

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

In the Matter of	)	
	)	
Inquiry Concerning the Deployment of	)	GN Docket No. 10-159
Advanced Telecommunications Capability to	)	
All Americans in a Reasonable and Timely	)	
Fashion, and Possible Steps to Accelerate	)	
Such Deployment Pursuant to Section 706 of	)	
the Telecommunications Act of 1996, as	)	
Amended by the Broadband Data	)	
Improvement Act	)	
	)	

**COMMENTS OF VERIZON AND VERIZON WIRELESS ON THE SEVENTH  
BROADBAND DEPLOYMENT NOTICE OF INQUIRY**

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## **I. INTRODUCTION AND SUMMARY.**

Broadband has been and is continuing to be deployed on a reasonable and timely basis throughout the United States. Today, the Commission's data establish that approximately 95 percent of the population has access to broadband. And continuing deployment financed by massive private investment (hundreds of billions of dollars over the last 10 years in wireline broadband, competing 3G and now 4G wireless broadband networks, and high-speed satellite service) is ongoing both to upgrade existing infrastructure and to extend broadband networks to even more Americans. There are some isolated areas where broadband has not yet been deployed, and it is possible that there is not currently a business case to deploy to a subset of the relatively small number of Americans that do not yet have access to broadband. But the Commission has confirmed time and again that broadband has already been deployed to the overwhelming majority of all Americans. It is not unreasonable, or surprising, that there is a relatively small number of Americans living in hard-to-reach areas where it is not yet economical to deploy. Going forward in this and the related National Broadband Plan proceedings, the Commission should focus its broadband policies on those few, isolated areas that are truly unserved and are unlikely to be reached by private investment in the near future.

The rollout of broadband networks and adoption of broadband services in this country has occurred at an unprecedented pace. In fact, in contrast to the vast majority of countries, most U.S. consumers have the choice of at least two wireline options for broadband Internet access service, in addition to multiple providers of 3G wireless Internet access and two satellite providers of broadband. And additional heavy private investments – nearly \$60 billion annually – to deploy broadband networks and to upgrade to next-generation capabilities is already well underway. Such investment is evident from increased deployment of robust fiber-based networks (such as Verizon's FiOS network), upgrades by cable to DOCSIS 3.0 technology, the

nascent rollout of 4G networks using LTE and WiMAX technologies, and increased capacity and speeds for satellite broadband technology.

Despite these clear and continuing successes, the Commission nonetheless found in its Sixth Broadband Deployment Report<sup>1</sup> that broadband deployment to “all Americans is not reasonable and timely.” It is difficult to reconcile that finding with the facts and section 706 itself. Regardless, the Commission’s determination that there is some gap in the reasonable and timely deployment of broadband cannot mean that broadband has not been deployed anywhere in a timely manner. Such an interpretation would not be credible since the Commission’s own data used for the Sixth Report indicate that broadband *has already been deployed* to the overwhelming majority of all Americans and plainly is in fact being upgraded in and deployed to even more areas right now. The Commission’s finding in the Sixth Report, therefore, must mean that there is some subset of the remaining 5 percent of the population that is unlikely to have access to broadband in the near future through private investment. While it is possible that the Commission might conclude broadband has not been deployed in a timely fashion to that relatively small subset of the population, the Sixth Report made little effort to actually identify areas that are unserved and unlikely to obtain service in a reasonable and timely period in any meaningful way. And, in any event, the Commission’s finding cannot have broad import given its obvious tension with the facts, the actual language of section 706, and the Commission’s own previous findings.

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<sup>1</sup> *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, Sixth Broadband Deployment Report, 25 FCC Rcd 9556 (2010) (“Sixth Report”).

The Commission's finding in the Sixth Report fundamentally misapprehends the task assigned by Congress. Indeed, the Commission created artificial roadblocks to a reasoned finding by relying on *older* data concerning the services subscribers purchased (as of 2008) and comparing that to a newly-minted and forward-looking benchmark that builds in anticipated *future* increases in demand for broadband capabilities (4 Mbps downstream and 1 Mbps upstream). Similarly, the new, future-looking lines drawn in defining which broadband services were being considered for these purposes had the effect of arbitrarily ignoring a substantial percentage of the services that consumers choose (and find useful) today – such as a DSL or cable modem service with upstream speeds that may be lower than 1 Mbps, 3G wireless services, and satellite broadband services – thus ignoring the true reach of the Nation's broadband infrastructure and of the services that consumers value. The Commission compounded these problems by applying questionable assumptions to the data that resulted in implausible conclusions. For example, the Sixth Report deemed entire counties as unserved notwithstanding evidence to the contrary.

The Commission should not repeat these mistakes in the Seventh Report. Indeed, as suggested by NCTA in its petition for reconsideration,<sup>2</sup> it should correct them and revisit its conclusions in the last report. The Commission should provide a more complete, realistic, and reasoned assessment of the status of broadband deployment, utilizing the output of the NTIA-directed broadband mapping initiatives (combined with data from the recently enhanced Form 477 data collection effort). The broadband availability map will be the output of intensive state-level, on-the-ground efforts performed at the behest of Congress to provide a detailed picture of our Nation's current broadband infrastructure. Given the promise of this data – which is the

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<sup>2</sup> National Cable & Telecommunications Association, Petition for Reconsideration (Aug. 19, 2010) (“NCTA Petition for Reconsideration”).

result of intensive efforts by the state-level mapping entities, industry, and other stakeholders – it is unnecessary and would be counterproductive to rely on the erroneous data and assumptions that provided the basis for the Sixth Report or to create burdensome new (and potentially conflicting) reporting obligations on the providers engaged in the mapping efforts. These forthcoming maps and data will provide the appropriate basis for determining which areas are served by broadband infrastructure and which are not.

To accomplish the broadband goals embodied in section 706, the Commission should also pursue regulatory policies that will encourage continued, robust investment in all types of broadband platforms. As a starting point, the Commission should confirm once and for all that IP-based services – i.e., those services that “ride over” the broadband networks that the Commission seeks to extend to all Americans – are inherently interstate services subject to the Commission’s exclusive jurisdiction. Reforms of existing regulations concerning pole attachments, increased availability of spectrum for wireless broadband services, and universal service reform are other prime candidates. To address those limited areas and populations in which the business case for private investment in broadband has not yet materialized, at a minimum, the Commission should “do no harm,” such as inappropriately and unlawfully reclassifying broadband Internet access services as Title II telecommunications services or imposing intrusive net neutrality regulation, based on the erroneous findings from the Sixth Report. Instead, it should reaffirm its commitment to encouraging investment in broadband infrastructure by limiting unnecessary regulation, and modifying existing regulatory obstacles to greater infrastructure investment.

By taking these steps as it approaches the Seventh Report, the Commission will not only produce a more accurate and useful analysis, but also can materially move the ball forward

towards achieving the preeminent national broadband goals set out in section 706 and reflected in the National Broadband Plan.<sup>3</sup>

## **II. BROADBAND HAS BEEN DEPLOYED TO ALL BUT A RELATIVELY SMALL NUMBER OF AMERICANS AND IS BEING DEPLOYED TO ADDITIONAL AREAS IN A REASONABLE AND TIMELY MANNER.**

The Commission had repeatedly found that broadband Internet access services are developing in a competitive manner, that the broadband marketplace is rapidly evolving, and that there are no signs of so-called “market failure.”<sup>4</sup> In fact, the Commission’s own data used for the Sixth Report indicate that approximately 95 percent of Americans already have access to wireline broadband networks.<sup>5</sup> The Commission’s findings have been fully supported by the evidence concerning the broadband marketplace, with intermodal broadband competition steadily increasing as traditional telephone companies, cable operators, wireless companies, and

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<sup>3</sup> See *Connecting America: The National Broadband Plan*, <http://download.broadband.gov/plan/national-broadband-plan.pdf> (2010) (“National Broadband Plan”).

<sup>4</sup> See, e.g., *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, Report and Order and Notice of Proposed Rulemaking, 20 FCC Rcd 14853, ¶ 44 (2005) (“*Wireline Broadband Order*”); *Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities*, Declaratory Ruling and Notice of Proposed Rulemaking, 17 FCC Rcd 4798, ¶¶ 44, 52-55 (2002) (“*Cable Modem Order*”); *United Power Line Council’s Petition for Declaratory Ruling Regarding the Classification of Broadband over Power Line Internet Access Service As an Information Service*, Memorandum Opinion and Order, 21 FCC Rcd 13281 (2006); *Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, 18 FCC Rcd 16978, ¶ 272 (2003); *Petition for Forbearance of the Verizon Telephone Companies Pursuant to 47 U.S.C. § 160(c)*, Memorandum Opinion and Order, 19 FCC Rcd 21496, ¶ 19 (2004).

<sup>5</sup> Sixth Report ¶ 1 (finding based on 2008 data that 14 to 24 million Americans, out of a total population of approximately 310 million [*see* U.S. Census Bureau, Data Finders, Population Clocks, <http://www.census.gov/>], did not have access to broadband); *compare with* National Broadband Plan at 20 (finding that “[t]oday, 290 million Americans—95% of the U.S. population—live in housing units with access to terrestrial, fixed broadband infrastructure capable of supporting actual download speeds of at least 4 Mbps.”) (citations omitted).

satellite providers have continued to make massive investments in new technologies such as fiber-to-the-premises, DOCSIS 3.0, 4G wireless services (including LTE and WiMax), and next-generation satellite broadband. Wireless 4G services in particular, with higher speeds and expanded capabilities, will provide a true third (and fourth, fifth, and sixth) broadband pipe into the home and result in even greater cross-platform competition. The evidence demonstrates that broadband deployment and competition are thriving – providers have made massive investments, consumers have benefitted from greater speeds and capabilities, and prices have declined.

**A. Wireline And Other Fixed Broadband Providers Aggressively Compete Against One Another.**

Since the Commission decided to free telephone company broadband services from legacy regulation, traditional telephone companies and cable providers have engaged in fierce competition to retain existing subscribers and gain new ones. By all indicators, competition among these rivals is strong and growing. First, these companies have made massive investments in their networks, with the result that cable modem services are available to at least (based on the best available data from 2008) 92 percent of all U.S. households and DSL to approximately 84 percent.<sup>6</sup> These providers are now pouring new investment dollars into upgrading these networks even further. Verizon itself has been investing approximately \$17 billion per year on its networks (more than \$80 billion total between 2004 and 2008) and recently reported that it remains on track to invest approximately that amount this year notwithstanding

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<sup>6</sup> See National Cable & Telecommunications Association, *Industry Data*, <http://www.ncta.com/Statistics.aspx> (cable modem availability as of June 2010) (last visited Sept. 7, 2010); Ind. Anal. & Tech. Div., Wireline Competition Bureau, FCC, *High-Speed Services for Internet Access: Status as of December 31, 2008*, [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-296239A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-296239A1.pdf), at Table 19 (Feb. 2010) (“FCC December 2008 High-Speed Internet Access Report”) (DSL availability as of December 31, 2008 to homes where ILECs offer telephone service).

the challenging economic climate.<sup>7</sup> As part of this, Verizon is investing more than \$23 billion to pass more than 18 million premises with its next-generation, all-fiber FiOS network, and has already passed more than 15.9 million of those premises as of the end of June 2010.<sup>8</sup> Other companies such as AT&T and Qwest also are deploying fiber-based broadband services to millions of households.<sup>9</sup> Each of the major cable operators is upgrading its network to DOCSIS 3.0 technology, with many already between two-thirds and 100 percent complete, and analysts expect the technology to be available to all cable homes passed by cable by 2013.<sup>10</sup> According to the Commission, wireline broadband providers made about \$48 billion in capital expenditures in 2008 and another \$40 billion in 2009, with broadband-specific investments of at least \$20 billion in 2008 and \$18 billion in 2009.<sup>11</sup> And, as discussed below, investment in next-generation wireless broadband networks adds tens of billions more to the mix.

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<sup>7</sup> See Verizon News Release, *Verizon Reports Strong Wireless, FiOS Customer Growth; Increased Enterprise Revenues; Strong Cash Flow in 2Q*, <http://newscenter.verizon.com/press-releases/verizon/2010/Verizon-Reports-Strong-Wireless-FiOS-Customer-Growth-Increased-Enterprise-Revenues-Strong-Cash-Flow-in-2Q.html> (July 23, 2010).

<sup>8</sup> See Verizon Investor Quarterly, *Second Quarter 2010*, <http://investor.verizon.com/financial/quarterly/vz/2Q2010/2Q10Bulletin.pdf>, at 8 (July 23, 2010).

<sup>9</sup> See FCC OBI Technical Paper No. 1, *The Broadband Availability Gap*, <http://download.broadband.gov/plan/the-broadband-availability-gap-obi-technical-paper-no-1-table-of-contents-exhibits-introduction.pdf>, Exhibit 2-K (Apr. 2010) (“Broadband Availability Gap Report”).

<sup>10</sup> See Jessica Reif Cohen, Bank of America/Merrill Lynch, *Battle for the Bundle: Best of Times... Worst of Times*, at Table 6 (Aug. 23, 2010) (expected DOCSIS 3.0 roll-out by YE2010); *Broadband Availability Gap Report* at 26. See also Rebecca Arbogast & David Kaut, Stifel Nicolaus, *Policy Day Takeaways: Targeted N.N. Bill Tough, Accord Possible; Spectrum Hot*, at 4 (June 28, 2010) (reporting near-term estimates of 90+% availability of DOCSIS 3.0).

<sup>11</sup> National Broadband Plan at 38.

In reliance on the Commission’s consistent, bipartisan policies of foregoing heavy-handed regulation of broadband networks and services, providers have made these multibillion dollar investments in response to competitive pressures and the real risk that they will lose subscribers to rivals. Investment by one competitor breeds investment by another. Time Warner, for example, has acknowledged that it is upgrading to DOCSIS in a targeted way as a direct response to Verizon’s deployment of FiOS.<sup>12</sup> As the Commission recognizes in its Broadband Plan, “competition appears to have induced broadband providers to invest in network upgrades.”<sup>13</sup>

Second, even as consumers have benefited from the higher speeds and greater capabilities of these networks, prices (particularly on a per megabit basis) have been *falling* over time – clear indication of a competitive marketplace.<sup>14</sup> The Bureau of Labor Statistics’ Consumer Price Index for Internet services fell by roughly *25 percent* over the last five years.<sup>15</sup>

Third, both telephone and cable companies have been engaged in aggressive marketing campaigns, including discounts and special offers. These advertisements regularly compare the provider’s own service to those of competitors both in terms of capabilities and features and price. *See* Topper Decl. ¶¶ 42-43. Verizon’s FiOS advertisements, for example, criticize cable

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<sup>12</sup> Transcript, TWC - Time Warner Cable, Inc. at Morgan Stanley Technology, Media & Telecom Conference at 11-12 (Mar. 1, 2010); *see also id.* at 7 (“I would say that there are going to be times where we [Time Warner and Verizon] trade innovative product sets back and forth. Something -- one day I will have something that they don’t have and vice versa.”).

<sup>13</sup> National Broadband Plan at 38.

<sup>14</sup> *See* Comments of Verizon and Verizon Wireless, *Preserving the Open Internet; Broadband Industry Practices*, GN Docket No. 09-191, WC Docket No. 07-52, at Attachment C, Decl. of Michael D. Topper, ¶¶ 35-36 (Jan. 14, 2010) (“Topper Decl.”) (See Attachment I).

<sup>15</sup> BLS, Consumer Price Index – All Urban Consumers, Series SEEE03: Internet services and electronic information providers, <http://data.bls.gov:8080/PDQ/servlet/SurveyOutputServlet;jsessionid=6230780901981e1c6623> (last visited Jan. 11, 2010).

broadband technology, and cable companies such as Comcast, Cox, and Time Warner have responded by specifically targeting FiOS in their advertisements. *See id.* ¶¶ 42-43. Such significant advertising expenditures would make no sense in the absence of a competitive marketplace.

Fourth, the vibrant competition is evident from the considerable and rising subscriber churn rates among wireline broadband providers. *Id.* ¶ 20. For example, Comcast reports that 65 percent of its new subscribers are switching from other Internet service providers.<sup>16</sup> According to one prominent analyst, cable broadband providers have experienced monthly churn rates of between 2.4 percent and 3.0 percent, equating to annualized churn rates of between 28.8 percent and 36 percent.<sup>17</sup>

Finally, in addition to fiber, cable, and DSL, there is additional broadband competition from a variety of sources. The United States is perhaps the only country in the world with at least two satellite broadband services widely available. *See Topper Decl.* ¶ 109. As the Commission recognized in the National Broadband Plan, these providers also are on the verge of substantial upgrades, and “[s]atellite broadband, as provided by next generation satellites that will be launched as early as 2011, meets [the National Broadband Plan’s] Broadband Availability Target requirements by offering a minimum speed threshold of 4 Mbps downstream and 1 Mbps” to virtually any consumer nationwide.<sup>18</sup>

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<sup>16</sup> Comments of Comcast, *Preserving the Open Internet: Broadband Industry Practices*, GN Docket No. 09-191, WC Docket No. 07-52, at 20 (Jan. 14, 2010)

<sup>17</sup> *See* Craig Moffett et al., Bernstein Research, *Broadband: Are We Reaching Saturation?*, at 4, Ex. 2 (Aug. 14, 2007). *See also* Amy Lind, IDC, *U.S. Consumer Broadband Services 2010-2014 Forecast*, at Table 1 (May 2010) (“Competitive churn is on the rise as new subscriber growth is increasingly driven by existing broadband subscribers switching from one provider’s service to another.”).

<sup>18</sup> *Broadband Availability Gap Report* at 89.

