless virtuous cycle is ongoing and growing.

Finally, CTIA cannot leave unanswered baseless claims that incumbents intentionally prolong proceedings.³⁰ As the Commission and the Court of Appeals have recognized, “the time agencies take to make decisions must be governed by a ‘rule of reason.’”³¹ A number of factors are relevant, including the “complexity of the task” before the agency,³² whether the agency is confronted with “competing priorit[ies],” whether there is a “congressional timetable” for action, whether “human health and welfare” are involved, and “the nature and extent of the interests prejudiced by delay.”³³ To single out incumbent carriers as the cause of the FCC’s delay is highly ironic given that today’s providers are themselves all too familiar with protracted proceedings – for example, it took over eight years for the Commission to work through the AWS-1 allocation, service rules, and auction proceedings.³⁴ More profoundly, the

²⁹ See, e.g., AT&T Comments at 46-47 (AT&T has tagged machine to machine or M2M communications as the “Next Innovation Frontier,” and has just announced the establishment of a new lab designed specifically to test and certify embedded wireless and machine-to-machine devices for use on AT&T’s network.); T-Mobile Comments at 14 (“Consistent with the Administration’s commitment to smart grid technology for energy conservation, T-Mobile has teamed with Echelon Corp to develop a wireless smart grid system using advanced metering infrastructure.”); Verizon Wireless Comments at 29 n.97 (“In July 2009, Verizon Wireless and Qualcomm Incorporated formed a joint venture, called nPhase, that will provide end-to-end M2M solutions to enable ‘Smart Services’ initiatives in a variety of industries, including healthcare, manufacturing, utilities, distribution and consumer products.”).

³⁰ See Comments of Marcus Spectrum Solutions LLC, at 5-6 (filed Sept. 24, 2009) (“Marcus Comments”).

³¹ See, e.g., *Telecommunications Research & Action Center v. FCC*, 750 F.2d 70, 90 (D.C. Cir. 1984) (“TRAC”).

³² *Mashpee Wampanoag Tribal Council, Inc. v. Norton*, 336 F.3d 1094, 1101 (D.C. Cir. 2003).

³³ TRAC, 750 F.2d at 80.

³⁴ See, e.g., Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium, *Policy Statement*, 14 FCC Rcd 19868 (1999); Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, *Notice of Proposed Rule Making and Order*, 16 FCC Rcd 596 (2001); *Second Report and Order*, 17 FCC Rcd 23193 (2002); *Fourth Notice of Proposed Rulemaking*, 18 FCC Rcd 13235 (2003); *Third Memorandum Opinion and Order*, 19 FCC Rcd 20720 (2004); *Seventh Report and Order*, 19 FCC Rcd 21350 (2004); *Fourth Memorandum Opinion and Order*, 21 FCC

Commission's deliberation of service rules and bandplans for the 700 MHz band extended at least 10 years before an auction took place in 2008.³⁵ Simply put, even for good ideas with broad appeal, resolution unfortunately can take a long time notwithstanding the desire of parties to speed the process along.³⁶ As to whether Section 7 of the Communications Act, as amended,³⁷ compels the Commission to affirmatively grant an application that claims a new technology or service within 12 months,³⁸ the D.C. Circuit already has held that Section 7 does not place on the agency the burden of proving that a proposal, like M2Z's, is *not* in the public interest.³⁹

II. MORE SPECTRUM IS NEEDED TO SATISFY THE GROWING DEMANDS OF THE WIRELESS MARKETPLACE

It is widely acknowledged that the wireless industry needs more spectrum.⁴⁰ Chairman

Rcd 4441 (2006); Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands, *Notice of Proposed Rulemaking*, 17 FCC Rcd 24135 (2002); *Report and Order*, 18 FCC Rcd 25162 (2003); *Order on Reconsideration*, 20 FCC Rcd 14058 (2005); Auction of Advanced Wireless Licenses Scheduled for June 29, 2006, *Public Notice*, 21 FCC Rcd 794 (2006).

³⁵ See, e.g., Reallocation of Television Channels 60-69, the 746-806 MHz Band, ET Docket No. 97-157, *Notice of Proposed Rulemaking*, 12 FCC Rcd 14141 (1997); *Report and Order*, 12 FCC Rcd 22953 (1997); *Memorandum Opinion and Order*, 13 FCC Rcd 21578 (1998); Service Rules for the 746-764 and 776-794 MHz Bands, And revisions to Part 27 of the Commission's Rules, *First Report and Order*, 15 FCC Rcd 476 (2000); *Second Report and Order*, 15 FCC Rcd 5299 (2000); *Second Memorandum Opinion and Order*, 16 FCC Rcd 1239 (2001); *Third Report and Order*, 16 FCC Rcd 2703 (2001); *Order on Reconsideration of the Third Report and Order*, 16 FCC Rcd 21633 (2001); Reallocation and Service Rules for the 698-746 MHz Spectrum Band (TV Channels 52-59), *Notice of Proposed Rulemaking*, 16 FCC Rcd 7278 (2001); *Report and Order*, 17 FCC Rcd 1022 (2002); *Memorandum Opinion and Order*, 17 FCC Rcd 11613 (2002); Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, *Notice of Proposed Rulemaking*, 21 FCC Rcd 9345 (2006); *Report and Order and Further Notice of Proposed Rulemaking*, 22 FCC Rcd 8064 (2007); *Second Report and Order*, 22 FCC Rcd 15289 (2007); Auction of 700 MHz Licenses Scheduled for January 16, 2008, *Public Notice*, 22 FCC Rcd 15004 (2007); Auction of 700 MHz Band Licenses Closes, *Public Notice*, 23 FCC Rcd 4572 (2008).

³⁶ On the other hand, some ideas are bad ones, and it would serve the public interest for the Commission to act more swiftly in rejecting these proposals. See, e.g., M2Z Networks, Inc., *Application for License and Authority to Provide National Broadband Radio Service in the 2155-2175 MHz Band* (filed May 5, 2006, amended Sept. 1, 2006).

³⁷ 47 U.S.C. § 157.

³⁸ Marcus Comments at 4-6.