Fixed wireless broadband also is available in many locations, with the potential to reach many more at relatively low cost compared to the deployment of wireline facilities. *See* Topper Decl. ¶ 108. WISPA, which represents approximately 400 wireless ISPs, states that more than 2,000 wireless ISPs cover more than 2 million square miles in all 50 states, and that they provide broadband fixed wireless services to more than 2 million consumers and businesses, concentrated heavily in rural areas.<sup>19</sup> There is at least one fixed wireless broadband provider in all but one state (Delaware), and an average of 17 providers in the 43 states for which data are available.<sup>20</sup>

**B. Wireless Companies Have Expanded Into Broadband Services With The Advent Of 3G Services, And The Deployment Of 4G Services Will Bring Increased Cross-Platform Competition.**

Wireless broadband services, while still at their nascent stage, also are the subject of intense competition that has led to heavy investment by multiple competitors and speedy deployment of competing broadband networks and technologies. Competition for wireless broadband is evident even from just the number of competitors. The marketplace for wireless broadband service includes a wide range of providers, including the four national carriers, other facilities-based providers such as Clearwire, and numerous regional and smaller carriers. Topper Decl. ¶¶ 51, 69-72. In its most recent Wireless Competition Report, the Commission found that as of November 2009, 98 percent of the population had access to at least one mobile provider of

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<sup>19</sup> Comments of the Wireless Internet Service Providers Association, *Amendment of Part 90 of the Commission's Rules To Improve Interference Protection in the 3650-3700 MHz Band*, RM-11604, at 1-2 (July 6, 2010); Comments of the Wireless Internet Service Providers Association, *Preserving the Open Internet; Broadband Industry Practices*, GN Docket No. 09-191, WC Docket No. 07-52, at 1-2, (Jan. 14, 2010).

<sup>20</sup> FCC December 2008 High-Speed Internet Access Report at Table 20.

3G wireless broadband service, 90 percent had a choice of two or more mobile broadband providers, and 76 percent had a choice of three or more mobile broadband providers.<sup>21</sup>

As Verizon recently explained in great detail,<sup>22</sup> just the past year has seen the emergence of significant new competition from a variety of wireless providers that previously did not exist or were at best minor players. For example, as noted below, Clearwire has aggressively deployed 4G wireless broadband service and advertises it as a substitute for wireline offerings. Other providers such as Leap and Atlantic Tele-Network have dramatically expanded the scope of their offerings. And a variety of providers are likewise rolling out 4G services with capabilities that rival traditional wireline offerings and provide the added benefit of mobility.<sup>23</sup> Most recently, a new business venture called LightSquared has emerged as the “[f]irst-ever wholesale nationwide 4G-LTE wireless broadband network integrated with satellite coverage,” which plans to invest \$7 billion in a network that will “allow[] partners to offer terrestrial-only, satellite-only, or integrated satellite-terrestrial services to their end users.”<sup>24</sup> The Chairman has

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<sup>21</sup> *Implementation of Section 6002(B) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, Fourteenth Report, WT Docket No. 09-66, FCC 10-81, at 7 (May 20, 2010) (“14th CMRS Report”).

<sup>22</sup> *See Comments of Verizon Wireless, Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, WT Docket No. 10-133 (July 30, 2010) (“Verizon Wireless Competition Comments”).

<sup>23</sup> *See Comments of Verizon and Verizon Wireless, Framework for Broadband Internet Service*, GN Docket No. 10-127, at 69-72 (July 15, 2010) (“Verizon Broadband Framework Comments”).

<sup>24</sup> *See Press Release, LightSquared, Introducing LightSquared: Revolutionizing the U.S. Wireless Industry*, <http://www.lightsquared.com/press-room/press-releases/> (July 20, 2010).

lauded the agreement to create a “new nationwide 4G wireless broadband network,”<sup>25</sup> which commentators have noted will be a new competitor in the provision of mobile broadband services.<sup>26</sup>

Nothing in a recent report issued by the United States Government Accountability Office (GAO) regarding the wireless marketplace contradicts the facts demonstrating the robustly competitive nature of the American wireless industry.<sup>27</sup> The GAO Report reviewed mergers and acquisitions since 2000, finding that there are still more than 140 companies currently offering wireless service to the public and that no single carrier has more than one-third of the national market share. GAO Report at 7. Many of these providers offer wireless broadband services, and consumers are increasingly demanding Internet services on their mobile devices. *Id.* at 1 (noting that “consumers use their mobile devices for more than phone calls and text messages; devices are increasingly becoming a primary link to the Internet.”). Despite outlining some industry consolidation over the last 10 years, the GAO also reported that “consumers have [] seen benefits, such as generally lower prices, which are approximately 50 percent less than 1999

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<sup>25</sup> See Tim Warren & Yu-Ting Wang, *Nokia Siemens to Operate 4G Network for Harbinger*, *Communications Daily*, July 21, 2010, at 8.

<sup>26</sup> See, e.g., Varun Modi, *LightSquared Squares Competition*, *Headliner Watch*, <http://www.headlinerwatch.com/8108/lightsquared-squares-competition.htm> (July 20, 2010) (“The 4G market is facing a stiff competition with Verizon Wireless and Clearwire Corp facing another competitor in the Harbinger Capital Partners’ LightSquared, which announced a plan with Nokia-Siemens Networks of \$7bn.”); Peter Svensson, *LightSquared Will Make Broadband Wireless Access More Competitive*, *Christian Science Monitor*, <http://www.csmonitor.com/From-the-news-wires/2010/0721/LightSquared-will-make-Broadband-wireless-access-more-competitive> (July 21, 2010) (“LightSquared will launch a new wireless broadband network that aims to provide competition to the incumbent phone companies”),.

<sup>27</sup> GAO, *Report to Congressional Requesters, Telecommunications: Enhanced Data Collection Could Help Better Monitor Competition in the Wireless Industry*, GAO-10-779, <http://energycommerce.house.gov/documents/20100826/GAO-10-779.Report.July.2010.pdf> (July 2010) (“GAO Report”).

prices, and better coverage.” *Id.* at i. Further, the GAO noted that “national figures can sometimes mask the regional strength of some smaller carriers, according to one carrier with whom we spoke.” *Id.* at 11.

In addition to the growing number of competitors for facilities-based wireless broadband services, competition among wireless broadband services also is evident on every other dimension.<sup>28</sup> The robust level of investment in 3G wireless networks further demonstrates the competitiveness of this marketplace and the success of current policies. CTIA reports that by the end of 2009, wireless providers had made more than \$285 billion in cumulative capital investments, including an annual average of approximately \$22.8 billion per year from 2001 through 2008.<sup>29</sup>

Wireless providers are now in the midst of making billions of dollars of additional investments to deploy fourth generation wireless technologies such as LTE and WiMAX. Competition will only be increased by the emergence of these 4G services, which, at anticipated typical speeds of 5-12 Mbps and peak download speeds as high as 50-60 Mbps for at least some networks, are comparable to many of the fixed broadband options that consumers use today and

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<sup>28</sup> The fierce competition among wireless providers over pricing, devices, applications, service plans and other measures are described in Verizon Wireless’ recent comments on wireless competition. *See* Verizon Wireless Competition Comments; *see also* GAO Report at 24 (reporting falling prices generally in the wireless sector).

<sup>29</sup> *See* Comments of CTIA – The Wireless Association, *Framework for Broadband Internet Service*, GN Docket No. 10-127, at 21-22 (July 15, 2010) (excluding investments at FCC auctions to acquire spectrum licenses).

sufficient for the average user.<sup>30</sup> In 2008, Verizon Wireless invested over \$9 billion for spectrum in the 700 MHz auction, and it will initiate commercial LTE service with coverage to approximately 100 million people in up to 30 markets during this year, and expects to provide coverage to its entire 3G footprint by the end of 2013.<sup>31</sup> AT&T will be starting LTE trials this year, with commercial deployment beginning in 2011.<sup>32</sup> Sprint now offers 4G to 48 markets and plans to bring service to multiple additional markets including Boston, Los Angeles, New York, and Miami during this year.<sup>33</sup> Indeed, Sprint has access to so much spectrum that its CEO has suggested that it could deploy infrastructure to offer 4G services over *both* WiMAX and LTE.<sup>34</sup> Clearwire has launched 4G service in at least 49 markets and plans to cover 120 million people

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<sup>30</sup> Topper Decl. ¶¶ 97-98; Reply Comments of Verizon and Verizon Wireless, *Preserving the Open Internet; Broadband Industry Practices*, GN Docket No. 09-191, WC Docket No. 07-52, at Attachment C, Reply Decl. of Michael D. Topper, ¶ 13 (Apr. 26, 2010) (“Topper Reply Decl.”) (See Attachment II); Marguerite Reardon, Verizon Expects 4G Launch Next Year, *cnet reviews*, [http://reviews.cnet.com/8301-13970\\_7-10166622-78.html](http://reviews.cnet.com/8301-13970_7-10166622-78.html) (Feb. 18, 2009) (“In its initial trials, Verizon says that it has demonstrated peak download speeds of around 50Mbps to 60Mbps.”).

<sup>31</sup> Topper Decl. ¶ 65; Verizon Wireless, Verizon Wireless LTE Network, <https://www.lte.vzw.com/AboutLTE/VerizonWirelessLTENetwork/tabid/6003/Default.aspx>.

<sup>32</sup> Topper Decl. ¶ 66; AT&T Investor Briefing, [http://www.att.com/Investor/Financial/Earning\\_Info/docs/1Q\\_10\\_IB\\_FINAL.pdf](http://www.att.com/Investor/Financial/Earning_Info/docs/1Q_10_IB_FINAL.pdf), at 5 (Apr. 21, 2010),.

<sup>33</sup> News Release, Sprint, Sprint Launches 4G Coverage in Delaware, Florida and Michigan and Extends 4G Coverage in California, [http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle\\_newsroom&ID=1454813&highlight=](http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1454813&highlight=) (Aug. 2, 2010) (last visited Sept. 7, 2010).

<sup>34</sup> Andrew Parker & Paul Taylor, Sprint’s 4G Move Opens Way to Merger, *Financial Times* (July 12, 2010).

in 80 markets by the end of this year.<sup>35</sup> Cable companies such as Comcast and Time Warner have already begun to resell Clearwire's 4G service in more than 20 markets.<sup>36</sup> Regional wireless providers are also upgrading. MetroPCS, for example, plans to begin deployment of its LTE network in the second half of this year.<sup>37</sup>

Moreover, wireless providers already are advertising their 4G services as wireline replacements. Clearwire, for example, advertises its 4G WiMAX service as "a wireless alternative to DSL or cable internet service," and one of its officers recently noted that "roughly half the customers come on and use it [Clearwire's services as an] overall as a replacement to whatever it is that they were having before, which is a combination usually of DSL or cable broadband." (Topper Reply Decl. ¶¶ 14, 16.) The Department of Justice has stated that "[e]merging fourth generation ("4G") services may well provide an alternative sufficient to lead a significant set of customers to elect a wireless rather than wireline broadband service."<sup>38</sup> The

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<sup>35</sup> News Release, Clearwire Brings CLEAR4G to Stockton and Modesto, <http://newsroom.clearwire.com/phoenix.zhtml?c=214419&p=irol-newsArticle&ID=1454819&highlight=> (Aug. 2, 2010) (last visited Sept. 7, 2010); News Release, Clearwire Reports Strong Second Quarter 2010 Results, <http://newsroom.clearwire.com/phoenix.zhtml?c=214419&p=irol-newsArticle&ID=1456460&highlight=> (Aug. 4, 2010) (last visited Sept. 7, 2010); Topper Decl. ¶ 69; Topper Reply Decl. ¶ 6.

<sup>36</sup> Topper Decl. ¶¶ 70, 101; Topper Reply Decl. ¶ 6; News Release, Comcast Launches High-Speed Wireless Data Service in Philadelphia, <http://www.comcast.com/About/PressRelease/PressReleaseDetail.ashx?PRID=935> (Nov. 4, 2009) (last visited Sept. 7, 2010); Time Warner Cable, 4G Benefits, <http://4gactivation.timewarnercable.com/benefits.html>.

<sup>37</sup> Topper Decl. ¶ 71; News Release, MetroPCS Reports Second Quarter 2010 Results, <http://investor.metropcs.com/phoenix.zhtml?c=177745&p=irol-newsArticle&ID=1456731&highlight=> (Aug. 5, 2010) (last visited Sept. 7, 2010).

<sup>38</sup> Ex Parte Submission of the United States Department of Justice, *Economic Issues in Broadband Competition; A National Broadband Plan for Our Future*, GN Docket No. 09-51, at 8 (Jan. 4, 2010) ("*DOJ Broadband Ex Parte*").

Department of Justice also recognized that “the fact that some customers are willing to abandon the established wireline providers for a wireless carrier suggests that the two offerings may become part of a broader marketplace.”<sup>39</sup> Indeed, even the research director of Free Press was recently quoted as acknowledging that “many consumers are starting to use wireless and it could be a viable alternative to wireline.”<sup>40</sup>

A recent survey also suggests that “low-income groups are the fastest adopters of the mobile Web, showing an opportunity that wireless technology could play in helping to bridge a digital divide.”<sup>41</sup> As with voice telephony, in which wireless services initially were a complement to wireline services but have now become a common replacement as increasing numbers of consumers “cut the cord,”<sup>42</sup> the rollout of 4G will make wireless broadband a clear competitive alternative to wireline service and force those wireline providers to respond in terms of price, capabilities, or other attributes to counter the advantage of mobility.

### **C. Broadband Deployment Continues To Advance At A Reasonable And Timely Pace.**

The intense and growing intermodal competition for both wireline and wireless broadband services is the best evidence that broadband infrastructure is being deployed in a

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<sup>39</sup> *Id.* at 10.

<sup>40</sup> “Google-Verizon Recognizes That Wireless Is Different, Tauke Says,” *Comm. Daily* (Aug. 25, 2010).

<sup>41</sup> Cecilia Kang, *Pew: Blacks, Hispanics Among Biggest Users of Wireless Web*, *Wash. Post*, [http://voices.washingtonpost.com/posttech/2010/07/minorities\\_low-income\\_homes\\_mo.html](http://voices.washingtonpost.com/posttech/2010/07/minorities_low-income_homes_mo.html) (July 7, 2010).

<sup>42</sup> GAO Report at 14 (noting that “the number of adults living in households with only wireless telephone service has increased from less than 5 percent in 2003 to nearly 23 percent in 2009”).

reasonable and timely fashion. The Commission’s own maps also show that the country is blanketed with competing fixed and wireless broadband networks, with only isolated pockets lacking broadband.<sup>43</sup> All of this deployment contributes to robust access to broadband by approximately 95 percent of Americans.<sup>44</sup>

Similarly, a recent survey conducted by the Pew Internet and American Life Project confirmed that lack of access to broadband facilities is far down the list today of those factors preventing more widespread adoption of broadband Internet access services. The survey found that two-thirds of American adults now use broadband Internet access connections at home.<sup>45</sup> For the 21 percent of American adults who do not use the Internet, only 6 percent of those non-users cite lack of availability as the reason. *Id.* at 11. In contrast, 48 percent of non-users – eight times as many – point to the lack of relevance to their lives as the reason; 18 percent – three times as many – cite usability concerns; and 12 percent – or twice as many – indicate that the lack of a computer is the main reason for not subscribing. *Id.*

### **III. THE SIXTH REPORT INCLUDED FLAWED LEGAL AND FACTUAL ANALYSIS THAT SHOULD BE CORRECTED GOING FORWARD.**

Section 706 calls on the Commission to determine “whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion.”<sup>46</sup> In conducting its section 706 analysis for the Sixth Report, the Commission made

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<sup>43</sup> FCC December 2008 High-Speed Internet Access Report at 7.

<sup>44</sup> Sixth Report ¶ 1.

<sup>45</sup> Pew Internet & American Life Project, “Home Broadband 2010,” <http://www.pewinternet.org/Reports/2010/Home-Broadband-2010.aspx>, at 2 (Aug. 11, 2010) (“Pew Home Broadband 2010”).

<sup>46</sup> 47 U.S.C. § 1302(b).

several legal and factual errors. The Commission should revisit its approach to the section 706 inquiry and should avoid making the same mistakes going forward.

**A. The Commission Misinterpreted The Statutory Standard.**

The Commission’s approach to the Sixth Report minimizes or ignores crucial parts of the test set out by Congress. First, the Commission did not even attempt to reconcile its approach in the recent report with the statutory “is being deployed” language – a progressive tense formulation that plainly contemplates a forward-looking, ongoing effort. Instead, the Commission focused solely on whether the ultimate goal of universal availability had already been satisfied (as of the two-year-old data on which the Commission was relying).

Second, the fact that some customer *somewhere* in the country does not have access to broadband is not a basis for finding that the section 706 goal has not been met *anywhere* in the nation. While the Commission concluded that the phrase “all Americans” establishes “the goal of universal broadband availability for every American,”<sup>47</sup> it is unreasonable to treat that laudable aspiration as a basis to conclude that broadband is not in fact being deployed in a reasonable and timely manner everywhere.

Finally, the Commission’s approach effectively writes out of the statute the final six words of the inquiry – “in a reasonable and timely fashion.” Particularly when coupled with the phrase “is being deployed” that precedes it, this phrase evinces an intent for a reasoned analysis of the ongoing deployment of broadband in light of relevant circumstances. Instead of providing such an analysis, however, the Commission effectively excised the phrase from the inquiry by making a negative finding based entirely on its conclusion that a small minority of Americans continue to lack broadband access. To be sure, the Commission acknowledges the existence of this phrase in a footnote, and suggests that it interprets it “as calling for broadband to be made

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<sup>47</sup> Sixth Report ¶ 28 n.119.

available as soon as possible assuming all reasonable steps are taken.” *Id.* Aside from this passing footnote reference, however, the Commission makes no effort to explain why “in a reasonable and timely manner” either has no meaning for purposes of the analysis required by section 706 or, alternatively, necessarily means “now” and “everywhere.”

In its next report – and even on reconsideration of its last one<sup>48</sup> – the Commission should adjust course and instead provide the more realistic, reasoned analysis required by section 706. The plain language of section 706 acknowledges that the deployment and upgrade of America’s broadband infrastructure will be an ongoing – likely never-ending – process. At a minimum, the Commission should more expressly limit any negative findings under section 706 to those few areas (covering less than 5 percent of the population) that remain truly unserved today and are unlikely to be reached by private investment in the near future.

**B. The Commission’s Negative Finding In Its Recent Report Was Based On A Combination Of Outdated Data And An Arbitrary Forward-Looking Broadband Benchmark.**

The Commission not only misinterpreted the statute and answered the wrong question in its Sixth Report, but it then compounded that error in significant ways as it applied its reformulated test. Most significantly, the Commission’s analysis relied on a mismatch of outdated broadband subscribership data from 2008 with a new “benchmark” for broadband that it just now adopted and that was expressly designed to be forward-looking and take into account likely increased consumer speed demands for several years into the future. In other words, the Commission’s negative finding is based on the fact that *some* Americans did not have access *two years ago* to a level of broadband service that admittedly exceeds typical demands even today, and that will likely not be required by most consumers for several more years. In doing so, the Commission did not take into account increases in broadband availability or speed that have

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<sup>48</sup> See NCTA Petition for Reconsideration.

taken place over the last two years, and applied various other untested assumptions that exaggerated the likely scope of remaining “unserved” areas. As it prepares the Seventh Report, the Commission should correct these significant errors.

**Outdated and Incomplete Data.** To begin with, the Commission erred by relying almost exclusively on outdated Form 477 data as of December 2008 in reaching its conclusion about the level of broadband adoption (and by extension, its conclusion concerning broadband deployment and availability). The Commission relied on this older subscribership data, notwithstanding the fact that two additional rounds of Form 477 data had already been submitted to the Commission in advance of the report, reflecting subscribership levels as of June and December 2009.<sup>49</sup> As NCTA points out in its recent petition for reconsideration, many significant areas deemed unserved based on the 2008 data and the Commission’s various assumptions applied to that data – including populous counties such as “Mecklenburg County, North Carolina (population 890,000), Wake County, North Carolina (population 866,000), Richland County, South Carolina (population 364,000), and Lexington County, South Carolina (population 249,000),” just to provide four examples from two states – all have widespread access to broadband services that satisfy the new broadband “benchmark.”<sup>50</sup> Indeed, given the tens of billions of dollars of annual private capital investment by broadband providers but also billions of dollars of federal stimulus funding specifically targeted at unserved areas, it would be surprising if the “availability gap” had not significantly shrunk over the course of the last two years. Although some “lag” is inevitable in any data set that the Commission uses, under these

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<sup>49</sup> Last week a third round of Form 477 data was released. See Ind. Anal. & Tech. Div., Wireline Competition Bureau, FCC, *High-Speed Services for Internet Access: Status as of June 30, 2009*, [http://www.fcc.gov/Daily\\_Releases/Daily\\_Business/2010/db0902/DOC-301294A1.pdf](http://www.fcc.gov/Daily_Releases/Daily_Business/2010/db0902/DOC-301294A1.pdf) (Sept. 2010).

<sup>50</sup> NCTA Petition for Reconsideration at 3.

circumstances and given the more recent data that was already available to the Commission, its analysis in the recent report was at least incomplete, if not affirmatively misleading.

In future reports, the Commission should use the most up-to-date data at its disposal, including the most recent Form 477 filings and updated data resulting from the state-level broadband mapping initiatives. Each of those data sources will be updated every six months on a coordinated schedule, thus eliminating any need to rely on two-year-old data in the context of a dynamic marketplace. The Commission should also take into account factors – such as continued investment and deployment or changes in public broadband funding – likely to have resulted in any substantial changes in the level of broadband deployment since the last data collection effort. Only by taking these steps can the Commission and other policymakers and stakeholders have confidence in the Commission’s analysis and conclusions.

**Erroneous Use of New Speed Benchmark.** In addition to relying on outdated subscribership data, the Commission also erred by testing outdated data from 2008 against its newly adopted, forward-looking broadband “benchmark” of 4 Mbps downstream and 1 Mbps upstream. The Commission’s OBI Technical Report that provides the basis for the new benchmark, however, confirms that this new standard does not provide an appropriate measuring stick for 2008 subscribership or the adequacy of current broadband infrastructure to meet even today’s demand.<sup>51</sup> That recent paper expressly set out to establish a “forward-looking” standard, rather than a standard that reflects typical consumers’ current demands, much less those from two years ago. *Id.* at 16. The paper states that the new benchmark “represents a speed *significantly higher* than what the typical residential customer consumes today (approximately 1 Mbps downstream and 250 kbps upstream), and a speed sufficient to stream high quality video

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<sup>51</sup> See Broadband Availability Gap Report.

from commonly used websites and services.” *Id.* at 17. The Commission’s paper likewise shows that – given historical trends showing rapid increases in available speeds over time – it was inappropriate to use this forward-looking standard to analyze years-old subscribership data. The paper confirms that there has been an “historical 20% annual growth in advertised subscription speeds,” thus indicating that many areas that may not have had services fast enough to meet the “benchmark” in 2008, likely have services that meet that standard today.<sup>52</sup> *Id.* at 16. In other words, as the Commission’s own analysis underlying the new benchmark shows that applying this standard for purposes of assessing 2008 broadband availability was inappropriate and set an unreasonably high bar in light of prevalent consumer demand characteristics and the increases in available speeds that likely have occurred since 2008.

Another aspect of the Commission’s mode of analysis that artificially increased the number of areas deemed “unserved” is the 1 Mbps upstream requirement to satisfy the new broadband “benchmark.” The Commission’s own technical paper acknowledges that typical upstream demand by today’s consumers is approximately 250 kbps, *id.* at 17, but the Commission set a benchmark that was four times as high without any explanation. Then in the Sixth Report, the Commission applied that artificially inflated benchmark in a way that would treat millions of broadband connections that consumers subscribed to in 2008 as not being good enough to satisfy the section 706 test. This is significant because many broadband services –

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<sup>52</sup> The paper also acknowledged that “data suggest that people do not generally use the full capacity of their broadband connections, so growth in actual demand could be less than 20%.” *Id.* Nonetheless, speeds for all services continue to increase. *See, e.g.,* Verizon, News Release, *Verizon [DSL] High Speed Internet Now Available at 10 to 15 Megabits per Second*, <http://newscenter.verizon.com/press-releases/verizon/2010/verizon-high-speed-internet.html>, at 2 (Aug. 30, 2010) (“The new 10 to 15 Mbps [DSL] speed tier is the latest addition to Verizon’s existing suite of High Speed Internet speeds – 4 to 7 Mbps, 1.5 to 3 Mbps’ and 768 kilobits per second to 1 Mbps downstream for consumers, as well as similar business packages.”).

including many traditional DSL and cable modem services, in addition to 3G wireless services – offer upstream speeds that are less than 1 Mbps, even though they are still well above today’s typical consumer demands. For example, upstream speeds of 512 kbps or 768 kbps are still quite common and are two or three times the capacity that the Commission itself recognizes the typical user demands. Yet the Commission’s approach ignores these services and deem these millions of American consumers to be entirely “unserved.”

The Commission should avoid such errors going forward by placing less emphasis on arbitrary lines or speed definitions and instead focus more attention on collecting and analyzing useful data that reflects changes in the marketplace over time and the ability of existing broadband infrastructure to meet consumers’ current demands. Indeed, the Commission’s current practice of collecting data concerning a wide range of “speed tiers” – currently 72 of them, reflecting combinations of upstream and downstream speeds – already allows that type of analysis. Likewise, the state-level broadband mapping initiative will provide similar, detailed information about the ranges of speeds that are available to consumers. Such data will allow the Commission to monitor the changing capabilities of broadband networks over time, and the ability of those networks to satisfy consumers’ evolving demands.

**Additional, Unwarranted Assumptions.** In addition to these errors, the Commission also applied several arbitrary assumptions that create additional uncertainty about the findings in the Sixth Report. For example, the Commission provides no reasoned explanation for its “de minimis” test that treated entire counties as unserved based on the subscribership numbers that – as explained above – were themselves artificially low. While subscribership data provides some evidence concerning the location of broadband deployment (or lack thereof), the Commission should not assume that relatively low penetration based on a relatively high broadband speed

target necessarily means that large geographic areas are unserved. This is particularly true given that the subscription data itself excluded services that consumers chose to purchase in 2008 but that did not satisfy the new “benchmark,” even if higher speed services may have been available in those areas but consumers made different purchasing decisions. For example, it would not be surprising, given the Commission’s own findings concerning today’s typical usage patterns, to find that large numbers of subscribers found services with upstream speeds of 768 kbps to be sufficient for their needs, even if they could also choose to subscribe to more expensive and higher speed services.

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As all of this shows, the Commission’s analysis in the Sixth Report was flawed for reasons both legal and factual. As the Commission prepares its next report, it should engage in the more realistic and reasoned analysis required by section 706. Fortunately, as discussed below, the data that will soon be made available as a result of state-level mapping efforts under the auspices of the NTIA broadband mapping program will make the Commission’s task easier in future reports.

**IV. A MORE COMPLETE AND ACCURATE ANALYSIS WILL BE POSSIBLE GIVEN RECENT AND SOON-TO-BE AVAILABLE DATA CONCERNING BROADBAND DEPLOYMENT AND ADOPTION.**

As the Commission prepares its next Broadband Deployment Report, it has the opportunity to significantly improve the accuracy and utility of its report, and to provide substantially improved analysis concerning the current status of the Nation’s broadband infrastructure. Moreover, the Commission has the opportunity to do so – and to overcome many of the limitations of past reports or gaps in previous data collection efforts – based on efforts that are already well underway, most notably including the state-level broadband mapping being administered by NTIA. The Commission should make full use of these data collection

initiatives, rather than undermining them or overburdening providers with redundant or conflicting requirements.

**A. State-Level Broadband Mapping Promises The Best Source For Data.**

Most significantly, Congress' decision to fund state-level broadband mapping efforts should result in detailed and accurate data, directly responsive to the section 706 inquiry. Verizon has long supported state-level mapping efforts – particularly those conducted using the public-private partnership approach – as the best and most efficient way to obtain granular information about the availability and status of broadband infrastructure. Congress also recognized the benefits of this state-level, cooperative approach when it adopted the Broadband Data Improvement Act (BDIA) in 2008, creating a grant program to encourage these initiatives across the country. As part of last year's American Recovery and Reinvestment Act of 2009 (Recovery Act), Congress provided \$350 million to fund these mapping projects – a step that has accelerated the proliferation of state-level broadband mapping and that will provide detailed information about a wide range of supply- and demand-side factors affecting broadband. Consistent with the requirements of the BDIA and the Recovery Act, the output of these efforts also will be rolled up into a comprehensive, detailed, national broadband map by NTIA no later than February 2011 – just a few months from now – thus providing a ready and useful source of information from which the Commission and other policymakers can draw in assessing the progress of the broadband marketplace. In fact, some states' maps are already available to consumers and policymakers.<sup>53</sup>

NTIA's mapping program requires state-level mapping initiatives to quickly collect vast amounts of granular data (including address-specific data) concerning, among other things, the

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<sup>53</sup> See, e.g., Connected Texas, [www.connectedtx.org](http://www.connectedtx.org).

availability and adoption of broadband services; available speeds; and technologies being used to serve consumers.<sup>54</sup> This granular data will provide more than enough information for the Commission to perform the inquiry required by section 706, particularly when viewed together with the substantial amount of data that the Commission already receives through the Form 477 process. The first iteration of a national broadband map will be available in February, and the underlying maps and data will continue to be updated every six months for five years from the date of the initial data collection.

The mapping efforts underway in each of the states are massive undertakings that will yield tremendous amounts of information about the broadband marketplace. Indeed, while much of the product of state-level initiatives will be available to the public at large – including the detailed broadband availability map – the NTIA program is designed to ensure that the Commission is able to take full advantage of these efforts. In fact, NTIA took steps in setting up the program to ensure that the Commission could benefit from the resulting data. The Notice of Funding Availability (NOFA) provides that “awardees will submit all of their collected data to NTIA for use by NTIA and the Federal Communications Commission (FCC) in developing and maintaining the national broadband map,” and further provides that the “data collection under this Program will be used for public purposes and also utilized by governmental entities” including the Commission. *Id.* at 5, 7. The state-level initiatives also “agree[d] to cooperate with NTIA and the FCC’s national broadband mapping efforts.” *Id.* at 39. NTIA also made clear that it could provide even confidential information to the Commission, provided that the Commission protect that information consistent with applicable law and precedent. *Id.* at 21.

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<sup>54</sup> NTIA, State Broadband Data and Development Grant Program, Notice of Funds Availability and Solicitation of Applications, 74 FR 32545 (July 8, 2009) (“NTIA Mapping NOFA”).

The Commission should rely on the national broadband map and the other data collected by the state-level entities for purposes of its next report.

**B. The New Form 477 Collection Also Furnishes Considerable Data.**

The Commission's existing Form 477 collection process also provides the Commission with a wide array of data concerning the broadband marketplace. As the Commission is aware, it substantially revised its "Form 477" broadband data reporting process just two years ago, and those revisions – reflected in the data submitted for the last three collection periods – also provide the Commission and other policymakers with mountains of granular data about the broadband marketplace.<sup>55</sup> Among other things, the recently revised Form 477 requires all broadband providers to report the number of broadband connections in service in each census tract as well as the technology and speed tier associated with those connections. Providers must also provide an estimated break-down between residential and business customers at that level. *Id.* ¶¶ 10-18. At the same time, the Commission increased to 72 the number of "speed tiers" that are now tracked on the Form 477, and included both upload and download speeds in defining these tiers. *Id.* ¶¶ 19-22. And the Commission further amended the Form 477 to provide additional information about mobile wireless broadband services and VoIP services. *Id.* ¶¶ 23-31.

As the Commission continues to work through and revise the process of collecting and analyzing this data it promises to provide a wealth of useful information concerning the broadband marketplace, including where broadband services are offered, what services are

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<sup>55</sup> See *Development of Nationwide Broadband Data to Evaluate Reasonable and Timely Deployment of Advanced Services to All Americans, Improvement of Wireless Broadband Subscriber Data, and Development of Data on Interconnected Voice over Internet Protocol (VoIP) Subscriber Data*, Report and Order and Further Notice of Proposed Rulemaking, 23 FCC Rcd 9691 (2008).

consumers subscribe to, and how the speeds of those services and technologies used to provide them evolve over time.

**C. Consumer Surveys Provide Useful Insights, But Must Be Used With Caution.**

Section 706 requires the Commission to conduct an annual survey of consumers concerning their broadband services, and doing so can produce certain useful information concerning the overall broadband marketplace. As noted above, for example, the recent Pew survey again showed that issues such as lack of perceived relevance, lack of computer literacy or other “usability” considerations, and lack of computer ownership are far and away the most significant reasons that non-users of the Internet do not subscribe.<sup>56</sup> In contrast, among American adults who do not use the Internet only 6 percent cited lack of access to broadband as the primary factor.<sup>57</sup>

Consumer surveys can also help provide useful qualitative information concerning the broadband marketplace and the issues of most concern to consumers. For example, notwithstanding the gloom-and-doom portrayal of some pro-regulatory activists concerning the American broadband marketplace, the Commission’s own survey also revealed that 91 percent of American broadband subscribers report being “very” or “somewhat” satisfied with the speed of their broadband service at home.<sup>58</sup>

For certain other purposes, however, consumer surveys are not as useful and the Commission should exercise caution in relying on them. Consumers’ self-reporting of the speed

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<sup>56</sup> Pew Home Broadband 2010 at 3.

<sup>57</sup> *Id.* at 11.

<sup>58</sup> See John Horrigan and Ellen Satterwhite, Omnibus Broadband Initiative, FCC, Americans’ Perspectives on Online Connection Speeds for Home and Mobile Devices, [http://www.fcc.gov/Daily\\_Releases/Daily\\_Business/2010/db0601/DOC-298525A1.pdf](http://www.fcc.gov/Daily_Releases/Daily_Business/2010/db0601/DOC-298525A1.pdf), at 1 (June 2010).

tiers of the services to which they subscribe or the speeds that they experience at home, for instance, are likely to be very unreliable. Many consumers who use online speed tests are not likely to understand the varied factors – often unrelated to their provider – that can affect achieved speeds. There is also likely to be a self-selection bias, leading a disproportionate number of unsatisfied customers to pay attention to such things or to test their speeds at the sites provided by the Commission.