³⁹ M2Z Networks, Inc. v. FCC, No. 07-1360, 13, (D.C. Cir.) (Mar. 10, 2009).

⁴⁰ See, e.g., Blair Levin, Executive Director, Omnibus Broadband Initiative, Federal Communications Commission, *A Framework for Universal Broadband*, Udwin Breakfast Group (Sept. 2, 2009) (“[A] key input is spectrum and everyone agrees, there is not enough of it. Moreover, demand curves from new uses by smart phones suggest a massive increase in demand ahead for that input. Indeed, CTIA has already declared that the lack of commercial

Genachowski himself spoke emphatically about the problem during his recent speech at CTIA's WIRELESS I.T. & Entertainment conference:

Spectrum is the oxygen of our mobile networks. While the short-term outlook for 4G spectrum availability is adequate, the longer-term picture is very different. In fact, I believe that the biggest threat to the future of mobile in America is the looming spectrum crisis.⁴¹

To meet projected demand, CTIA has called for the Federal government to identify and allocate a significant amount of spectrum – at least 800 MHz below 3 GHz⁴² – for licensed commercial wireless services within the next six years.⁴³ While it is impossible to quantify precisely what amount of additional spectrum would be “future proof,” such an allocation would be an important step towards meeting rapidly accelerating demand and maintaining U.S. leadership in the global mobile broadband marketplace.

Not surprisingly, numerous commenters echoed CTIA's earlier calls for additional

spectrum will create a crisis for this country. But we need details on where new spectrum will come from.”). *See also Spectrum Requirements for the Next Generation of Mobile Networks*, NGMN Alliance at 22 (June 2007) (when the Next Generation Mobile Networks Alliance – a coalition of wireless providers, industry partners, and academic advisors – reviewed ITU projections for spectrum use, it determined that an additional 500 MHz to 1 GHz of spectrum would be required, depending on region.).

⁴¹ Genachowski America's Mobile Broadband Future at 4. *See also* John Eggerton, *Q&A: FCC's Baker Sounds Alarm Over 'Anecdote'-Based Regulations*, MULTICHANNEL NEWS (Oct. 26, 2009), available at http://www.multichannel.com/article/366250-Q_A_FCC_s_Baker_Sounds_Alarm_Over_Anecdote_Based_Regulations.php (last visited Nov. 4, 2009) (quoting FCC Commissioner Meredith Atwell Baker “I think that we do need to find more spectrum. I do think we need to be looking at both commercial and government allocations when we do this. We are really facing a spectrum crisis and we need to approach this issue differently than we have in the past.”).

⁴² *See* International Telecommunication Union, *Report ITU-R M.2078: Estimated Spectrum Bandwidth Requirements for the Future Development of IMT-2000 and IMT-Advanced*, at 25, Table 25 (2006) (ITU estimate that commercial wireless will need an allocation of 1,300 MHz by 2015 – meaning an additional 800 MHz of spectrum in the U.S. – in order to meet surging demand of mobile broadband services). CTIA estimates the U.S. wireless industry has access to just 409.5 MHz of spectrum (which includes AWS and 700 MHz spectrum, much of which is not yet deployed, as well as 55.5 MHz of 2.5 GHz BRS spectrum), but still serves well over 270 million subscribers – more than 660,000 consumers per megahertz of spectrum. *See* CTIA Comments at 21.

⁴³ *See* Letter from Christopher Guttman-McCabe, Vice President, Regulatory Affairs, CTIA to Chairman Julius Genachowski *et al.*, Federal Communications Commission, GN Docket No. 09-51 (Sept. 29, 2009); Comments of CTIA, NPB Public Notice #6, GN Docket Nos. 09-51, 09-47, 09-137 (filed Oct. 23, 2009).

spectrum.⁴⁴ In calling for more spectrum, commenters highlighted the ability of LTE- and WiMAX-enabled networks to deliver increasingly bandwidth-intensive applications and the growing demand for services such as mobile video.⁴⁵ Indeed, Cisco has projected that mobile data traffic will double every year between 2008 and 2013, resulting in traffic 66 times 2008 levels.⁴⁶ Although network operators are constantly investing in their networks and innovating to enhance spectral efficiency, the technological capacity limits of existing spectrum allocations will not keep pace with expected demand.⁴⁷ Thus, to support next generation wireless voice and data services, additional commercial wireless spectrum will be essential.

As policymakers consider new sources of commercial wireless spectrum, it is likely that underutilized spectrum currently assigned to the Federal government (as well as some commercial users) will be a critical source of spectrum to be repurposed. Google observes that “[g]iven [] the government has exclusive access to a substantial amount of spectrum, and even more spectrum is designated for government/non-government shared use, it is highly likely that spectrum suitable for reallocation for commercial and other purposes can be identified.”⁴⁸

To address near-term needs of the wireless industry, CTIA has urged the Commission to work with NTIA to allocate the 1755-1780 MHz band for commercial wireless use and pair it with the readily-available 2155-2180 MHz band for licensed commercial wireless use as quickly

⁴⁴ See, e.g., AT&T Comments at 68-69; Verizon Wireless Comments at 138-147; Comments of the Telecommunications Industry Association, at 3 (filed Sept. 29, 2009); Comments of Vodafone Group Plc, at 6 (filed Sept. 30, 2009).

⁴⁵ See, e.g., Clearwire Comments at 14 (“Clearwire anticipates that the Innovation Network [using 4G WiMAX technology] will foster not only new wireless devices, but also innovative wireless applications, including mobile video, location-based, and innovative gaming services.”).

⁴⁶ See Cisco Systems, Inc., *Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update*, at 1-2 (Jan. 2009), available at http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.pdf.

⁴⁷ Scott Corson, Vice President of Engineering, Qualcomm Flarion Technologies, FCC Wireless Broadband Workshop – General Transcript, at 17 (Aug. 13, 2009), available at http://www.broadband.gov/docs/ws_06_tech_wireless_transcript.pdf.

⁴⁸ Comments of Google Inc., at 17 (filed Sept. 30, 2009) (“Google Comments”) (footnote omitted).

as possible.⁴⁹ Pairing of these two bands would inject an additional 50 MHz of spectrum that is ideally suited for mobile broadband and other next generation wireless applications to the strained CMRS spectrum market. Furthermore, such a pairing would conform to international allocations, reducing the time to market and costs of compatible devices and services, as providers and manufacturers could draw upon the work that has been done elsewhere with this spectrum.

In addition to the 1755-1780 MHz band that should be rapidly reallocated for commercial use, the Commission and NTIA should work together to identify other government spectrum that is being underutilized. As the Mercatus Center correctly notes, “Government actors do not internalize the benefits of innovation as well as a private actor might. As a result, federal agencies that control spectrum have little incentive to make manage [sic] it well or deploy more efficient technologies that better exploit bandwidth.”⁵⁰

It is also likely that a spectrum inventory may identify underutilized non-government spectrum that could be put to a higher and better use. Indeed, as Blair Levin, Executive Director of the Commission’s Omnibus Broadband Initiative, has stated, all spectrum options should be on the table to meet U.S. consumers’ growing demand for mobile wireless broadband services.⁵¹ To this end, and while not an exhaustive list, CTIA describes below three areas that are ripe for Commission attention: spectrum allocated to the U.S. broadcast industry, fixed wireless spectrum below 3 GHz, and spectrum allocated to satellite providers.

⁴⁹ See Reply Comments of Ericsson Inc., at 2 (filed Oct. 13, 2009) (“Ericsson supports CTIA’s proposal to pair readily available spectrum in the 1.7 GHz band with the 2.1 GHz band. This is consistent with the Region 2 decision which endorsed the pairing of the 2110-2170 MHz band with the 1710–1770 MHz band.”) (footnotes omitted).

⁵⁰ Mercatus Center Comments at 4 (also noting that over 20 percent of the prime spectrum in the U.S. is Federal government-controlled, and that the Department of Defense alone controls over 500 MHz).

⁵¹ See “In broadband plan, FCC’s Levin acknowledges need for more spectrum,” FierceWireless (Sept. 2, 2009) available at: <http://www.fiercewireless.com/story/levin-lays-out-broadband-priorities-spectrum-key/2009-09-02>.

CTIA urges the Commission to take a hard look at the spectrum use of the U.S. broadcast industry and urges the Commission to consider reallocating this valuable spectrum to services better able to serve the needs of U.S. consumers. The highly inefficient broadcasters currently occupy a large band of spectrum in the UHF frequency band (470 MHz – 698 MHz). This spectrum, immediately adjacent to the 700 MHz spectrum, was recently described by the Commission as “beach front property” for mobile broadband services and is uniquely suited to the provision of mobile services. The overwhelming majority of broadcast television, by contrast, is provided to U.S. consumers through wired technologies. If the public interest in providing over-the-air television to the fraction of U.S. households without cable or satellite television has not already been overtaken by technological changes, it is rapidly becoming so. In recognition of the importance of mobile broadband services to the more than 276 million U.S. wireless subscribers, the well-documented explosion in mobile data traffic and mobile video traffic in particular, and the lengthy process of reallocating and licensing new spectrum, the Commission should immediately open a proceeding to consider the reallocation of broadcast spectrum for mobile broadband services.

In the short term, there are steps with respect to the broadband spectrum that the Commission can take to immediately further the provision of mobile wireless broadband services. As an initial matter, as the Commission begins to authorize devices for use in the television white spaces it should do so by beginning with authorizations at the bottom end of the available white spaces. To the extent the Commission should decide that broadcasters, white space devices and mobile broadband services should continue to coexist in the television bands, the Commission would do well to ensure that additional spectrum for licensed mobile broadband

services is available at the top end of the television band, adjacent to existing 700 MHz allocations.

CTIA also urges the Commission to begin immediately looking at the broadcast spectrum bands closest to the 700 MHz allocation and reallocating unused DTV channels to licensed mobile wireless broadband use. In geographic areas where channel 51, for example, is unused, reallocation to licensed wireless broadband services will provide a needed and immediate infusion of spectrum to help meet growing consumer demand for wireless broadband services.

Commission action to ensure that the spectrum in the remaining UHF bands is used to meet the needs of the more than 276 million U.S. consumers, businesses, and government users who subscribe to, rely on, and increasingly demand mobile access to data will advance the Commission's goals of ubiquitous broadband, competition for broadband services, and putting spectrum to its highest, best and most efficient use.

The Commission also should consider relocation of spectrum below 3 GHz that is currently allocated for fixed wireless use. CTIA recognizes that fixed wireless has an important complementary role to play in the deployment of future mobile wireless networks. Indeed, fixed wireless services are an important source for mobile wireless backhaul. Yet spectrum below 3 GHz is ideally suited for commercial wireless services. As such, the Commission should consider relocating fixed wireless spectrum below 3 GHz and identifying additional spectrum over 4 GHz that can be allocated for fixed wireless uses.⁵² Such relocations would free up a significant amount of spectrum for mobile wireless services that can only be accommodated in spectrum below 3 GHz.

⁵² See *Comment Sought on Spectrum for Broadband – NBP Public Notice #6*, GN Docket Nos. 09-47, 09-51, 09-137, Public Notice, DA 09-2100, at 6 (Sept. 23, 2009) (asking “[w]hat spectrum bands are best positioned to support fixed wireless broadband?”).

Finally, CTIA urges the Commission to undertake an examination of spectrum allocated to U.S. satellite providers. CTIA believes that a review of current satellite authorizations, coupled with an assessment of whether such providers are fully and efficiently utilizing their spectrum allocations, will inform whether this spectrum should be reallocated for licensed CMRS wireless broadband use.