**D. Additional Modeling Data Is Unnecessary And Of Little Benefit In This Context.**

In the Sixth Report the Commission pointed to the model it created in connection with the National Broadband Plan and now asks what role that model should have in the section 706 process going forward. As Verizon has previously explained, the Commission’s model is a useful analytical tool that served an important purpose in the context of the Broadband Plan. Going forward, however, the model does not provide the most useful approach for analyzing the broadband marketplace as part of the 706 inquiry, and it would be even less appropriate for use with universal service or other programs aimed at funding broadband deployment in unserved areas. As explained in other proceedings, market-based mechanisms such as competitive bidding and reverse auctions – not cost or revenue models – are the best way to distribute public funding for broadband.<sup>59</sup> The Commission need look no further than the existing Hybrid Proxy Cost Model (HCPM) for non-rural high cost universal service voice support to understand how arduous it would be to develop a workable new broadband cost/revenue model. Now 14 years

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<sup>59</sup> See, e.g., Comments of Verizon and Verizon Wireless, *Connect America Fund*, WC Docket No. 10-90, at 26-27 (July 12, 2010); Reply Comments of Verizon and Verizon Wireless, *Connect America Fund*, WC Docket No. 10-90, at 11 (Aug. 11, 2010); Comments of Verizon and Verizon Wireless on NBP Public Notice #19, *International Comparison and Consumer Survey Requirements in the Broadband Data Improvement Act*, GN Docket No. 09-47, at 14-16 (Dec. 7, 2009); Comments of Verizon and Verizon Wireless, *A National Broadband Plan for Our Future*, GN Docket No. 09-51, at 115-116 (June 8, 2009).

after the 1996 Act, the Commission is *still litigating* aspects of the HCPM. And unlike the HCPM, a new cost/revenue model for broadband would apply to *all providers*, not just a handful of the largest legacy telecommunications carriers that draw voice subsidies from the HCPM under the existing system. That reality alone significantly expands the potential for disputes, delay, and litigation. Moreover, a model that examines not only costs, but revenues as well, requires many additional assumptions and inputs for a period covering multiple years. Establishing these assumptions and inputs – for example, predictions of average revenue per user (ARPU), broadband penetration rates, and so on – is a process that has never been undertaken for broadband networks.

Where, as is the case here, other sources for data – including the state-level broadband maps and the Form 477 data – are available, reliance on modeling would add much complexity and potential for controversy, with little if any offsetting benefits.

**E. Ongoing Data Collection And Analysis Should Occur In A Coordinated And Efficient Manner.**

In light of the substantial efforts that are already underway to obtain broadband data, the Commission should not adopt additional broadband reporting obligations at this time. The state-level mapping initiatives and the Commission's Form 477 broadband reporting requirements, in particular, necessarily require substantial resources from broadband providers of all types, and the outcome will provide granular data concerning virtually all aspects of the broadband marketplace. Piling on additional levels of reporting would do little other than create redundant and expensive reporting obligations with little demonstrated need or benefit, and that could undermine existing efforts or result in unnecessary confusion.

Frequent changes with regard to data collection and analysis are also likely to complicate the Commission's task of assessing the status of the broadband marketplace. For example, in the

Sixth Report, the Commission explained that it would rely on county-level, rather than census tract-level, data for most purposes because of some anomalies that it had discovered in the data set. While the Commission and providers can hopefully resolve any issues going forward, every time the goal posts are shifted it creates a substantial likelihood of such problems arising, as both providers and Commission staff have to adjust to the new requirements. Moreover, frequent changes in data collection make it much more difficult for the Commission to track changes and make valid comparisons over time. A reasonable level of consistency and stability – particularly in light of the volume and granularity of data now being reported – facilitates sound analysis by the Commission and other interested stakeholders.

Rather than taking the counterproductive move of adding still more reporting obligations on providers, the Commission should now focus its attention on coordinating closely with NTIA, providers, and other stakeholders to ensure that relevant data is collected in an efficient manner. With the state-level broadband mapping data coming in soon, the next few months will be a critical time for such coordination.

Moreover, going forward, the Commission should look for opportunities to cut back on processes or data collections that are redundant or that do not result in useful data. For example, much of the information that is being collected on geographic coverage and transfer rates on the Form 477 may soon be available to the Commission in even more detail through the state-level broadband mapping program. At that point, the Commission should consider to what extent the census-tract level data on the Form 477 is still necessary, and whether other steps could streamline the Form 477 process and minimize the duplication of effort to obtain data already available from other sources or being reported in other places. Verizon's comments in response

to the Commission's notices concerning existing data collection processes provide several suggestions in that regard.<sup>60</sup>

**V. APPROPRIATELY TAILORED POLICIES WOULD ACCELERATE DEPLOYMENT AND FURTHER THE GOAL OF UNIVERSAL AVAILABILITY OF BROADBAND.**

Regardless of any finding that the Commission makes in connection with past or future reports pursuant to section 706, it should remain focused on encouraging the continuing high levels of investment and innovation in broadband infrastructure. As discussed above, the broadband marketplace remains dynamic, with vibrant, intermodal competition in most areas and massive investments continuing in next-generation wireline and wireless networks. The Commission must pursue policies that encourage, rather than undermine, the prevailing dynamic. At the same time, for those isolated areas unserved by broadband or those populations lagging in broadband adoption, the Commission should pursue tailored policies – bolstered by appropriate, narrow findings under section 706(b) of a need for additional Commission action – to help address any current gaps.

**A. Reaffirm That All IP Services Are Jurisdictionally Interstate Services Subject To The Commission's Exclusive Jurisdiction.**

Regulatory uncertainty claimed by some parties regarding the IP services that ride over those broadband networks the Commission seeks to expand presents an obstacle to additional deployment. The Commission should reaffirm, once and for all, that all IP services — regardless of provider or technology — are interstate for jurisdictional purposes and are subject to the

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<sup>60</sup> See, e.g., Comments of Verizon and Verizon Wireless, *Review of Wireline Competition Bureau Data Practices*, WC Docket No. 10-132, MB Docket No. 10-103, WT Docket No. 10-131, at 7-8 & Attachment A at 6 (Aug. 13, 2010).

Commission’s exclusive jurisdiction.<sup>61</sup> This is the conclusion the Commission previously reached in *Vonage Order*.<sup>62</sup> There, although the Commission was specifically presented with a state attempt to regulate a nomadic VoIP service, the Commission made clear that its conclusions about the interstate jurisdiction of VoIP services applied equally to “cable companies” and other “facilities-based providers” of so-called “fixed” VoIP services.<sup>63</sup>

Nonetheless, some persist in claiming that states retain authority to regulate the entry, rates, and other terms and conditions on which facilities-based providers offer VoIP and IP-based services.<sup>64</sup> This claim is wrong. The Commission has already determined that all VoIP and IP-enabled services, regardless of provider, are jurisdictionally interstate. To avoid confusion going forward and to clear the way for greater investment in broadband, the Commission should reaffirm that legal conclusion.

Moreover, as a policy matter it makes sense for the Commission to confirm the interstate nature of VoIP and IP-enabled services as it implements the National Broadband Plan and a strategy to promote widespread deployment of the broadband networks. Broadband platforms and the IP-based services that ride over those platforms are being rolled out over wide geographic areas without regard to state boundaries. This approach to deploying broadband and

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<sup>61</sup> See, e.g., Comments of Verizon and Verizon Wireless, *High-Cost Universal Service Support et al.*, WC Docket Nos. 05-337 *et al.*, at 5-21 (Nov. 26, 2008); Comments of Verizon, *IP-Enabled Services*, WC Dockets Nos. 04-36 & 04-29, at 31-42 (May 28, 2004).

<sup>62</sup> *Vonage Holdings Corporation Petition for Declaratory Ruling Concerning an Order of the Minnesota Public Utilities Commission*, Memorandum Opinion and Order, 19 FCC Rcd 22404 (2004) (“*Vonage Order*”).

<sup>63</sup> *Id.* ¶ 25 n.93, 32.

<sup>64</sup> See, e.g., Comments of National Association of Regulatory Utility Commissioners, *High-Cost Universal Service Support et al.*, WC Docket Nos. 05-337 *et al.*, at 22 (Nov. 26, 2008) (arguing that “there is no question it is possible to separate intrastate non-nomadic facilities-based VoIP calls from interstate calls” and that, therefore, “the FCC has no jurisdiction over such intrastate calls”).

IP networks and services — and uniform, federal rules for those networks and services — allows these networks and services to be deployed with common systems, platforms, and processes, and results in efficiencies that provide significant cost savings. In contrast, state or local regulation would require these platforms and services to be redesigned and re-engineered to conform to disparate state and local requirements, which would eliminate those efficiencies and increase costs. A piecemeal, localized approach deploying broadband and IP networks and services would undermine widespread deployment and adoption of broadband.

In addition, the Commission must also resolve once and for all the proper regulatory classification of VoIP and other IP services as either telecommunications or information services. Verizon has supported classifying VoIP and IP-based services as information services going forward in the context of comprehensive intercarrier compensation reform, and that approach continues to make sense.<sup>65</sup> Lack of clarity on the classification issue has persisted for many years and has resulted in costly disputes (in court and elsewhere) between providers and state and local regulators about which regulatory system applies to IP-based services. This significant open question has deterred competition and market entry, and discouraged investment in and deployment of broadband and IP networks and services – contrary to congressional objectives described section 706.

In the absence of industry-wide Commission rulings confirming that all VoIP and IP-enabled services are jurisdictionally interstate and resolving the regulatory classification of these

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<sup>65</sup> See, e.g., Comments of Verizon and Verizon Wireless, *High-Cost Universal Service Support et al.*, WC Docket Nos. 05-337 *et al.*, at 25-27 (Nov. 26, 2008). As Verizon has previously explained, those classifications do not alter carriers' ability to interconnect and exchange traffic under the Act. See Ex Parte Letter from Donna Epps, Verizon, to Marlene Dortch, FCC, *Developing a Unified Intercarrier Compensation Regime; IP-Enabled Services*, CC Docket No. 01-92, WC Docket No. 04-36, at 1-2 (Oct. 3, 2008).

services, the industry and regulators will continue to face an uncertain landscape that will hinder the roll-out broadband and the next-generation communications services that consumers expect and demand.

**B. Increase Available Spectrum For Wireless Broadband Services.**

The Commission has already correctly recognized that “[w]ireless broadband is poised to become a key platform for innovation in the United States over the next decade,”<sup>66</sup> and that there is an urgent need to identify additional spectrum that can be made available for these purposes. In fact, the Commission has already identified certain, specific spectrum bands that may be used for future mobile use. As the National Broadband Plan found, “[t]he growth of wireless broadband will be constrained if government does not make spectrum available to enable network expansion and technology upgrades . . . [resulting in] higher prices, poor service quality, an inability for the U.S. to compete internationally, depressed demand and, ultimately, a drag on innovation.”<sup>67</sup>

While it was just a down-payment on the additional spectrum that will be needed to satisfy future demand for wireless broadband, the Commission’s recent identification of the 1675-1710 MHz band as a potential source of spectrum for wireless broadband services is an important step in fulfilling this need. The Commission’s identification of additional spectrum for

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<sup>66</sup> National Broadband Plan at 75.

<sup>67</sup> *Id.* at 77. *See also* The White House, Presidential Memorandum: Unleashing the Wireless Broadband Revolution, <http://www.whitehouse.gov/the-press-office/presidential-memorandum-unleashing-wireless-broadband-revolution> (June 28, 2010) (“Spectrum Presidential Memorandum”) (“America’s future competitiveness and global technology leadership depend, in part, upon the availability of additional spectrum. . . . Expanded wireless broadband access will trigger the creation of innovative new businesses, provide cost-effective connections in rural areas, increase productivity, improve public safety, and allow for the development of mobile telemedicine, telework, distance learning, and other new applications that will transform Americans’ lives.”).

mobile broadband use should not stop here, and the Commission should move quickly and aggressively to identify and reallocate additional spectrum for mobile broadband use. For example, Verizon Wireless has recommended that a contiguous block of 25 MHz in the 1755-1850 MHz band be reallocated and paired with the 2155-2180 MHz band that is currently allocated for AWS but not yet assigned.<sup>68</sup> This would provide 50 MHz of new AWS spectrum that is aligned with the current AWS band plan and fully compatible with AWS networks that are currently being designed and built. Only with the reallocation of this and other substantial blocks of spectrum for future mobile use will the mobile broadband market realize its full potential.

**C. Encourage Increased Broadband Investment Through Reform Of Pole Attachment Rates.**

As the Commission has recognized, it has the opportunity to unleash additional investment in broadband infrastructure through common sense reforms of the regime regulating the rates for pole attachments. These rates directly and substantially affect the costs to deploy broadband networks, and appropriately tailored reforms could remove existing obstacles to increased deployment by certain types of broadband providers.

The Commission's top priority here should be to set a broadband attachment rate that applies uniformly to all broadband service providers and will facilitate negotiations between broadband service providers and utilities. In the ongoing proceeding addressing these issues, the record amply demonstrates that some competing providers of broadband services are forced to pay widely varying rates for their attachments and that such variation discourages broadband deployment. The Commission has already relied upon its authority under section 224 to set a broadband attachment rate at the cable rate level for cable companies that provide broadband

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<sup>68</sup> See National Broadband Plan at 86-87.

services commingled with cable services. The Commission likewise can rely on that same section 224 authority to set a broadband attachment rate that covers all other broadband service providers that provide broadband services commingled with other services, such as telecommunications services. Setting a uniform broadband attachment rate at the cable rate level would not only level the playing field, it would facilitate negotiations between broadband service providers and pole owners, and promote competitive deployment of broadband networks by all broadband services providers.

The Commission's next priority in this area should be to adopt additional guidelines for the performance of make ready work. Such guidelines can help accelerate the performance of make ready work, but also accommodate individual circumstances and factors that are beyond the pole owners' control. The Commission should not, however, adopt strict rules for the performance of make ready work because such work is not amenable to a "one size fits all" approach. Given the widely varying factors and conditions that affect the timing and performance of make ready work, firm rules would inevitably embroil the Commission in many disputes between pole attachers and pole owners.

**D. Reform The High Cost Universal Service Fund For Broadband.**

In order to increase broadband availability in those limited areas that remain unserved (i.e., areas covering less than 5 percent of the population and where private investment is unlikely to reach in the near future), it is time to shift the focus of the high cost Universal Service Fund (USF or "fund") away from supporting legacy voice services and towards more ubiquitous deployment of broadband. There may be many ways to achieve successful universal service reform. But to put the fund on a sustainable path going forward and to protect consumers that pay for the fund, the most important first step is for the Commission to establish a budget for the all-broadband Connect America Fund (CAF) proposed in the National

Broadband Plan and stick to it. Clearly defined parameters for the CAF will enable the Commission to best set broadband spending priorities and force providers to maintain reasonable expectations for high cost funding in the future.

Within the CAF budget, the Commission must then make some difficult choices. And the National Broadband Plan reflects a reasonable and realistic framework for repurposing the high cost fund to support national broadband expansion. As a part of universal service reform the Commission must require *all* providers to develop sustainable business models that rely primarily on end-user revenue, rather than consumer-funded government subsidies. This process will undoubtedly engender opposition, but it is the only way to ensure long-term viability of the fund. Consumers should not be forced to pay the price for insulating a subset of privileged providers from the market dynamics that their industry competitors navigate without such assistance.

Just a few weeks ago, the Chairman underscored that the USF is presently on an “unsustainable path,” and that one “core principle” of reform is to recognize that “USF funds are finite [and] must not unfairly burden consumers.”<sup>69</sup> To realize meaningful universal service reforms without unfairly burdening consumers, all carriers will have to adapt to program changes necessary to allow the Commission to meet the National Broadband Plan’s goals. The Commission should follow two key principles offered by Verizon: (1) to protect consumers, the fund cannot grow beyond its current size; and (2) to be fair to providers and their customers, reductions in USF support from existing mechanisms must be spread equally among all similarly

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<sup>69</sup> See “Prepared Remarks of Chairman Julius Genachowski, 47th Annual OPASTCO Summer Convention and Trade Show, Seattle, Washington” [http://www.fcc.gov/Daily\\_Releases/Daily\\_Business/2010/db0728/DOC-300473A1.pdf](http://www.fcc.gov/Daily_Releases/Daily_Business/2010/db0728/DOC-300473A1.pdf) (July 28, 2010) (“Genachowski Remarks”).

situated providers. Adhering to these recommendations will promote the overall goal of providing all Americans with affordable access to broadband, and will support the basic framework of the CAF. More specifically, the Commission should permanently cap the high cost fund at its present level, cap high cost support for voice services at the study area level while transitioning to the CAF, resist calls to set a broadband speed target for USF support that is unattainable and unaffordable, phase out legacy support for voice services on schedules that do not favor one provider over another, and rely on market-based mechanisms to distribute new broadband support from the CAF.<sup>70</sup>

As Verizon has explained previously, the Commission possesses ample authority to reform universal service for the broadband era.<sup>71</sup> And if the Commission were to identify those specific areas where private investment in broadband is unrealistic, the additional authority that such a finding would trigger pursuant to section 706(b) would further support appropriate universal service reform efforts.

The Commission has direct statutory authority over universal service, and it has already exercised that authority to assess taxes on Internet-based services. Likewise, the Commission has authority to reform USF in order to subsidize broadband deployment in areas where it is otherwise not economically feasible to do so. Specifically, the ambiguous terms of section 254, read in combination with the express terms of section 706(b), can fairly be interpreted to give the

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<sup>70</sup> At the same time, to clear the way for broadband deployment in unserved areas, and greater investment in underserved areas, the Commission must rationalize its intercarrier compensation system. A single, low terminating rate that applies to all traffic and all providers is critical to provide regulatory certainty regarding intercarrier compensation revenue and payments.

<sup>71</sup> Verizon Broadband Framework Comments at 21-22; Reply Comments of Verizon and Verizon Wireless, *Framework for Broadband Internet Service*, GN Docket No. 10-127, at 11-15 (Aug. 12, 2010) (“Verizon Broadband Framework Reply Comments”).

Commission authority to provide universal service support for broadband deployment. Section 254(b) provides that the Commission’s universal service programs “shall” be based on certain enumerated principles, which include that “[a]ccess to advanced telecommunications and information services should be provided in all regions of the Nation.” 47 U.S.C. § 254(b)(2); *see also id.* § 254(b)(3) (“Consumers in all regions of the Nation, including low-income consumers and those in rural, insular, and high cost areas, should have access to telecommunications and information services . . .”). Although other provisions of section 254 may focus on providing universal service support for telecommunications services, the Commission generally has discretion to interpret an ambiguous statute, and the D.C. Circuit itself made clear that Congress’s statutorily stated purpose in enacting an express delegation of authority in a substantive provision of the Act such as section 254 is relevant to determining the intended scope of that authority. *See Comcast Corp. v. FCC*, 600 F.3d 642, 654 (D.C. Cir. 2010).