III. EXCLUSIVE-USE, FLEXIBLE RIGHTS LICENSING HAS PROVEN TO FOSTER INNOVATION AND INVESTMENT, WHEREAS UNDERLAYS AND OTHER OPPORTUNISTIC PROPOSALS WILL UNDERMINE THE MOBILE WIRELESS MARKET

A. The Benefits of Exclusive-Use, Flexible Rights Licensing Are Well Documented

It is critical that policymakers maintain the most effective spectrum policies to promote U.S. leadership in mobile broadband development. To ensure the nation's limited spectrum resources are used effectively and efficiently, there is substantial agreement in the record that the Commission should continue to employ an exclusive-use, flexible rights licensing model that allows the market and consumers, rather than regulators, to determine the highest and best use of the spectrum.⁵³

The success of the mobile wireless market demonstrates that granting an entity an exclusive license, and ensuring that its use of that spectrum will not be subject to harmful interference, is a tremendously powerful way for the government to encourage innovation and investment.⁵⁴ Indeed, the exclusive-use, flexible rights license model has successfully attracted

⁵³ See, e.g., Comments at Comcast, at 8 (filed Sept. 30, 2009) ("Comcast Comments") ("Finally, to ensure that consumers will enjoy reliable, interference-free wireless broadband service, this spectrum should be made available for the most part on a licensed basis. The Commission has allocated ample unlicensed spectrum to determine its efficacy in expanding wireless broadband."); Verizon Wireless Comments at 91 ("the key to the development of new services and technologies has been – and will continue to be – access to unfettered, exclusive use spectrum that allows flexible use to best serve customers").

⁵⁴ See, e.g., Thomas W. Hazlett, *A Law and Economics Approach to Spectrum Property Rights: A Response to Weiser and Hatfield*, 15 Geo. Mason L. Rev. 975, 1005 (2008) ("With broad, exclusive spectrum rights, de facto

billions of dollars in investment in infrastructure necessary to create large-scale mobile networks. Clearwire observes that “[l]icensed spectrum provides superior certainty and increased interference protection in congested areas,” explaining that this “encourages the large, long-term investments needed for substantial infrastructure development.”⁵⁵ In short, Clearwire explains, “[w]ithout the certainty that characterizes licensed spectrum Clearwire and other facilities-based innovators and competitors simply would not be able to bring their innovations to consumers.”⁵⁶

The exclusive-use, flexible rights regime has provided licensees with the certainty needed to invest in networks without the threat that their services would be subjected to harmful interference. It also has allowed competing service providers to choose different approaches and change technologies when needed. For example, with no need for regulatory intervention, licensees have been able to evolve their systems from analog 1G networks to 2G digital voice networks, to high-speed 2.5G, then to 3G, and currently 4G networks, without worry that their investments will be futile due to harmful interference.

Exclusive-use, flexible rights licensing therefore encourages licensees to invest in their networks and efficiently utilize their spectrum.⁵⁷ Such licensees receive a bundle of well-established rights and specific boundaries within which those rights may be exercised.

owners invest aggressively in wireless infrastructure complementary to their airwaves and then promote intense utilization of the opportunities thereby afforded”).

⁵⁵ Clearwire Comments at 10-11.

⁵⁶ *Id.* at 11.

⁵⁷ See, e.g., Thomas W. Hazlett & Matthew L. Spitzer, *Advanced Wireless Technologies and Public Policy*, 79 S. Cal. L. Rev. 595, 646-647 (2006) (“In [exclusively-assigned, flexible-use spectrum] bands, licensees invest enormous sums to deploy advanced technologies. They do so due to two advantages offered by the property rights regime. First, the governance rules imposed on unlicensed users, including power limits and technology standards, are absent. With exclusive rights, decisions about governance are delegated to rights holders, providing the network operator wider latitude to optimize spectrum use than networks accessing unlicensed bandwidth enjoy. Second, unlicensed bandwidth potentially allows large numbers of users to access spectrum now and in the future without the permission of network investors. This constitutes a threat of appropriation for such investors, lowering expected returns for irreversible network infrastructure investments. Exclusive ownership of spectrum rights, alternatively, provides security for investors sinking capital complementary to the use of frequencies.”).

Licenses (and the related FCC rules) define for the licensee any limits on how the spectrum can be used. The spatial and frequency boundaries are set as well. As a result, an exclusive licensee knows where spectrum may be used and is protected from harmful interference by others. The flip-side of this principle is that companies are unlikely to invest billions of dollars in infrastructure for wireless service if they have little certainty that they can operate it at a planned level of quality and modify it to meet the demands of a dynamic, evolving marketplace. As MetroPCS explains, wireless providers “naturally are reluctant to incur the substantial investments in network infrastructure, customer acquisition costs, and constructing the necessary customer service infrastructure in circumstances where they do not have assured exclusive use of an identifiable spectrum resource.”⁵⁸

CTIA recognizes that a few parties in this proceeding are calling for the Commission to identify additional spectrum for unlicensed use.⁵⁹ Some of CTIA’s members are among the largest operators of unlicensed “hot spots,” and CTIA believes that unlicensed devices will continue to have a complementary role to the mobile broadband network.⁶⁰ As indicated in its comments, unlicensed shared use is well suited for short-distance communications among limited numbers of devices, *i.e.*, cordless phones, Wi-Fi LAN, and Bluetooth.⁶¹ Indeed, unlicensed hot spots can serve as an important means to offload traffic from broadband networks in certain localized areas. At the same time, for large-scale mobile networks requiring extensive infrastructure investment, exclusive-use licensing is the only viable approach. Thus, at the core of the spectrum identification, reallocation, and assignment process, there must be a laser-like

⁵⁸ Comments of MetroPCS Communications, Inc., at 25 (filed Sept. 30, 2009) (“MetroPCS Comments”).

⁵⁹ *See, e.g.*, Comments of The Wireless Internet Service Providers Association, at 4-5 (filed Sept. 30, 2009).

⁶⁰ *See, e.g.*, T-Mobile Comments at 14 (discussing T-Mobile’s use of Unlicensed Mobile Access to supplement its licensed wireless network).

⁶¹ *See* CTIA Comments at 68.

focus by the Federal government on making licensed spectrum available. “[I]f the [C]ommission is seeking to get the greatest bang for its innovation buck, it would do well to prioritize making more exclusive flexible-use spectrum available. Unlicensed spectrum is a complement, not a substitute, for it.”⁶²

Finally, CTIA disagrees with Boeing’s characterization that the “Commission should [] refrain from depending on auctions to maximize spectrum efficiency and equating auctions with a guarantee of automatic spectral efficiency.”⁶³ Rather, as Cellular South explains, “the [FCC’s] successful spectrum allocation, assignment, and competitive bidding process . . . have spurred technological innovations aimed at maximizing the efficient and valuable use of spectrum, and these innovations in turn have propelled investment in wireless infrastructure, equipment, and services.”⁶⁴ CTIA fully agrees.

B. Proposals Such As Interference Temperature and Underlays Will Limit Innovation and Investment in the Mobile Wireless Market

Google asserts that “Federal policy should allow – if not encourage – any spectrum that is unused at a particular place and time to be eligible for secondary uses by any lawful devices.”⁶⁵ The Commission must be careful in this regard so as not to inject uncertainty into the investment calculation for licensed wireless operations. Google’s vision of third-party access to licensed spectrum outside the permissive use, secondary markets framework, would convert exclusive-use spectrum into non-exclusive, shared spectrum and undermine the very purpose of the instant proceeding – innovation and investment. As MetroPCS appropriately observes:

A licensee using non-exclusive spectrum has no way of knowing or accurately predicting the level and extent of use by other

⁶² Mercatus Center Comments at 7.

⁶³ Comments of The Boeing Company (filed Sept. 30, 2009), at 14.

⁶⁴ Comments of Cellular South, Inc., at 3-4 (filed Sept. 30, 2009) (footnotes omitted).

⁶⁵ Google Comments at 9.

co-licensees. Thus, it is impossible for a network operator to predict the capacity it will enjoy on its constructed network or the revenues it will earn. Uncertainty of this nature deters investment because it increases risks.⁶⁶

Google asks the Commission to reopen the *Interference Temperature* proceeding and consider other related Part 15 underlay or overlay concepts.⁶⁷ However, when the Commission terminated its *Interference Temperature* proceeding two years ago, it noted that commenters generally found it was “not a workable concept and would result in increased interference in the frequency bands where it would be used.”⁶⁸ The Commission went on to note that none of the interference temperature advocates had come forward with technical rules to make that model work.⁶⁹ Google offers no new technical proposals but instead posits that recent research justifies “a fresh look,” citing a single subsequently published article.⁷⁰ The referenced article, however, describes the interference temperature model as “an interesting, but ultimately unsuccessful idea for providing a simple regulation for managing interference and allowing underlay networks.”⁷¹ As described further below, there is simply no basis for reopening the interference temperature model or pursuing the concept that all spectrum that is “unused” at a given place and time should be made available to any lawful device.⁷²

Commenters overwhelmingly explain how any such policy would undermine the incentives for innovation and investment. As Clearwire points out, “the very premise of Clearwire’s underlying network technology (4G wireless, using OFDM) is to pack as much data

⁶⁶ MetroPCS Comments at 43.

⁶⁷ See Google Comments at 22-24.

⁶⁸ *Interference Temperature Order*, 22 FCC Rcd at 8938.

⁶⁹ *Id.*

⁷⁰ See Google Comments at 23, citing T. Charles Clancy, *Dynamic Spectrum Access Using the Interference Temperature Model*, 64 ANNALS OF TELECOMMUNICATIONS 573-585 (Aug. 2009), available at <http://www.cs.umd.edu/~clancy/docs/itma-at08.pdf>.

⁷¹ Clancy, 64 ANNALS OF TELECOMMUNICATIONS at 584.

⁷² See Google Comments at 9.

as possible into a limited amount of spectrum. . . . Underlays and overlays may limit a spectrum-constrained network provider's ability to manage its spectrum to the detriment of its customers."⁷³ Indeed, Verizon Wireless observes that an interference temperature or underlay approach "would take resources away from a PCS operator just as reducing the allotted bandwidth would take away resources . . . significantly degrad[ing] the quality of service received by customers . . . includ[ing] dropped calls, blocked calls, reduced voice quality, decreased data throughput, and an inability to locate an E-911 caller."⁷⁴

There is no engineering basis to conclude that opportunistic uses will protect the primary service – especially a mobile service – from adverse effects due to increased interference. As Sprint Nextel explained:

A critical factor that enables wireless operators to provide innovation and higher-speed broadband services is having a predictable and relatively noise-free RF environment. Many 3G and 4G technologies use adaptive modulation techniques that permit higher data rates to be transmitted when high signal-to-noise ratios (SNRs) are present. . . . The SNR can be impacted by a number of factors. For example, as users move away from a base station, the signal level that they receive decreases. Also, as users operate nearer to noise sources, the level of noise can increase.⁷⁵

Sprint Nextel added that operators have a limited ability to improve SNR levels. While they can add new base stations (which come with attendant tower siting delays and difficulties),⁷⁶ there are economic and engineering limits on how much can be done in a noise floor situation. Because of these challenges, controlling the noise (or interference) that is present on a frequency channel is critical if high broadband data rates, and the associated innovative services, are to be

⁷³ Clearwire Comments at 11.

⁷⁴ Verizon Wireless Comments at 135.

⁷⁵ Sprint Nextel Comments at 17-18.

⁷⁶ See *infra* Section IV.B.

ubiquitously offered to consumers.⁷⁷ Verizon Wireless confirmed, “[a]ny underlay operations, even at very low power levels, would undermine the performance and capacity of the wireless network.”⁷⁸ Commercial wireless providers use digital air interface technologies that adjust power levels on a near real-time basis so that they operate with the minimal power necessary for reliable operations. “Put simply, the advanced technologies that enable unlicensed devices to operate ‘in the noise floor’ are the same ones already being used by CMRS operators today to make the most efficient use of their licensed spectrum and provide the most robust level of service possible for their customers.”⁷⁹

The Commission’s Spectrum Policy Task Force attempted to use the interference temperature model to facilitate overlays and underlays, but the Commission ultimately found, along with the commenters, that it was not workable. The record in the *Interference Temperature* proceeding established that the effects of non-consensual secondary use in the commercial mobile wireless bands would be especially devastating. CTIA’s Reply Comments there summed up the record as follows:

The technical shortcomings with the Commission’s proposal would be particularly acute in CMRS bands, where systems are now designed to operate down to (and in some cases below) the noise floor. Excess capacity for [interference temperature]-based systems in CMRS bands simply does not exist. According to a Telcordia study referenced by Sprint, the Commission’s [interference temperature] proposal would result in a net reduction in spectrum efficiency in CDMA networks. Cingular and BellSouth observed that, “[b]y operating more efficiently, licensees push their technologies and their spectrum usage closer to the performance limits, which often means that the signal is

⁷⁷ *Id.*

⁷⁸ Verizon Wireless Comments at 134; *see also* Qualcomm Comments at 39-42.