The Commission’s section 254 authority to provide universal service support to broadband is reinforced by section 706(b) and would be supported by appropriately tailored findings in this proceeding.<sup>72</sup> To the extent the Commission finds that broadband capabilities are not being deployed in a reasonable and timely fashion, that section directs the Commission to “take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment . . . .” 47 U.S.C. § 1302(b). Accordingly, while the Commission would be unable to support a generalized finding that broadband is not being deployed nationally – given its own recognition that approximately 95 percent of Americans already have access to broadband – it could conclude that economic barriers are preventing deployment in specific,

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<sup>72</sup> Although, as the Comcast court noted, the Commission has previously concluded that section 706(a) does not provide it with substantive regulatory authority, it has reached no such conclusion with respect to section 706(b).

limited areas where it is not economical. Under those circumstances, section 706(b) itself directs the Commission to take action to remove barriers to infrastructure investment. Such actions could include targeted universal service support for such investment, as well as Lifeline and Link Up programs if an evidentiary record demonstrated that such programs stimulate demand for supported services and thereby help promote infrastructure investment.

**E. Forego Unnecessary Regulation Of Broadband, Including Intrusive Common Carriage Or Net Neutrality Regulation.**

As important as those policies that the Commission affirmatively should pursue in order to further national broadband goals are those that it should promptly reject. As Verizon and other parties have explained in detail in the records of the Commission's pending proceedings addressing net neutrality regulation or the "reclassification" of broadband Internet access as a Title II common carriage service subject to outdated monopoly-era telephone regulation,<sup>73</sup> the Commission has no factual or legal basis to regulate broadband Internet access services. Doing so would directly undermine the key policy goals embodied in section 706 and in the National Broadband Plan and strike a blow to the already shaky economy by directly undermining existing incentives to invest in broadband infrastructure.

As the Commission recognized in the National Broadband Plan, the growth of broadband depends on encouraging "more private innovation and investment."<sup>74</sup> Since the time the Commission confirmed that broadband services were not subject to heavy-handed regulation

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<sup>73</sup> See, e.g., Verizon Broadband Framework Comments, at 1,-20, 72-78; Verizon Broadband Framework Reply Comments, at 1-15; Comments of Qwest Communications International Inc., *Framework for Broadband Internet Service*, GN Docket No. 10-127, at 1-19 (July 15, 2010); Comments of Comcast Corporation, *Framework for Broadband Internet Service*, GN Docket No. 10-127, at 30-43 (July 15, 2010); Comments of Time Warner Cable Inc., *Framework for Broadband Internet Service*, GN Docket No. 10-127, at 6 (July 15, 2010).

<sup>74</sup> National Broadband Plan at 5.

such as common carriage regulation, broadband investment and deployment – and the associated economic growth and creation of jobs – has skyrocketed. In recent years, as discussed above, the private sector has invested more in broadband infrastructure – hundreds of billions over the last ten years – than the federal government has invested in all forms of transportation.<sup>75</sup> Verizon itself has invested more in capital expenditures in recent years – more than \$80 billion from 2004 through 2008 – than any other company in the United States in any industry. While private investment throughout the economy dropped by 6 percent between mid-2006 and mid-2008, investment in communications equipment grew by nearly 10 percent over that same time period.<sup>76</sup> The chairman of the President’s Council of Economic Advisers, Christina Romer, has touted the centrality of private “[n]onhousing business investment,” both to help pull the economy out of recession in the short term and to provide a stable basis for economic growth going forward.<sup>77</sup>

The increased regulation and uncertainty resulting from heavy-handed new regulation of broadband Internet access services would reduce the ability and incentives for network providers to take risks and make the investments leading to such economic growth and job creation. As the

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<sup>75</sup> Jeffrey Eisenach, Empiris LLC, *The Telecom Sector and the Economy: How U.S. Broadband Policies Are Working for America*, <http://www.naviganteconomics.com/docs/TelecomandTheEconomyPresentationRevMay2009.pdf>, at 7 (May 2009).

<sup>76</sup> *Id.*

<sup>77</sup> “Growth Without Bubbles, Session Three in the Stephen C. Freidheim Symposium on Global Economics on Financial Turbulence and U.S. Power,” Christina Romer, President’s Council of Economic Advisers, at 7-12, [http://www.cfr.org/publication/19402/growth\\_without\\_bubbles\\_session\\_three\\_in\\_the\\_stephen\\_c\\_freidheim\\_symposium\\_on\\_global\\_economics\\_on\\_financial\\_turbulence\\_and\\_us\\_power.html?breadcrumb=%2Fpublication%2Fpublication\\_list%3Fgroupby%3D3%26type%3Dtranscript%26filter%3D2009%26page%3D5](http://www.cfr.org/publication/19402/growth_without_bubbles_session_three_in_the_stephen_c_freidheim_symposium_on_global_economics_on_financial_turbulence_and_us_power.html?breadcrumb=%2Fpublication%2Fpublication_list%3Fgroupby%3D3%26type%3Dtranscript%26filter%3D2009%26page%3D5) (May 12, 2009).

Department of Justice noted, regulation – and in particular price regulation – can “stifl[e] the infrastructure investments needed to expand broadband access.”<sup>78</sup> Economic literature is replete with findings that inappropriate regulation can adversely affect consumer welfare by harming innovation and delaying the expansion of output. For example, one study concluded that delays in the introduction of voice messaging services due to line-of-business restrictions and delays in the introduction of cellular telephone service each imposed multi-billion dollar losses in consumer welfare.<sup>79</sup> Applying Title II regulation or intrusive net neutrality regulation to broadband Internet access would likewise inflict large welfare losses on consumers. In fact, economic studies have shown that imposing so-called net neutrality rules – the apparent impetus for the Commission’s reclassification proposal – “would cost the U.S. economy at least 100,000 to 200,000 jobs per year over the next five years”<sup>80</sup> or as many as 1.45 million jobs by 2020.<sup>81</sup>

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<sup>78</sup> *DOJ Broadband Ex Parte* at 28; *see also* Robert J. Shapiro, “Broadband and American Jobs,” <http://ndn.org/blog/2010/03/broadband-and-american-jobs> (Mar. 4, 2010) (“[T]he central element for job creation here are the investments required to ensure universal access — not only now, but also as broadband technologies continue to advance. The FCC should promote these investments in every way it can. At a minimum, the Commission should be extremely cautious about policy changes which could weaken the incentives for those investments — i.e., reduce their returns — or raise the price for people to access broadband.”).

<sup>79</sup> *See* Jerry Hausman, *Valuing the Effect of Regulation on New Services in Telecommunications*, in *Brookings Papers on Economic Activity, Microeconomics* (Martha V. Gottron & Anne Lesser, eds. 1997).

<sup>80</sup> Charles M. Davidson & Bret T. Swanson, *Net Neutrality, Investment & Jobs: Assessing the Potential Impacts of the FCC’s Proposed Net Neutrality Rules on the Broadband Ecosystem* at 51 (June 2010).

<sup>81</sup> Coleman Bazelon, *The Employment and Economic Impacts of Network Neutrality Regulation: An Empirical Analysis*, at ii (April 23, 2010); *see also* Frost & Sullivan, *Net Neutrality: Impact on the Consumer and Economic Growth*, at 4 (May 2010) (even under a “best case scenario in terms of the amount of GDP impact and job growth, the Stratecast model still predicts that in 2011 alone, net neutrality could impose a seven billion dollar a year overhead on the economy with a commensurate job impact of up to 70,000 jobs”).

Likewise, studies have demonstrated that the unbundling mandates of Title II alone would significantly reduce investment.<sup>82</sup>

The negative effects on jobs and investment would be substantially greater if the Commission's proposal were extended to wireless broadband Internet services. As the President recently stated, “[f]ew technological developments hold as much potential to enhance America’s economic competitiveness, create jobs, and improve the quality of our lives as wireless high-speed access to the Internet.”<sup>83</sup> As Larry Summers, head of the National Economic Council, noted in a recent speech, the wireless industry directly employs 268,000 people today and another 2.4 million American jobs are directly or indirectly dependent on the U.S. wireless industry.<sup>84</sup> Since 2001, wireless carriers have made an average combined investment of more than \$22.8 billion per year to upgrade their networks to facilitate advanced voice and data offerings. (Topper Decl. ¶ 64.) Carriers are also making billions of dollars of additional investments today to roll out 4G technologies. Mr. Summers observed that as “[e]ach dollar invested in wireless deployment is estimated to result in as much as \$7 to \$10 higher GDP. . . . the benefits for job creation and job improvement are likely to be substantial.”<sup>85</sup> Extending

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<sup>82</sup> See, e.g., Thomas W. Hazlett & Anil Caliskan, Natural Experiments in U.S. Broadband Regulation, 7 *Review of Network Economics* 460, 477 (Dec. 2008) (finding that investment incentives were highly sensitive to changes in unbundling policy, even in the short run, and that the rapid growth of DSL service following the repeal of an unbundling mandate “presents a strong case for protecting such growth dynamics in public policy”).

<sup>83</sup> Spectrum Presidential Memorandum, at 1.

<sup>84</sup> Lawrence H. Summers, Remarks at the New America Foundation, “Technological Opportunities, Job Creation, and Economic Growth,” <http://www.whitehouse.gov/administration/eop/nec/speeches/technological-opportunities-job-creation-economic-growth> (June 28, 2010).

<sup>85</sup> *Id.*

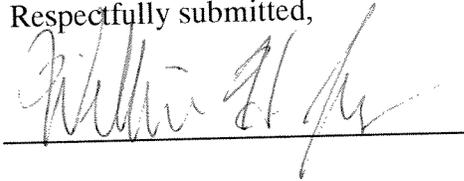
archaic common carrier regulations to wireless broadband services at this crucial time would severely undermine these benefits.

In any event, as explained in detail in Verizon's comments in the records of the net neutrality and Title II proceedings, such regulation would be not only unwise and unwarranted as a factual and policy matter, but also would be illegal. Statutory, administrative law, and constitutional considerations would all foreclose such a course of action. In contrast, if the Commission were to expressly reject that approach and recommit to the pro-investment broadband policies that have led to hundreds of billions of dollars of private investment in broadband infrastructure, it has the opportunity to remove the uncertainty and regulatory overhand that are already discouraging investment in this vital sector of the American economy.

**VI. CONCLUSION.**

The Commission should confirm that broadband services are being deployed in a reasonable and timely fashion in the overwhelming majority of the country, and the Commission should continue to pursue policies that encourage robust private investment and innovation in broadband.

Respectfully submitted,



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September 7, 2010

## **Attachment I**

**Declaration of Michael D. Topper  
January 14, 2010**

# **Broadband Competition and Network Neutrality Regulation**

**GN Docket 09-191, WC Docket No. 07-52**

**Declaration of Michael D. Topper**

**January 14, 2010**

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## **I. Introduction and Summary**

1. I am Vice President and Head of the Antitrust & Competition Practice at Cornerstone Research. I have been a faculty member in the Department of Economics at the College of William & Mary, and a lecturer in the Department of Economics at Stanford University. While at William & Mary and Stanford, I taught courses in microeconomics, econometrics, and antitrust economics. I have a Ph.D. and an M.A. in Economics from Stanford University. I also received a B.S. in Systems Engineering from the University of Virginia and an M.S. in Engineering Economic Systems from Stanford University.
2. Before receiving my doctorate in economics, I worked as an engineering economist at Bell Laboratories and Bell Communications Research. In my fifteen years at Cornerstone Research, my consulting work has focused on the application of microeconomics, econometrics, and quantitative analysis to litigation and regulatory matters. I have worked on numerous consulting projects involving the telecommunications industry, including with respect to competition and antitrust issues, merger review, spectrum policy, intellectual property, contracts, and securities issues. My complete CV is included here as Attachment A.
3. I have been asked by Verizon to assess the competitiveness of the current market environment for the provision of broadband access services to consumers, and the implications of the current market environment for the “network neutrality” proposals contained in the Federal Communications Commission’s recent Notice of Proposed Rulemaking (NPRM) in the Matter of Preserving the Open Internet.<sup>1</sup>
4. In summary, my findings are:
  - The Internet ecosystem generally and broadband Internet access in particular are still nascent businesses. These businesses have been and are continuing to develop in a competitive manner, and that competition appears to be increasing. Thus, the usual “monopoly” precondition for regulation that restricts provider conduct is absent.
  - Broadband Internet access is a capital intensive business. There has been massive private investment to deploy broadband networks, and that investment is continuing as wireline and wireless broadband providers deploy next-generation technology.

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<sup>1</sup> FCC, Notice of Proposed Rulemaking, In the Matter of Preserving the Open Internet, GN Docket No. 09-191, released October 22, 2009, ¶16. (“NPRM”)

- As in other capital-intensive industries – ranging from voice telephony to transportation – competition in broadband access has developed across platforms. In particular, there is extensive and growing cross-platform competition for both wireline broadband and wireless broadband service, and increasingly between wireline and wireless broadband alternatives. This cross-platform competition is founded not only on the functional similarities between and among different platforms, but also on the unique features of each, such that even platforms that are not perfect substitutes exert substantial competitive pressure on other platforms.
- Cable companies were the early leaders in providing broadband service. Local telephone companies began competing aggressively in broadband once regulatory restrictions that inhibited their broadband deployment were lifted. Today, there is vigorous competition between cable television companies and local telephone companies to provide broadband services to consumers, and both are investing heavily in next-generation broadband technology to improve the broadband experience. Telcos are deploying fiber deeper in their networks, while cable companies are implementing new DOCSIS 3.0 technology. As a result of this competition, wireline broadband access has been characterized by falling prices, much faster access speeds, improvements in service quality, and significant customer churn.
- Wireless companies also have begun to expand aggressively into the provision of data and broadband services. The added feature of mobility of these services makes them a competitive alternative to wireline broadband even at relatively lower throughput speeds, but wireless broadband providers are rapidly improving their networks to compete with respect to speed as well. Wireless companies initially offered relatively low-speed data services using technologies such as 1xRTT, but have more recently implemented Third Generation (“3G”) technology that permits much higher speeds. There is aggressive competition between wireless companies, and throughout all aspects of the wireless sector, from service, to handsets and other devices, to operating systems, applications and content.
- Wireless providers are now moving aggressively to deploy Fourth Generation (“4G”) technology such as Long-Term Evolution (“LTE”) and WiMAX and to further expand the broadband capabilities of their networks. This will enable even more robust cross-platform competition between wireless and wireline broadband.
- The current broadband marketplace has brought numerous benefits to consumers, including lower prices, faster speeds, higher quality service, and new ways to access broadband content. Competition has prompted extensive innovation and investment in technology, which in turn have been key drivers of many of these consumer benefits. The current environment, which relies on market forces, creates incentives for broadband providers, device manufacturers, software developers and content providers to experiment with different business models, vertical relations, network management approaches, and service offerings that are attractive to consumers.
- Given current levels of broadband competition and the nascent and rapidly changing broadband environment, network neutrality regulation is unwarranted. In a competitive

market setting, consumers have the ability to choose among different service providers, creating strong incentives for broadband providers to employ business practices that benefit consumers. In such a market setting, provider practices such as network management, differential pricing, and vertical contracting with applications and content providers are typically motivated by procompetitive reasons and providers have neither the ability nor the incentive to engage in anticompetitive practices that harm consumers.

- Imposing network neutrality regulation that restricts provider conduct imposes considerable costs and can have many unintended consequences that render such regulation counterproductive to its intended purpose. Regulation, however well intended, can distort market outcomes and reduce incentives to invest in new technologies. In a competitive, dynamic market setting it is particularly difficult to craft regulations that achieve their intended benefits and avoid imposing large and unintended costs. Rapid technological change, entry by new players, the wide variety of broadband content, diverse consumer preferences, and innovative new business models make the effective use of regulatory power without unintended consequences virtually impossible. By potentially limiting flexibility in pricing, network management, and the development of business models, network neutrality rules would reduce the ability and incentives of broadband providers to innovate and invest and distort the competitive process.
- In the NPRM, the Commission voices concern that effective broadband competition may not be sufficient to protect against certain market failures, and proposes network neutrality regulations to address those concerns. However, there is no evidence of such market failure to date, there are procompetitive justifications for the challenged broadband provider practices, and competition among broadband providers reduces the ability and incentives of providers to engage in anticompetitive pricing, network management, or vertical practices. Moreover, the available evidence suggests that broadband is growing more, not less, competitive. As a result, the risk of anticompetitive conduct continues to fall.
- Given the current competitive environment in broadband access and the Internet ecosystem generally, competitive forces create incentives for broadband providers to offer services that meet consumer demands. A better approach than broad, ex-ante network neutrality regulation is to rely on industry players disclosing their practices and government intervention only when presented with evidence of anticompetitive behavior arising from service provider practices that threatens to harm consumers.

5. Support for these opinions is provided in the remainder of this paper. Section II reviews wireline broadband competition, and in particular the intense rivalry between cable companies and local exchange carriers. Section III assesses competition for wireless broadband services and the wireless ecosystem generally. Section IV explains that increasing cross-platform competition is emerging between mobile wireless providers and wireline providers for the provision of broadband services. I also review several other technologies, such as WiFi and satellite, which provide additional broadband access alternatives for consumers. Section V assesses the

implications of the competitive environment for proposed network neutrality regulation and addresses several specific concerns raised in the NPRM regarding harms that might arise even amidst competition. Section VI provides a brief conclusion.