⁷⁹ Verizon Wireless Comments at 134.

more sensitive to interference or degradation than a signal in a less sophisticated system.”⁸⁰

CTIA also noted a study demonstrating that “an increase of only 0.33 dB in the total cumulative system noise floor would cause ‘CDMA coverage [to] be reduced by as much as 32 percent in urban markets and 38 percent in rural markets,’ and ‘[t]he cell site capacity of the CDMA system would be reduced by as much as 61 percent,’ which would ‘entail as much as a 390 percent increase in capital and operating costs’ to achieve comparable performance.”⁸¹ In the last five years, mobile wireless providers have used their spectrum even more intensively and efficiently, and the harm would be of even greater consequence.⁸²

As CTIA already has shown, creating underlay or overlay rights for third parties in licensed spectrum would undermine the efficient use of spectrum by wireless providers and impose significant regulatory uncertainty into the auction process.⁸³ Forcing licensees to share their spectrum with unlicensed users will upset their expectations regarding what they bargained for at the auction – and will put bidders in future auctions on notice that the Commission feels free to diminish the value of what auction winners pay for, after the fact.⁸⁴ In such an environment, bidders will not be able to value spectrum in accordance with its highest and best use, and investors will be discouraged from investing in technologies reliant on exclusively licensed spectrum.

Indeed, Michael Katz commented that:

⁸⁰ Reply Comments of Cellular Telecommunications and Internet Association, ET Docket No. 03-237, at 3-4 (filed May 5, 2004) (footnotes omitted).

⁸¹ *Id.* at 4.

⁸² See generally CTIA Comments at 80-81.

⁸³ See e.g., Verizon Wireless Comments at 120 (“Evidence of the impact of regulatory stability on investment choices is most clearly illustrated by the Commission’s spectrum auctions, the success of which have frequently been contingent on the service rules established in advance of the bidding process.”).

⁸⁴ Such an action also would effectively modify the legal rights of existing licensees under their licenses by changing the practical utility of their licenses, which requires compliance with Section 316. See 47 U.S.C. § 316.

It is worth noting that the adverse consequences of mandatory sharing can be particularly acute when there is a high degree of marketplace uncertainty and investments are risky, such as with R&D projects. . . . In short, a regulatory policy that forces the investor to bear all of the risks of its investment project but socializes the benefits associated with that investment will have especially pernicious effects.⁸⁵

Such FCC-mandated sharing can have a distortionary impact on the incentives of providers to invest and innovate in their networks and additional spectrum sharing and spectrum use opportunities.⁸⁶

While the Commission should refrain from permitting non-consensual secondary use of spectrum in the CMRS bands – *i.e.*, underlay or overlay operations without the cooperation and consent of the primary licensee – a very different situation is posed by permissive secondary use. The commercial mobile wireless licensee’s bundle of rights, under an exclusive-use, flexible rights regime, includes the right to determine how and when its spectrum will be used by third parties. A licensee may engage in voluntary secondary market leases of access to its spectrum on defined terms, because that may lead to more efficient spectrum usage provided that the primary user is able to determine whether safeguards are sufficient to prevent likely adverse effects.⁸⁷ As Michael Katz has noted, “reliance on secondary markets and other economic incentives can be expected to lead to more efficient deployment of broadband wireless networks

⁸⁵ Michael L. Katz, Public Policy Principles For Promotion Efficient Wireless Innovation And Investment, at 58-59, attached to AT&T Comments.

⁸⁶ See Gerald Faulhaber and David J. Farber, Innovation In The Wireless Ecosystem: A Customer- Centric Framework, at 20-22, attached to AT&T Comments (Detailing the efficient use of spectrum by U.S. wireless carriers and the evolution of the MVNO market in which a market price has emerged and all wireless carriers have found in their interest to transact. “Intervening in this market by setting a zero price seems a totally unnecessary and highly distortionary regulatory intervention. . . . Should the FCC wish to mandate sharing of spectrum as a result of special pleadings at the expense of existing and future licensees and customers, there is no need to dress it up in the language of efficiency and innovation.”).

⁸⁷ See *id.* at 82-84.

and other new technologies than would creation of government-mandated underlay rights.”⁸⁸ Thus, usage can occur today where the primary user is not using the spectrum and has voluntarily placed the spectrum in the secondary market.

Google claims that “the Commission confirmed that 700 MHz licensees are not prohibited from conducting dynamic spectrum management techniques, including dynamic auctions,” and asks that the policy be extended to all licensees under the spectrum leasing rules.⁸⁹ It is true that the Commission held that licensees *may* employ dynamic spectrum management techniques as a general matter to the extent they conform to the existing flexible use and secondary market rules, but it did not rule on the permissibility of any particular technique, such as dynamic auctions.⁹⁰ The Commission found that “licensees and spectrum lessees may enter into a wide variety of dynamic spectrum leasing arrangements that enable users to share use of the licensed spectrum *based on the particular parameter and arrangements that the licensee and spectrum lessee(s) have agreed upon,*” but it denied Google’s request to mandate the use of particular techniques.⁹¹ The Commission emphasized that “[m]andating any particular dynamic spectrum management mechanism on a licensee may impose unanticipated or unnecessarily burdensome requirements on a particular licensee, including requirements for the network, and the devices deployed on it, that may not be consistent or appropriate for that licensee’s business model.”⁹² CTIA shares this view – secondary market policies should create

⁸⁸ Michael L. Katz, *Don’t Let Short-Term Reforms Interfere with Long-Term Policy Goals* at 19, *att. to Comments of CTIA*, ET Docket No. 03-237 (filed Apr. 5, 2004).