## II. Wireline Broadband Competition

6. The broadband ecosystem generally and broadband Internet access in particular are still nascent businesses. Broadband access providers and other companies are racing to grow and develop the marketplace by attracting new subscribers. Even with broadband providers' great success over the past few years, many households still do not have a broadband connection. And even households with an existing broadband connection are expected to upgrade those connections to higher-speed technologies over the next several years. From an economic perspective, this is significant because in nascent industries that are undergoing rapid technological change, it is particularly difficult for even the most capable regulator to keep up with the market's evolution.<sup>2</sup>

7. Although broadband is still in its early stages, economic indicators suggest it is developing in a competitive manner, as the Commission itself has previously and repeatedly concluded.<sup>3</sup> In particular, competition is developing as economics would predict given the capital-intensive nature of providing broadband services – that is, competition is developing across platforms. Just as such cross-platform or “intermodal” competition has transformed industries such as transportation (where trucks, railroads, shipping, and planes all compete with each other) and voice telephony (where telephone carriers, cable operators, wireless companies, and VoIP providers all compete with each other), the same is now occurring with broadband.

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<sup>2</sup> See, e.g., Stephen Breyer (1982), *Regulation and Its Reform*, pp. 286–287; Alfred E. Kahn (1971), *The Economics of Regulation*, p. 127; John C. Panzar and Robert D. Willig (1977), “Free Entry and the Sustainability of Natural Monopoly,” *Bell Journal of Economics*, Vol. 8, p. 21; Richard A. Posner (1969), “Natural Monopoly and Its Regulation,” *Stanford Law Review*, Vol. 21, pp. 548, 636.

<sup>3</sup> See, e.g., Appropriate Framework for Broadband Access to the Internet over Wireline Facilities, Report and Order and Notice of Proposed Rulemaking, 20 FCC Rcd 14853, ¶ 44 (2005); Appropriate Regulatory Treatment for Broadband Access to the Internet over Wireless Networks, Declaratory Ruling, 22 FCC Rcd 5901 (2007); United Power Line Council's Petition for Declaratory Ruling Regarding the Classification of Broadband over Power Line Internet Access Service As an Information Service, Memorandum Opinion and Order, 21 FCC Rcd 13281 (2006); Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, 18 FCC Rcd 16978, ¶ 272 (2003); Petition for Forbearance of the Verizon Telephone Companies Pursuant to 47 U.S.C. § 160(c), Memorandum Opinion and Order, 19 FCC Rcd 21496, ¶ 19 (2004).

**A. There is Significant Head-to-Head Competition between Cable and Telco Providers of Broadband Access**

**1. Cable and DSL Broadband Service**

8. Most U.S. consumers that subscribe to wireline broadband service currently obtain that service either from a cable company or from a local exchange carrier (“telco”). Cable companies were the early leaders in providing broadband Internet access directly to the home. Today, cable modem service typically offers maximum download speeds of between 768 Kbps and 20 Mbps,<sup>4</sup> although maximum speeds of 101 Mbps or more are possible with recently implemented DOCSIS 3.0 technology.<sup>5</sup>

9. Cable broadband access is widely available across the U.S. The National Cable & Telecommunications Association (“NCTA”) estimates that as of 2008, cable modem service was available to more than 92 percent of U.S. households, up from 46 percent in 2000.<sup>6</sup> The vast majority of urban and suburban consumers have access to cable broadband service, and many rural consumers also have access. Specifically, as of 2009, cable operators offered broadband service to approximately 15-20 million rural households.<sup>7</sup> According to the Commission’s annual High-Speed Services for Internet Access Reports (“High-Speed Services Report”), cable modem lines with speeds of over 200 kbps in both directions (“advanced services lines”) have risen from about 6.8 million in 2002 to 37.8 million in 2008.<sup>8</sup>

10. Telephone companies are competing aggressively with cable companies in the provision of broadband access, having been freed from regulatory restrictions that initially hampered such deployment for several years. DSL service, which relies on twisted pair copper wire “telephone lines,” has traditionally been the most common way for telcos to provide broadband access. Like cable modem service, most DSL service offered to consumers is asymmetrical, with faster download speeds than upload speeds; these asymmetrical services are often called ADSL.

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<sup>4</sup> UBS Investment Research, *Telecommunications and Pay TV*, September 3, 2009, p. 9. (“UBS Telecom and Pay TV”)

<sup>5</sup> UBS Telecom and Pay TV, p. 9; “Cablevision Pushes DOCSIS 3.0 Needle to 101 Mbps,” *CEDMagazine.com*, April 28, 2009 (“CED Cablevision 2009”) available at <http://www.cedmagazine.com/News-Cablevision-DOCSIS30-101-Mbps-042809.aspx>.

<sup>6</sup> National Cable & Telecommunications Association Comments, A National Broadband Plan for Our Future, GN Docket No. 09–51, filed June 8, 2009, p. 10.

<sup>7</sup> Letter from Steven Morris, NCTA, to Marlene Dortch, FCC, Regarding Rural Broadband Strategy, GN Docket No. 09–29, April 10, 2009, p. 1. (“Letter Re Rural Broadband Strategy”)

<sup>8</sup> See FCC Industry Analysis & Technology Division, Wireline Competition Bureau, High-Speed Services for Internet Access: Status as of June 30, 2008, July 2009, Table 2. (“FCC High-Speed Services 2009”)

Average download speeds of DSL service are comparable to those of cable and typically range from 768 Kbps to 12 Mbps,<sup>9</sup> although more advanced technology such as ADSL2+ and VDSL can deliver maximum download speeds of 24 Mbps and higher.<sup>10</sup> Typical upload speeds range from 128 to 896 Kbps.<sup>11</sup> I discuss more recent telco deployment of fiber-based broadband service below in Section II.B.1.

11. DSL broadband service is widely available across the U.S. According to the Commission's High-Speed Services Report, as of June 2008, DSL service was available to 83% of U.S. residential households who have local telephone access, up from 76% in June of 2005.<sup>12</sup> According to the same report, ADSL "advanced services" lines have risen from about 1.9 million in 2002 to 26.1 million in 2008, with another 3.8 million ADSL lines with speeds of over 200 kbps in just one direction. In addition, telco-provided SDSL and "traditional wireline" broadband service account for another 900,000 "advanced services" lines.<sup>13</sup>

12. DSL service is widely available to urban and suburban consumers, and many rural consumers also have access to DSL service. As of 2008, the smallest rural incumbent local exchange carriers had already upgraded 91% of their lines to provide at least 200 Kbps of broadband access.<sup>14</sup> The National Exchange Carrier Association confirms these figures, finding that broadband availability to customers served by this group of carriers increased to 92% in 2008 from 79% in 2005.<sup>15</sup>

## 2. Cable-DSL Overlap

13. The increased availability of both cable and DSL service represents a dramatic shift from a decade ago, when dial-up was the most prevalent technology for consumers to access the Internet. Today, DSL has evolved to be a full-fledged competitor to cable modem service, which was the

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<sup>9</sup> Bank of America Merrill Lynch, *Battle for the Bundle: Pressure Eases as Discounts Rolled Back*, October 21, 2009, p. 13. ("Bank of America Pressure Eases 2009")

<sup>10</sup> Merrill Lynch, *Everything Over IP*, March 12, 2004, p. 39.

<sup>11</sup> Bank of America Pressure Eases 2009, p. 13.

<sup>12</sup> FCC High-Speed Services 2009, Table 14; FCC Industry Analysis & Technology Division, Wireline Competition Bureau, High-Speed Services for Internet Access: Status as of June 30, 2005, April 2006, Table 14.

<sup>13</sup> FCC High-Speed Services 2009, Table 2.

<sup>14</sup> FCC Presentation for the September Commission Meeting on Broadband.gov, the National Broadband Plan," September 29, 2009, p. 47 ("FCC Presentation 2009")

<sup>15</sup> National Exchange Carrier Association Comments, Report on Rural Broadband Strategy, GN Docket No. 09-29, filed March 25, 2009, pp. 2-3. These figures are for the NECA's Traffic Sensitive Pool which is a group of 1,119 rural carriers from 47 states. See NECA, "Trends 2008," available at [https://www.neca.org/cms400min/NECA\\_Templates/ResourceInterior.aspx?id=100](https://www.neca.org/cms400min/NECA_Templates/ResourceInterior.aspx?id=100).

early leader in the wireline broadband industry. As of 2003, cable modem lines accounted for 75.6% of wireline advanced services lines nationwide, while ADSL and other telco technologies held 24.5% of this share.<sup>16</sup> However, given improvements in DSL technology, changes in the regulatory environment, and telco deployment of fiber-to-the-home, telcos have become a robust competitor to cable. By 2008, cable's share of wireline advanced services lines had fallen to 56.3% while the share of wireline telcos had risen to 43.7%.<sup>17</sup>

14. Most consumers have a choice in broadband access between cable and DSL, forcing providers to respond to competitive forces. According to the Commission, as of June 2008, 68.1% of U.S. zip codes had two or more cable or DSL providers.<sup>18</sup> In addition, the national statistics cited above show that cable broadband covers 92% of U.S. households and DSL covers 83% of households with access to a local telephone line. This suggests that, at minimum, 75% of U.S. households have access to both types of providers.<sup>19</sup>

15. In regions where Verizon is the local exchange carrier, there is almost complete overlap between Verizon's provision of DSL and cable companies' provision of cable broadband. Verizon maintains data on the availability of its DSL service by wire center. It has obtained data regarding the availability of cable modem service from a third party source and has calculated the number of households in its service areas that can receive both DSL and cable broadband service for the states with the highest concentration of Verizon lines.<sup>20</sup> There are about 27 million households in Verizon's local service territory, and 96.5% of them are in areas that have access to both Verizon's DSL service and cable modem broadband. See Attachment B. The coverage is 100% in states such as Connecticut, New Jersey, and the District of Columbia and over 99% in Delaware, Florida, Massachusetts, Pennsylvania, and Rhode Island.

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<sup>16</sup> FCC High-Speed Services 2009, Table 2. Telco technologies include ADSL, SDSL, Traditional Wireline, and Fiber. In 2003, figures for fiber included a small number of non-telco broadband over power lines.

<sup>17</sup> These figures exclude the rapid growth in mobile wireless lines offering broadband access, which I discuss in more detail below.

<sup>18</sup> FCC High-Speed Services 2009, Table 16. The Commission's High-Speed Services Reports are based on provider Form 477 filings. Although some have suggested that more precise and granular data would be better, (See FCC High-Speed Services 2009, p. 1) they are the most comprehensive public data currently available.

<sup>19</sup> 83% of households with access to a local telephone line have DSL access, and virtually all households have access to a local telephone line. If all of the 17% of households without DSL access have cable access, the total percent of U.S. households with both is 75%. If some households without DSL also do not have access to cable broadband, then the total percentage of households will be higher.

<sup>20</sup> Verizon obtained data from a third party source derived from *Warren's Television & Cable TV Factbook* (2009) on cable modem service by each cable modem's franchise area. Verizon then compared its wire center boundaries with the boundaries of cable franchises. It then calculated the percentage of households in each of its wire centers that had access to both Verizon and cable modem services. For purposes of this analysis, where Verizon broadband or cable modem was available anywhere in the wire center, it was assumed to be available throughout the wire center.

16. This examination of market structure provides a broad contour of cable company and telco participation in the broadband marketplace. Although market structure can establish the framework of competition, an analysis of market structure by itself is insufficient in assessing the competitiveness of a market. That is particularly true for a nascent business like broadband. Given that many consumers still do not have broadband, and that many consumers with broadband will be upgrading those connections going forward, it makes little sense from an economic perspective to conclude that any broadband provider or group of providers has a durable (much less dominant) share of the evolving broadband marketplace in any economically meaningful sense. In any case, even in highly concentrated markets, producer rivalry can lead to competitive outcomes. For example, an increase in concentration can reflect vigorous competition as a more efficient or innovative firm takes market share away from rivals. Similarly, economists recognize that the action of a single provider who chooses to expand its sales aggressively can thwart the potential for collusion even in concentrated markets.<sup>21</sup> Thus, an assessment of competition must also account for price and non-price rivalry between providers, the ability of consumers to switch providers in response to better prices or service, and the potential for innovation by firms inside and outside the industry to change the competitive landscape.<sup>22</sup>

17. Even if one were to assume that cable companies and telcos were the only broadband alternatives, which ignores the increasing platform competition from wireless broadband and other technologies that I discuss below, this does not imply a lack of competition, and certainly does not represent the type of “market failure” that would generally be necessary to justify regulation. It is well recognized in economics that the number of competitors that can efficiently serve a market depends on the size of the market relative to the minimum efficient scale (“MES”) of production and distribution.<sup>23</sup> In a recent filing in this proceeding, the U.S. Department of Justice states, for example, that “[i]n markets such as [broadband], with differentiated products subject to large economies of scale (relative to the size of the market), the Department does not expect to see a large number of suppliers.”<sup>24</sup> Broadband is a capital-intensive industry and the dramatic

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<sup>21</sup> Jonathan Baker (2002), “Mavericks, Mergers, and Exclusion: Proving Coordinated Competitive Effects under the Antitrust Laws,” *New York University Law Review*, Vol. 77.

<sup>22</sup> This is the approach taken by the Commission in its analysis of the mobile wireless industry. See, e.g., FCC, Thirteenth Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, January 16, 2009. (“Thirteenth CMRS Competition Report”)

<sup>23</sup> See e.g., Dennis Carlton and Jeffrey Perloff (2005), *Modern Industrial Organization*, 4th ed., p. 76.

<sup>24</sup> *Ex Parte* Submission of the United States Department of Justice in the Matter of Economic Issues in Broadband Competition, GN Docket No. 09-51, January 4, 2010, p. 7. (“Economic Issues in Broadband Competition”)

improvements in coverage and capabilities of last-mile broadband provision have required substantial fixed investment. What economics would predict in such capital-intensive industries is for cross-platform competition to develop, as is the case in transportation and wireline telephony, as noted above, and as is occurring today in broadband.<sup>25</sup> Such cross-platform or intermodal competition offers significant consumer benefits as competitors that operate different technological platforms are able to offer highly differentiated packages of price, quality, and functionality. Cross-platform competitors have strong incentives to maintain and expand their subscriber base to spread their fixed costs over a large network of users. When a cable company or telco loses a subscriber to its competitors, it loses both the variable profit contribution from that subscriber as well as the subscriber's contribution to its fixed costs of building and maintaining its network. This creates a strong incentive for providers to maintain services and prices that appeal to consumers, and to continuously invest and innovate to provide better service.<sup>26</sup>

### **3. Head-to-Head Competition for Subscribers**

18. The number of U.S. households subscribing to wireline broadband service has grown rapidly in recent years. A Pew Internet study found that fewer than 5% of all adult Americans had wireline broadband access in 2000. In 2009, the figure is over 60%.<sup>27</sup> Industry analysts confirm these figures; for example, Oppenheimer estimated wireline broadband penetration to be about 60% in 2008.<sup>28</sup> Despite the rapid growth in broadband subscribers, there are still many households that have access to broadband but have chosen not to subscribe. In fact, the same Pew Internet study found that 33% of Americans had access to broadband but chose not to adopt it.<sup>29</sup>

19. This large potential wireline broadband market, along with significant turnover caused by the fact that numerous households move each year, has resulted in broadband providers competing aggressively for new broadband consumers. UBS Investment Research estimated that in the first quarter of 2009, cable companies and telcos evenly split new broadband subscribers between

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<sup>25</sup> See Alfred Kahn (2007), "Network Neutrality," *AEI-Brookings Joint Center for Regulatory Studies*, March 2007, p. 2.

<sup>26</sup> See e.g., Howard Shelanski (2007) "Adjusting Regulation to Competition: Toward a New Model for U.S. Telecommunications Policy," *Yale Journal of Regulation*, p. 85.

<sup>27</sup> "Home Broadband Adoption 2009," *Pew Internet and American Life Project*, June 2009, p. 11. ("Pew Internet June 2009")

<sup>28</sup> Oppenheimer Equity Research, "Key Takeaways from 3Q09," November 18, 2009, Exhibit 14.

<sup>29</sup> Pew Internet June 2009, pp. 3, 8. This is calculated by knowing that 37% of Americans did not subscribe to broadband at home and only 4% blamed it on lack of availability.

them,<sup>30</sup> and Morgan Stanley Research estimated that cable garnered 55% of new wireline broadband subscribers in 2008 and 46% of new wireline broadband subscribers in 2007.<sup>31</sup>

20. Competition for new subscribers also benefits existing broadband subscribers, who can and do switch providers in response to better deals and better service. Switching providers entails a relatively small cost, and data from independent sources show that broadband subscriber churn is considerable and rising. A 2009 IDC study found that 9% of broadband subscribers had changed providers within one year. The same study found that 28.7% of subscribers had changed providers within three years, indicating that consumers switch providers in response to more attractive service packages.<sup>32</sup> Churn rates have also been increasing over time. The one year churn rate reported by IDC in 2007 was 6.9% and the three year churn rate 20.4%, a rise of over 8% in just two years.<sup>33</sup>

21. The ability and propensity for consumers to switch providers creates incentives for cable companies and telcos to offer attractive combinations of price and service and to invest in their networks to improve service offerings. In addition, in order to attract and retain subscribers, cable and telco providers must offer access to a wide variety of content and do so using network management practices that consumers accept. In contrast, a provider that implements network management techniques or limits access to content in ways that consumers do not appreciate will quickly find itself faced with high levels of customer defection. In this way, competition provides a powerful signal to broadband providers about network management practices and open access to content.

22. Although there is substantial overlap in DSL and cable broadband coverage areas, the pro-consumer effects of such competition is not limited to just the overlap areas. Competition in these regions of overlap also protects consumers living in pockets without such overlap. Cable companies and telcos do not tailor their plans, services, or prices differently in pockets without overlap, and there would likely be considerable logistical and other difficulties in doing so. For example, uniform marketing and advertising is typically used across fairly broad geographic areas

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<sup>30</sup> UBS Investment Research, *Cable Making Gains in Broadband*, May 14, 2009, p. 3. (“UBS Cable Making Gains 2009”)

<sup>31</sup> Morgan Stanley Research, *Cable/Sat & Telecom Broadband Outlook: 1Q Subscriber Growth ‘Less Bad,’ Pricing Watch On*, April 17, 2009, p. 2.

<sup>32</sup> Presentation on Profile of U.S. Broadband Consumers – 2009 Survey, Amy Lind of IDC Consumer Broadband and Mobile Services, 2008, p. 20. (“IDC”)

<sup>33</sup> IDC p. 20.

(such as a DMA in the case of television advertising), and it would be difficult to conduct effective marketing campaigns that distinguish between overlap and non-overlap areas. Thus, even customers in areas who do not have access to both cable and DSL do have access to the improved plans and prices that are wrought by the competition in other areas.<sup>34</sup>

**B. Telcos and Cable Companies are Competing to Innovate and Deploy Advanced Technologies**

23. The substantial investment and deployment of new technology provides further evidence of vigorous competition among telcos and cable companies to attract and retain subscribers. Economists recognize that in markets where innovation and investment in technology are important, consumer welfare is highly dependent on firms competing to develop and deploy new and better services. In competitive markets, providers are forced to innovate and invest to meet changing consumer demands as those who do not will be weakened with consumer defections and a slowdown in new subscribers. As the Antitrust Modernization Commission has stated, “[i]nnovation provides a significant share of the consumer benefits associated with competition, particularly in the most dynamic industries. New and improved products and services, as well as new business methods and production processes, are created through innovation.”<sup>35</sup> Dynamic competition and fast-paced innovation are central features of the wireline broadband access industry. As broadband content has evolved and become more bandwidth intensive, consumers have demanded faster, more reliable, higher-quality services. Telcos and cable companies have met this demand for increased bandwidth with expensive and extensive deployment of new technologies and expanded services. Telcos are in the process of deploying fiber infrastructure at costs into the tens of billions of dollars. Cable companies are undertaking expensive investment to upgrade their infrastructure to DOCSIS 3.0.

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<sup>34</sup> A similar point has been made by other economists. See, e.g., Jerry Brito and Jerry Ellig (2007), “A Tale of Two Commissions: Net Neutrality and Regulatory Analysis,” *CommLaw Conspectus*, p. 19.

<sup>35</sup> *Antitrust Modernization Commission Report and Recommendations*, April 2007, pp. 39–40. (“AMC Report”) See also, Richard Gilbert (2005), “New Antitrust Laws for the ‘New Economy’?” Testimony before the AMC, November 18, 2005, p. 1. (“Dynamic competition to develop new products and to improve existing products can have much greater impacts on consumer welfare than static price competition”)

## 1. Telco Investment and Deployment of Fiber-Based Broadband Services

24. Telcos have invested heavily in deploying high speed fiber optic cable to improve the speed and reliability of their broadband services.<sup>36</sup> As of March 2009, fiber brought directly into the home (“FTTH”) (excluding fiber which reaches close to the premises but not into the home (fiber to the node, or “FTTN”)), passed 14.9 million U.S. households.<sup>37</sup> As of 2009, FTTH service was available to 13% of all U.S. households, and 4% of homes were actually subscribing to FTTH services.<sup>38</sup> Growth has been significant as fiber to the home was essentially non-existent in 2002.<sup>39</sup> The Commission has estimated that, as of 2008, there were 2.3 million advanced services fiber lines in service the U.S.<sup>40</sup> Industry analysts expect that total fiber, which includes FTTH and FTTN, to reach nearly 50 million households by 2012.<sup>41</sup>

25. Verizon has been the leader in deployment of FTTH and is in the middle of its plans to spend \$23 billion to bring its FiOS network to 19 million homes.<sup>42</sup> As of 3Q 2009, Verizon had already deployed FiOS to pass over 14.5 million premises covering more than 45% of its footprint.<sup>43</sup> Verizon advertises that its fiber network can deliver Internet download speeds of about 50 Mbps and upload speeds of 20 Mbps.<sup>44</sup>

26. AT&T has been deploying its U-verse service, which relies on fiber to the node (“FTTN”) technology.<sup>45</sup> In early 2008, analysts estimated that AT&T invested \$5.6 billion in 2007 and 2008 to deploy its U-verse service.<sup>46</sup> As of 2009, U-verse passed more than 19 million housing units,<sup>47</sup>

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<sup>36</sup> The telcos have also made improvements to their DSL service, often in combination with deployment of fiber technology.

<sup>37</sup> RVA LLC, Fiber-to-the-Home: North American Market Update, for the FTTH Council, April 2009, p. 6, available at [http://www.ftthcouncil.org/sites/default/files/RVA.FTTH\\_Apr09.060109.pdf](http://www.ftthcouncil.org/sites/default/files/RVA.FTTH_Apr09.060109.pdf) (“RVA 2009”)

<sup>38</sup> RVA 2009 p. 10.

<sup>39</sup> RVA 2009 p. 10.

<sup>40</sup> FCC High-Speed Services 2009, Table 2.

<sup>41</sup> Bernstein Research, U.S. Telecommunications, Cable & Satellite: The Dumb Pipe Paradox, Revisited, June 11, 2009, pp. 4–5.

<sup>42</sup> “Verizon’s FiOS: A Smart Bet or a Big Mistake,” *The New York Times*, August 19, 2008.

<sup>43</sup> Verizon, Q3 *Investor Quarterly* 2009, October 26, 2009, p. 8. (“Verizon 3Q Investor Quarterly 2009”)

<sup>44</sup> Verizon FiOS website available at <http://www22.verizon.com/Residential/FiOSInternet/FiOSvsCable/FiOSvsCable.htm> accessed on December 7, 2009.

<sup>45</sup> “AT&T U-verse TV Ranks Highest in J.D. Power and Associates Study in South and West Regions for Second Year in a Row,” *AT&T Press Release*, October 7, 2009. (“AT&T U-verse 2009”) Bear Stearns, *December Broadband Buzz: A Monthly Update on Critical Broadband Issues*, January 2, 2008, p. 2. (“Bear Stearns January 2008”)

<sup>46</sup> Bear Stearns January 2008, p. 2.

<sup>47</sup> AT&T U-verse 2009.

and AT&T plans to deploy U-verse to 30 million units by the end of 2011.<sup>48</sup> AT&T advertises maximum download speeds of 24 Mbps for its U-verse service.<sup>49</sup>

27. Qwest has started to roll out its high speed fiber-optic Internet footprint to various cities, including Denver, Phoenix, Tucson, Salt Lake City, and Minneapolis/St. Paul.<sup>50</sup> By the end of 2009, Qwest expected its fiber footprint to cover more than three million homes.<sup>51</sup> Qwest advertises that its fiber network can deliver Internet download speeds of up to 40 Mbps and upload speeds of 20 Mbps.<sup>52</sup>

28. Fiber deployment has not been limited to the largest ILECs. According to one study, as of March 2009, in addition to Verizon there were “a total of 681 other providers of FTTH in America which represents over 1.1 million total connections.”<sup>53</sup> Among tier 3 rural incumbent local exchange carriers, which represent roughly 8 million households, one market analyst noted that half of these rural carriers have already started providing FTTH to some of their customers and another quarter plan on building out FTTH over the next three years.<sup>54</sup>

## **2. Cable Company Investment and Deployment**

29. Cable companies are in the midst of their own technological upgrade, and invested more than \$14.6 billion in their total infrastructure (including non-broadband related access), during 2008. This figure was \$14.4 billion in 2009.<sup>55</sup> Some of this investment has been directed toward transitioning from DOCSIS 2.0 to DOCSIS 3.0 technology. DOCSIS 3.0 increases the efficiency of cable spectrum via channel bonding, which allows cable operators to share channels across

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<sup>48</sup> “AT&T Reports Fourth-Quarter and Full-Year Results Highlighted by Robust Wireless Data Growth, Accelerated U-verse TV Ramp, Continued Double-Digit Growth in IP Data Service,” *AT&T Press Release*, January 28, 2009.

<sup>49</sup> “AT&T U-verse High Speed Internet” available at <http://www.att.com/u-verse/explore/internet-landing.jsp> last accessed January 1, 2010.

<sup>50</sup> “Qwest Unveils 40 Mbps Downstream, 20 Mbps Upstream High-Speed Internet Service,” *Qwest Press Release*, July 20, 2009. (“Qwest 2009”)

<sup>51</sup> Qwest, Shareholders Meeting: Chairman’s (Ed Mueller) Remarks, 2009, p. 4. “Qwest has indicated total capital investment of \$1.6 billion or lower in 2009.” Joe Euteneuer, Qwest Executive Vice President – Chief Financial Officer, “Qwest Bank of America Merrill Lynch 2009 Credit Conference Presentation,” December 3, 2009, p. 14 available at <http://investor.qwest.com/index.php?s=19>.

<sup>52</sup> Qwest 2009.

<sup>53</sup> RVA 2009, pp. 9–10.

<sup>54</sup> Michael Render (2009), “Overview: ILEC vs. Muni-Fiber Builds,” *The FTTH Prism*, Vol. 6, No. 2, March 2009 available at <http://www.chaffeefiberoptics.com/nwsltr/ftthprismvol6no2.pdf>. (“Render 2009”)

<sup>55</sup> See NCTA, “Investments in Infrastructure,” available at <http://www.ncta.com/Statistics.aspx> accessed December 24, 2009 and January 8, 2009.

subscribers.<sup>56</sup> DOCSIS 3.0 can achieve downstream speeds of 100 Mbps,<sup>57</sup> allowing cable operators to compete with the speeds of the telcos' fiber networks. In comparison, DOCSIS 2.0 provides maximum downstream speeds from approximately 30 to 43 Mbps.<sup>58</sup>

30. Cablevision has already deployed DOCSIS 3.0 technology across its entire footprint, and launched service on May 11, 2009.<sup>59</sup> Comcast has deployed DOCSIS 3.0 to 50% of its footprint and planned to cover 80% of its footprint by the end of 2009.<sup>60</sup> Cox has planned to provide DOCSIS 3.0 service to more than two thirds of its systems across the country by the end of 2010.<sup>61</sup> Similarly, in September 2009, Time Warner Cable offered DOCSIS 3.0 technology in New York City<sup>62</sup> and plans to continue its DOCSIS 3.0 rollout through 2010.<sup>63</sup>

31. Rural cable companies are also upgrading to DOCSIS 3.0. For example, Sjoberg Inc., which provides cable broadband services to towns in Northwest Minnesota with populations ranging from 89 to 8,400, plans to offer DOCSIS 3.0 technology by the first quarter of 2010. BendBroadband which operates in central Oregon planned to deploy DOCSIS 3.0 throughout its footprint during 2009.<sup>64</sup> Analysts estimate that DOCSIS 3.0 will be available to almost 99 percent of all U.S. homes that are passed by cable by 2013.<sup>65</sup>

32. The fact that the cable companies and telcos are investing so heavily in new technologies confirms that the current wireline broadband market structure, with two firms aggressively competing head-to-head, is delivering the benefits of dynamic competition to consumers.

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<sup>56</sup> Bear Stearns, *March Broadband Buzz: A Monthly Update on Critical Issues*, April 1, 2008, p. 3. ("Bear Stearns April 2008")

<sup>57</sup> For example, see Cablevision's DOCSIS 3.0 speeds. CED Cablevision 2009 and UBS Cable Making Gains 2009, p. 5.

<sup>58</sup> Ron Hranac (2006), "DOCSIS 3.0," *Communications Technology*, March 1, 2006 available at <http://www.cable360.net/ct/strategy/emergingtech/14944.html>.

<sup>59</sup> "Cablevision Breaks the Century Mark – Introduces Nation's First 101-Megabits-Per-Second High-Speed Internet Service, Optimum Online Ultra," *Cablevision Press Release*, April 28, 2009.

<sup>60</sup> "Q2 2009 Comcast Corporation Earnings Conference Call – Final," *FD (Fair Disclosure) Wire*, Transcript 080609a2285950.750, August 6, 2009 (statement by Comcast EVP and CFO, Michael Angelakis).

<sup>61</sup> "Cox Ups Internet Speeds, Boards ESPN360.com Train," *CEDMagazine.com*, September 24, 2009 available at <http://www.cedmagazine.com/News-Cox-Internet-speeds-ESPN360-092409.aspx>.

<sup>62</sup> "Time Warner Cable Launches Its Fastest Internet Yet in New York City with Time Warner Cable Wideband Internet & Business Class Wideband Internet", *Time Warner Cable News Release*, Sept. 24, 2009.

<sup>63</sup> "Time Warner Cable, Inc. at Goldman Sachs Communacopia Conference New York – Final," *FD (Fair Disclosure) Wire*, Transcript 091509a2435064.764, September 15, 2009 (statement by Time Warner Cable CFO & Senior EVP Rob Marcus).

<sup>64</sup> Letter Re Rural Broadband Strategy.

<sup>65</sup> "Report: DOCSIS 3.0 To Blanket U.S. by 2013," *Multichannel News*, May 1, 2009 available at [http://www.multichannel.com/article/231033-Report\\_DOCSIS\\_3\\_0\\_To\\_Blanket\\_U\\_S\\_By\\_2013.php](http://www.multichannel.com/article/231033-Report_DOCSIS_3_0_To_Blanket_U_S_By_2013.php) (citing statistics from Pike & Fischer).

### C. Other Indicia of Vigorous Competition in the Provision of Broadband Access

33. Other marketplace evidence also demonstrates that cable companies and telcos are competing aggressively for subscribers, that competitive rivalry between cable companies and telcos is increasing, and that this competition is benefitting consumers with better broadband services and lower prices.<sup>66</sup>

#### 1. Prices Have Fallen and Service Quality Has Improved

34. The available evidence shows that broadband access prices have declined over time, while speed and quality of service have increased considerably.<sup>67</sup> In some cases, prices for the same level of service have fallen outright. In other instances, the consumer receives better and faster service, often significantly better and faster, for the same price. From an economic perspective, both of these are an indication that quality-adjusted prices have fallen.

35. A 2008 USTelecom analysis calculated that, industry wide, prices for telco plans ranging from 768 kbps to 1.5 Mbps dropped from about \$50 per month in 2001 to \$25 in 2007, and that a 15 Mbps plan, which was not even available in 2001, could be purchased for \$51 in 2007.<sup>68</sup> In other words, by 2007 consumers could obtain basic broadband service for 50% of the price they were paying in 2001, and for the same 2001 price they could get 10 to 20 times the maximum download speed by 2007.<sup>69</sup> Price declines have continued since then. Litan and Singer (2007) documented that the price of Verizon broadband service with 768 kbps of download speed had fallen from \$49.95 in 2001 to \$19.99 in 2007.<sup>70</sup> In 2009, a \$19.99 price from Verizon offered download speeds of up to 1 Mbps.<sup>71</sup> SBC (the precursor to the current AT&T) offered a 3 Mbps

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<sup>66</sup> In its 2007 report on the broadband Internet access industry, the FTC noted that “[t]here is evidence that the broadband Internet access industry is moving in the direction of more, not less, competition, including fast growth, declining prices for higher-quality service, and the current market-leading technology (i.e., cable modem) losing share to the more recently deregulated major alternative (i.e., DSL).” “Broadband Connectivity Competition Policy,” *FTC Staff Report*, June 2007, p. 10. (“FTC Staff Report 2007”)

<sup>67</sup> Price comparisons are complicated by significant improvements in speed, reliability, and quality of service over time. Price comparisons are also complicated by temporary promotions, contract terms, and bundled packages. See, e.g., Barclay’s Capital Equity Research, *Cable & Satellite Communications*, January 12, 2009. Nonetheless, comparisons of pricing offers over time still provides a useful guide to provider behavior.

<sup>68</sup> USTelecom, *Wireline Broadband Pricing 2001–2007 Presentation*, June 2008 available at <http://www.ustelecom.org/uploadedFiles/Learn/Broadband.Pricing.Document.pdf>.

<sup>69</sup> 15 Mbps is 10 times 1.5 Mbps and approximately 20 times 768 kbps.

<sup>70</sup> Robert Litan and Hal Singer (2007), “Unintended Consequences of Net Neutrality Regulation,” *Journal on Telecommunications and High Technology Law*, p. 17.

<sup>71</sup> Verizon website <http://www22.verizon.com/Residential/HighSpeedInternet/Plans/Plans.htm> last accessed on December 7, 2009.

month-to-month broadband plan for \$59.95 in 2005.<sup>72</sup> In 2009, AT&T offered a 3 Mbps month-to-month plan for \$30 per month.<sup>73</sup>

36. Cable companies have been boosting the speed of their access without increasing price over this same time period. In 2005, Comcast increased the download speed of its service from 3 Mbps to 4 Mbps at no extra cost. Its premium 4 Mbps service experienced a 50% increase in speed to 6 Mbps, also at no extra cost.<sup>74</sup> Time Warner Cable and Cox Communications upgraded their services at about the same time.<sup>75</sup> To get a sense of actual prices, in 2005 Comcast offered a 4 Mbps plan at \$42.95 per month.<sup>76</sup> In 2009, Comcast advertises a 15 Mbps plan for the same \$42.95 per month.<sup>77</sup> This represents a decline from \$10.74 per megabit in 2005 to \$2.86 per megabit in 2009. In 2005, Cox advertised a 5 Mbps plan for \$64.95 per month.<sup>78</sup> In 2009, Cox advertises speeds of up to 20 Mbps for the same \$64.95 price.<sup>79</sup> This represents a decline from \$12.99 per megabit in 2005 to \$3.25 per megabit in 2009.