⁸⁹ Google Comments at 11.

⁹⁰ Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, *Second Report and Order*, 22 FCC Rcd 15289, 15378-80 (2007).

⁹¹ *Id.* at 15379 (emphasis added).

⁹² *Id.*, at 15380.

robust opportunities for efficient spectrum use but should not mandate particular commercial or technology outcomes.

Finally, the Commission should be cautious about deeming its existing interference standards “overprotective,” or removing adjacent channel protections deemed not “necessary,” without any technical analysis to support their contentions.⁹³ Instead, commenters in this proceeding demonstrate that the investment in infrastructure needed to bring mobile broadband to American consumers requires the certainty that protection from interference makes possible. As AT&T stated, “licensees would have significantly reduced incentives to invest fully in innovation if the fruits of those investments could be diminished by interference that degrades the quality of the resulting services.”⁹⁴ CTIA agrees that the Commission has properly adopted rules that, if enforced, help to avoid the risk that the quality and reliability of those services – and the incentives to make long-term investments needed to provide these services – could be degraded by permitting increased opportunities for interference.⁹⁵

IV. THE COMMISSION SHOULD GENERALLY MAINTAIN THE CURRENT SPECTRUM POLICY MANAGEMENT APPROACH BUT TAKE CERTAIN STEPS TO ADVANCE DEPLOYMENT AND OPPORTUNITIES FOR INNOVATION

A. Commercial Mobile Spectrum Use is Highly Efficient and Onerous Conditions Would Disrupt Today’s Marketplace

In its comments CTIA provided a global analysis of spectrum holdings and wireless usage to verify that U.S. wireless carriers are the most efficient users of spectrum worldwide.⁹⁶

⁹³ See Google Comments at 21, 24-25.

⁹⁴ See AT&T Comments at 59 (footnotes omitted).

⁹⁵ See *id.*

⁹⁶ See CTIA Comments at 21 (“The combination of highly efficient networks and advanced wireless devices has made U.S. carriers the most efficient users of spectrum worldwide – serving more consumers, with less spectrum, and for more minutes of use than any other country. With access to just 409.5 MHz of spectrum (which includes AWS and 700 MHz spectrum, much of which is not yet deployed, as well as 55.5 MHz of 2.5 GHz BRS spectrum), the U.S. wireless industry serves well over 270 million subscribers – more than 660,000 consumers per megahertz of

Thus, the Commission should place little credibility in those unsupported arguments that Commission policy must be reformed to address alleged warehousing or the need for more efficient use of the spectrum.⁹⁷ The nature of the commercial mobile wireless services market – intensely competitive and teeming with innovation – ensures that valuable spectrum is put to good use by the spectrum licensees or through the active secondary market. Indeed, as AT&T observes, the “existence of active secondary markets [] provides significant additional opportunities to bring innovations to the marketplace and the licensed CMRS bands are in fact the most intensively shared spectrum bands of all.”⁹⁸ Where spectrum “can be flexibly used and easily traded, then licensees will fully internalize the opportunity costs of holding spectrum without using it.”⁹⁹

As to spectrum inventory considerations, CTIA supports plans to review existing spectrum use as a means of identifying new allocations, such as the inventory contained in the Radio Spectrum Inventory Act introduced by Senators Kerry and Snowe and Congressmen Waxman and Boucher.¹⁰⁰ Even in the absence of legislation, NTIA and the Commission can and should begin an inventory and assessment of spectrum usage, with a goal of identifying significant additional spectrum allocations for licensed commercial wireless use. In contrast, it makes little sense to require, as Google proposes, that each wireless licensee submit and make

spectrum. Moreover, these 660,000 customers (per megahertz) also use their service at a much higher rate than our foreign counterparts.”).

⁹⁷ See Green Flag Comments at 3-4 (alleging that rules for PCS encourage warehousing of spectrum); Comments of the Enterprise Wireless Alliance, at 7-8 (filed Sept. 30, 2009) (calling for strict construction requirements).

⁹⁸ AT&T Comments at 58 (citing, among others, Spectrum Policy Task Force Report at 57 (“The Task Force does not agree with commenters that contend that making an exclusive licensee the access ‘gatekeeper’ (*i.e.*, requiring potential spectrum users to obtain licensee consent) will inhibit access by new technology. . . . If the rights afforded to licensees are sufficiently well-defined and flexible, and the secondary market mechanism is fast and efficient with low transaction costs, licensees will have ample incentive to negotiate with potential secondary users for such access”)).

⁹⁹ Mercatus Center Comments at 5.

¹⁰⁰ See Radio Spectrum Inventory Act, S.649, H.R. 3125, 111th Cong. 1st Sess (2009).

publicly available information including “the frequencies on which operations have been conducted; location and operating parameters of each transmitter; whether each transmitter operated continuously or intermittently; and spectrum occupancy measurements.”¹⁰¹ Indeed, Google posits no persuasive public policy rationale for such burdensome, commercially sensitive, and national security-threatening disclosure requirements. The proposal far exceeds the scope of the bi-partisan spectrum inventory legislation identified above and warrants no further consideration.

In addition, CTIA cautions that uncertainty regarding the recently adopted *Open Internet NPRM*¹⁰² likely will slow innovation in the mobile wireless ecosystem as companies balance whether investment in new technologies may be undermined by regulation of next generation network features (and the services they support).¹⁰³ CTIA urges the Commission to heed the words of Chairman Genachowski: “Communications technologies are complex and changing rapidly, nowhere more than mobile, and my time in business has convinced me that the last thing we want is *heavy-handed and prescriptive* regulation. Our goal is to empower innovators, not lawyers.”¹⁰⁴

Specifically, service providers and network manufacturers are concerned about the impact of any Commission network management action on their ability to compete and innovate

¹⁰¹ Google Comments at 7. Google seemingly has gathered some of this information already to support its Google maps application. See http://www.google.com/intl/en/press/annc/20071128_maps_mobile_my_location.html (last visited on Nov. 3, 2009).

¹⁰² See Preserving the Open Internet; Broadband Industry Practices, *Notice of Proposed Rulemaking*, FCC 09-93 (rel. Oct. 22, 2009) (“*Open Internet NPRM*”).

¹⁰³ See CTIA Comments at 92-95.

¹⁰⁴ Genachowski America’s Mobile Broadband Future at 7 (emphasis added).

in the marketplace.¹⁰⁵ MetroPCS, for example, highlighted that “[n]ot all wireless network uses are ‘neutral.’ Some consume inordinate amounts of bandwidth and [tie] systems up for inordinate periods of time.”¹⁰⁶ CTIA agrees with T-Mobile that instead of network management regulation, carriers “must have the flexibility to ensure that some users do not unduly undermine the broadband experience of others or interfere with the carrier’s ability to offer voice and critical emergency services.”¹⁰⁷ Rather than seeking to impose additional regulations on the wireless industry, the Commission should instead acknowledge that “wireless broadband faces the special challenge of providing a *shared* resource over *finite* spectrum.”¹⁰⁸ Other carriers noted the negative impact network neutrality rules could have on business relationships in the constantly-changing wireless ecosystem, which often are different than those typically found in other sectors.¹⁰⁹

Simply put, imposing network management obligations on wireless operators would hamper wireless innovation by denying operators the flexibility they need to manage their networks in a constantly-changing environment utilizing finite spectrum resources and close integration between network and device.

¹⁰⁵ See, e.g., AT&T Comments at 93 (“Without doubt, the increasingly uniform adoption of IP throughout wireless networks will create efficiencies and flexibility that may further promote innovation, because innovators can more easily design services that integrate voice, video, and data capabilities in a common, IP format. The flip side of that convergence, however, is that it *increases* the importance of active management of wireless networks to prevent congestion and to protect quality of service so that all services receive the appropriate network performance to meet their particularized needs.”) (emphasis in original); Verizon Wireless Comments at 165 (“It is axiomatic that, where there is no demonstrable market failure and/or consumer harm, there is no justification for regulation. It is likewise axiomatic that regulations adopted in the absence of market failure or regulations not narrowly tailored to redress identifiable harms only serve to impose costs, alter incentives, and distort competition to the detriment of consumers.”) (footnotes omitted); Qualcomm Comments at 48 (“Qualcomm can state now that [network neutrality] requirements, whatever they may be, should not be applied to wireless networks, which operate with limited capacity due to the limited bandwidth available to any wireless operator. Innovative devices, applications, and services get deployed on wireless networks every single day without such requirements.”).

¹⁰⁶ MetroPCS Comments at 31.

¹⁰⁷ T-Mobile Comments at 36.

¹⁰⁸ *Id.* (emphasis in original).

¹⁰⁹ See AT&T Comments at 109-110 (detailing Terms of Service limitations imposed on Kindle users by Amazon).

B. The Commission Can Take Steps to Further Wireless Broadband Deployment and Innovation

In its comments, CTIA highlighted a number of areas in which the Commission could take specific action to promote innovation and investment, including the issues of wireless infrastructure deployment, spectrum availability, equipment authorizations and Special Temporary Authorizations, and network management.¹¹⁰ A wide range of stakeholders commented in support of these positions, particularly in the area of wireless infrastructure deployment.¹¹¹ For example, U.S. Cellular urges the FCC to act on CTIA’s “shot clock” proposal because “[a]n adequate number of antenna towers remains the indispensable prerequisite to the achievement of all wireless public interest objectives.”¹¹² Google likewise calls on the Commission “to adopt proposals in the CTIA Petition to establish a ‘Shot Clock’ for local authorities to act on tower siting and wireless facility applications, and to clarify that zoning authorities may not deny an application of one provider because another wireless provider already has a presence in the area.”¹¹³

Similarly, carriers like T-Mobile point out that “current pole attachment regulations and practices hamper the expansion of wireless coverage in residential and suburban neighborhoods and impede the deployment of competitive backhaul facilities.”¹¹⁴ T-Mobile lays out five specific recommendations for pole attachment reform that will drive continued innovation and investment in the wireless marketplace.¹¹⁵ Google notes further that “the Commission should affirm its tentative conclusion to establish a unified rate for providers of broadband service (to be

¹¹⁰ See CTIA Comments at 84-96.

¹¹¹ See, e.g., Qualcomm Comments at 46-47; T-Mobile Comments at 28-30; Clearwire Comments at 15-16.

¹¹² Comments of United States Cellular Corporation, at 3 (filed Sept. 30, 2009).

¹¹³ Google Comments at 14.

¹¹⁴ T-Mobile Comments at 29.

¹¹⁵ See *id.*

set at a rate as low as possible for utility companies to receive just compensation), and establish that pole-tops are 'usable space' for wireless attachments.”¹¹⁶

By streamlining the tower siting process and reforming the pole attachment rules with limited but targeted regulatory action, commenters generally agree that “[r]apid action by the Commission in these specific areas will help competition and innovation expand in the wireless market without broader regulation.”¹¹⁷

CONCLUSION

For the foregoing reasons, CTIA encourages the Commission to account for the virtuous cycle of innovation and investment that regularly occurs in the mobile wireless ecosystem, to take care not to disrupt that investment and innovation, and take the steps identified above to advance the mobile wireless marketplace.

Respectfully submitted,

/s/ Brian M. Josef

Brian M. Josef
Director, Regulatory Affairs

Michael F. Altschul
Senior Vice President and General Counsel

Christopher Guttman-McCabe
Vice President, Regulatory Affairs

Robert F. Roche, Ph.D.
Vice President, Research

CTIA-THE WIRELESS ASSOCIATION[®]
1400 16th Street, NW, Suite 600
Washington, DC 20036
(202) 785-0081

¹¹⁶ Google Comments at 14. *See also* Comcast Comments at 18 (“The Commission should thus affirm that broadband providers have access rights to utility poles on reasonable, non-discriminatory terms. The Commission should also consider clarifying that wireless providers may place appropriate equipment on pole tops and cable strands.”).

¹¹⁷ T-Mobile Comments at 30.

November 5, 2009