37. Many providers also offer economy broadband Internet service plans for budget-conscious consumers. For example, Comcast currently offers a 1 Mbps plan for only \$24.95 per month.<sup>80</sup> Cox offers its “Essential” cable Internet plan with speeds up to 3Mbps for \$31.99 per month.<sup>81</sup> Verizon offers DSL service at 1 Mbps, 3 Mbps, and 7.1 Mbps for \$19.99, \$29.99, and \$39.99 per month, respectively.<sup>82</sup>

38. Beyond competing strictly on monthly prices, wireline broadband providers also routinely offer various promotions and discounts. Providers offer special low prices for a limited period. They also have given away free hardware like modems, routers, and, recently, new netbooks. For

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<sup>72</sup> Bear Stearns Equity Research, *June Broadband Buzz: Pricing Actions, WiMAX, and Cable Privatization*, June 22, 2005, p. 2. (“Bear Stearns 2005”)

<sup>73</sup> See <http://www.att.com/gen/general?pid=10891> last accessed December 10, 2009.

<sup>74</sup> “Comcast to Raise Broadband Speed,” *CNet News*, January 16, 2005 available at [http://news.cnet.com/2100-1034\\_3-5537306.html](http://news.cnet.com/2100-1034_3-5537306.html). (“CNet News 2005”)

<sup>75</sup> CNet News 2005.

<sup>76</sup> Bear Stearns 2005, p. 2.

<sup>77</sup> See <http://www.comcast.com> for pricing information. Pricing information was found for Palo Alto, CA and last accessed on December 7, 2009.

<sup>78</sup> Bear Stearns 2005, p. 2.

<sup>79</sup> See <http://ww2.cox.com/residential/santabarbara/internet/premier-internet.cox> last accessed on December 10, 2009.

<sup>80</sup> See <http://www.comcast.com/> for internet prices last accessed on January 8, 2010.

<sup>81</sup> See <http://ww2.cox.com/residential/santabarbara/internet/premier-internet.cox> last accessed on December 10, 2009.

<sup>82</sup> See <http://www22.verizon.com/Residential/HighSpeedInternet/Plans/Plans.htm> last accessed on December 7, 2009.

example, Verizon recently ran a promotion that included a “Free Netbook/Camcorder.”<sup>83</sup> Cash back promotions are also popular.<sup>84</sup> The trend of lower prices and faster speeds demonstrates an environment where cable and telco companies are vigorously competing to attract and retain subscribers.

39. Consumers are also benefitting from having an increasing array of service options available from their cable and telco providers. Both cable and telco broadband providers typically offer a range of different pricing tiers that correspond to different speeds of service. For example, Comcast currently offers five different types of service plans based on speed: 1, 15, 20, 30 and 50 Mbps.<sup>85</sup> Verizon currently offers three types of plans, with speeds at 1 Mbps, 3 Mbps, and 7.1 Mbps.<sup>86</sup> Other wireline providers offer similar selections. Cable and telco providers also offer broadband as part of bundles of services, which typically offer consumers additional discounts as well as added convenience. Consumers can often choose to purchase broadband service with any combination of voice and television service, usually with an accompanying discount. This provides consumers with another dimension of choice – and greater price competition.

40. While quality-adjusted broadband prices have been declining, broadband service quality has also been improving, which is yet another sign of vigorous competition between cable and telco providers. Consumer Reports concluded in a 2009 report that subscribers were very satisfied with their broadband service from telcos and cable providers.<sup>87</sup> JD Power and Associates reported that overall satisfaction for residential high-speed internet service has increased relative to 2008 with improvement in performance and reliability.<sup>88</sup> TM Forum, an industry group for the communications and media industries, found that customer service for residential broadband has

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<sup>83</sup> Bank of America Pressure Eases 2009, p. 1. Also, see Verizon’s Neighbor Awareness 60 \$119 Rev 2 YVCF9102000.mov.

<sup>84</sup> See e.g., Bear Stearns April 2008, pp. 6–7.

<sup>85</sup> See Comcast internet plans available at <http://www.comcast.com> last accessed on December 15, 2009 for a Palo Alto, CA address.

<sup>86</sup> See <http://www22.verizon.com/Residential/HighSpeedInternet/Plans/Plans.htm> last accessed on December 7, 2009.

<sup>87</sup> See ConsumerReports.org report on Bundled Services posted in January 2009 available at <http://www.consumerreports.org/cro/electronics-computers/tvs-services/bundled-services/overview/bundling-ov.htm> last accessed on December 15, 2009.

<sup>88</sup> “J.D. Power and Associates Reports: Improvements in Performance and Reliability Drive Increase in Overall Customer Satisfaction with Residential Internet Service Providers,” *J.D. Power and Associates Press Release*, October 28, 2009.

increased dramatically since 2006. The group credits this improvement to more consumer choice and increasing competition.<sup>89</sup>

## **2. Cable Companies and Telcos Target Each Other's Broadband Service in Their Advertising**

41. Recent advertising campaigns by cable companies and telcos comparing their broadband services and prices provide further evidence of vigorous head-to-head competition between the two. Economists recognize that a main purpose of advertising is to increase demand for a firm's product.<sup>90</sup> Aggressive advertising that directly compares prices and services is strongly indicative of firms' attempts to change market perceptions and to increase market share. Many empirical studies have shown that advertisements about prices tend to reduce the average price consumers pay.<sup>91</sup>

42. Cable companies such as Cablevision, Brighthouse, Comcast, and Time Warner Cable have campaigns that emphasize cable's purportedly faster speeds,<sup>92</sup> lower prices,<sup>93</sup> better service and customer satisfaction,<sup>94</sup> and overall better value<sup>95</sup> in direct comparison to telcos generally and Verizon, specifically. Cox even has a campaign describing the experience of actual customers who have switched from telcos back to Cox,<sup>96</sup> and Cablevision has unleashed promotions giving away a free iPod Touch or cash back to consumers who make a switch.<sup>97</sup> Verizon has countered with similar advertisements trumpeting its offerings as the "best value in broadband."<sup>98</sup> Such aggressive advertising is not limited to telcos and cable. For example, Clearwire, a recent entrant into the broadband market, which I will discuss later, also markets itself on its website as an

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<sup>89</sup> The report specifically looked at customer service during service activation, response times to customer service requests, and incidents of repeated problems. "Residential Broadband Service Providers Have Improved Service Delivery and Problem Resolution Speed, Says New TM Forum Report," *M2 PressWire*, October 13, 2009.

<sup>90</sup> See Carlton and Perloff (2005), p. 477.

<sup>91</sup> See Carlton and Perloff (2005), p. 481.

<sup>92</sup> See Cablevision's *Woman Talks About Offer With No Hidden Fees.wmv*. See also Time Warner's *TMWCCA-16193a.mp3*.

<sup>93</sup> See Comcast's *COMCA-22818a.wmv* and *Attention Verizon Internet Customers.wmv*.

<sup>94</sup> See Cablevision's *GTAD81901.mp3*.

<sup>95</sup> See Brighthouse's *BRTHCA-1188a.mp3*.

<sup>96</sup> See Cox's *Customers Tell Us Why They're Switching.wmv*.

<sup>97</sup> See Cablevision's *CABVCA-1747a.wmv* and *CABVCA-1841a.wmv*.

<sup>98</sup> See Verizon's *Poster Revised Final 4[2].3.09.pdf*.

alternative to DSL and cable in home broadband provision,<sup>99</sup> and many observers including the Department of Justice see Clearwire as a viable alternative for wireline broadband customers.<sup>100</sup>

43. As I discussed above, Verizon has been extensively deploying and marketing its fiber-based FiOS broadband service. This has led to additional comparative advertising by Verizon and cable companies. Verizon has been heavily promoting FiOS by offering cash back deals or free netbooks for switching to FiOS.<sup>101</sup> Its advertisements have criticized cable broadband technology.<sup>102</sup> Cable companies such as Comcast, Cox, and Time Warner have responded by specifically targeting FiOS in their advertisements underscoring their allegedly better customer service,<sup>103</sup> emphasizing their better value,<sup>104</sup> and highlighting FiOS customers who have returned to cable.<sup>105</sup> Comcast and Cablevision have offered their own cash back promotions.<sup>106</sup>

### **3. All Sectors of the Wireline Broadband Ecosystem Are Thriving**

44. Another sign that competition for wireline broadband access is thriving is the massive innovation and investment that is taking place at all levels of the wireline broadband ecosystem. Innovation in content is evident through the development and popularity of Google, YouTube, iTunes, Facebook, Twitter, Hulu, and much more. Innovation has occurred in hardware as well; gaming consoles such as the Nintendo Wii rely on wireline broadband connections to bring online gaming and online content to consumers,<sup>107</sup> and the Vudu box allows users to watch movies from the Internet directly on their television.<sup>108</sup> The massive investment that occurs to promote this innovation reflects investor and marketplace confidence in the ability of consumers to obtain access to the broadband services necessary to access these content, applications, and devices. And the fact that this great success in the development and use of broadband applications, content, and devices has occurred in the absence of network neutrality regulation provides strong evidence that such regulation is unnecessary for the broadband ecosystem to develop and thrive.

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<sup>99</sup> See <http://www.clear.com/shop/services/home> last accessed on December 15, 2009.

<sup>100</sup> Economic Issues in Broadband Competition, p. 9.

<sup>101</sup> See CCT90024 Drop Cable Advo FSI 25-F-1.pdf; See Neighbor Awareness 60 \$119 Rev 2 YVCF9102000.mov.

<sup>102</sup> See More HD National YVZH8184.mov.

<sup>103</sup> See Cox's Employee Reads Quotes From Returning Customers.pdf.

<sup>104</sup> See Time Warner Cable 0197BAXZ\_PA0.wmv.

<sup>105</sup> See Comcast COMCA-24590a.mp3.

<sup>106</sup> See Comcast's Mike and Sarah are Back with 150 offer.pdf. See Bank of America Merrill Lynch, *Battle for the Bundle: Cable Chips Away at Bell Pricing Gap*, July 15, 2009, pp. 2–3. Cablevision's offer was for a \$200 American Express card.

<sup>107</sup> See <http://us.wii.com/connect/> last accessed on January 9, 2010.

<sup>108</sup> "High-Speed Video Store in the Living Room," *The New York Times*, September 6, 2007.

### III. Wireless Broadband Competition

45. Increasingly, cable and wireline telco are not the only platforms over which consumers receive broadband access. Wireless providers initially began to expand into data and broadband several years ago, with technologies such as 1xRTT. With the subsequent deployment of 3G and 4G technologies, consumers are increasingly using mobile wireless broadband for email, Internet access, social networking, access to streaming media, and other uses that had previously been available predominantly from wireline providers. Consumers can access broadband content via a variety of mobile devices, including smartphones, netbooks and laptops. Indeed, mobile broadband has become such an integral part of the broadband experience, that applications and content are now being developed specifically for mobile access. In this section, I document the competition among mobile wireless providers to provide broadband services.

46. The Commission has already assembled substantial evidence that there is vigorous competition within the mobile wireless ecosystem, of which mobile broadband is an increasingly important component. It has repeatedly concluded that the mobile wireless industry is competitive. In its most recent CMRS Competition Report, released on January 16, 2009, the Commission stated that “U.S. consumers continue to benefit from effective competition in the CMRS marketplace.”<sup>109</sup>

47. Since then, the Commission has initiated a Notice of Inquiry<sup>110</sup> on mobile wireless competition, seeking “to expand and enhance [its] analysis of competitive conditions, both to improve [its] assessment of the current state of competition in the entire mobile wireless market ecosystem and to better understand the net effects on the American consumer.” The record established in response again demonstrated the competitive nature of the mobile wireless industry, including the provision of mobile broadband services. Many parties submitted evidence regarding the vigor of competition, the high level of innovation, and the variety of business models within the mobile wireless ecosystem.

48. I submitted a declaration on behalf of Verizon Wireless, concluding that:

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<sup>109</sup> Thirteenth CMRS Competition Report, ¶274.

<sup>110</sup> Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, WT Docket No. 09-66, Notice of Inquiry, FCC 09-67, released August 27, 2009.

“The wireless market [including mobile broadband], while not perfectly competitive according to the textbook model, shows many signs of vigorous competition – low prices, numerous customer choices, new services and features, improved quality, and significant innovation. Most consumers have numerous choices when purchasing wireless service; switching between providers has gotten easier; service packages offering various bundles of services are available to consumers with different needs; there has been robust price competition for voice and data plans; wireless devices and mobile operating systems are evolving rapidly; and large numbers of new applications are available and in widespread use.”<sup>111</sup>

49. Similarly, in the Commission’s recent Mobile Wireless Innovation NOI proceeding, Gerald Faulhaber and David Farber filed a declaration that stated: “[W]e find that the three segments of the wireless marketplace (applications, devices, and core network) [including mobile broadband] have exhibited very substantial innovation and investment since inception... Further we find that the three segments of the industry are also highly competitive. There are many players in each segment, each of which aggressively seeks out customers through new technology and new business methods.”<sup>112</sup>

50. And, in the few months since the filing of these reports, developments have only served to reinforce the fact that competition to provide mobile broadband services is vigorous and evolving to meet varied consumer demands. In this section I discuss various market evidence related to the provision of mobile broadband services.<sup>113</sup>

#### **A. Consumers Have Many Choices for Mobile Broadband Service**

51. Market structure evidence shows that the majority of consumers have considerable choice in where and how they purchase and use mobile broadband services. All four “nationwide” facilities-based providers (AT&T, Verizon Wireless, Sprint, T-Mobile), several large regional facilities-based providers (MetroPCS, Leap, U.S. Cellular), and many smaller regional providers

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<sup>111</sup> Michael Topper (2009), “Assessing the Competition of Mobile Wireless: An Economic Analysis,” White Paper Regarding the FCC’s Mobile Wireless Competition NOI, September 30, 2009, p. 3.

<sup>112</sup> Gerald Faulhaber and David Farber (2009), “Innovation in the Wireless Ecosystem: A Customer-Centric Framework,” White Paper Regarding the FCC’s Mobile Wireless Innovation NOI, p. 2.

<sup>113</sup> For additional information, see my declaration for the Mobile Wireless Competition NOI proceeding (Topper (2009)), and other submissions to the Mobile Wireless Competition NOI and Mobile Wireless Innovation NOI proceedings.

provide mobile broadband services, along with voice, email and other services.<sup>114</sup> In addition, recent experience demonstrates that new entry is possible on a wide scale. For example, Clearwire – which is backed by Sprint as well as powerful industry players such as Intel, Google, and several cable companies – has recently entered the market as a mobile broadband provider. Finally, some MVNOs such as Virgin Mobile, Beyond Mobile and Credo Mobile also provide mobile broadband along with their voice services, further increasing the number of providers.<sup>115</sup>

52. Several new developments in the wireless industry have strengthened and expanded the provision of wireless broadband service. Recent acquisitions have enabled the facilities-based nationwide providers to expand their footprints and increase the capacity of their existing networks. Expansion from regional to nationwide footprints and aggregation of spectrum has allowed providers to achieve better economies of scale. These operating efficiencies have, in turn, allowed for expansion of 3G networks and deployment of 4G networks at speeds that greatly facilitate wireless broadband.

53. According to the Commission, as of May 2008, 92.3% of the population lived in census blocks with one or more provider of 3G wireless, 72.5% of the population lived in census blocks with two or more providers of 3G wireless, and 50.7% of the population lived in census blocks with three or more providers of 3G wireless.<sup>116</sup> This compares favorably to May 2007, when only 82.0% of the population lived in census blocks with one or more provider of 3G, 64.0% of the population lived in census blocks with two or more providers of 3G, and 41.0% of the population lived in census blocks with three or more providers of 3G.<sup>117</sup> Furthermore, as I discuss in detail below, wireless providers have continued to deploy next-generation technologies since 2008, suggesting that the penetration numbers reported for 19 months ago likely are a significant underestimate of current conditions.

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<sup>114</sup> For example, small regional carriers like Cincinnati Bell Wireless, NTELOS, SouthernLINC, Corr Wireless, Pocket Communications, and Cellular South, have mobile broadband services, just like their larger competitors.

<sup>115</sup> See Verizon Wireless Comments to Competition NOI, WT Docket No. 09-66, filed September 30, 2009, p. 33 for a list of MVNO's. ("Verizon Comments to Competition NOI") See Beyond Mobile's website <http://www.cbeyond.net/services/mobile/wireless-laptop-access.htm> accessed November 30, 2009. See Credo Mobile's website <http://www.credomobile.com/plan/extras.aspx> last accessed December 14, 2009. See Virgin Mobile's website <http://www.virginmobileusa.com/mobile-broadband> last accessed on December 14, 2009. Virgin Mobile is owned by Sprint.

<sup>116</sup> Based on American Roamer data at the census block level, with "mobile broadband" defined as WCDMA/HSDPA or EV-DO technologies. The U.S. Census Bureau uses census blocks as the smallest geographic unit in which to tabulate the census. Census blocks generally contain fewer than 3,000 people and are more granular than zip codes. Thirteenth CMRS Competition Report, ¶¶37–38, 146.

<sup>117</sup> Twelfth Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, February 4, 2008, ¶144.

54. The market structure of the mobile wireless industry, with numerous providers competing to offer a range of mobile broadband services to consumers, is one indicator of vigorous competition. Other pieces of market evidence, including increasing output, declining prices, diverse service offerings and business practices, significant investment in network infrastructure, highly competitive adjacent markets for wireless devices, mobile operating systems, applications, and broadband content, and significant innovation throughout the mobile wireless ecosystem also points to fierce rivalry among wireless providers. This market evidence, which I review in the next several sections, strongly suggests a well-functioning and rapidly evolving competitive marketplace that has delivered numerous consumer benefits and in which market forces are leading providers to adopt business and network management practices that benefit consumers.

### **B. Mobile Broadband Has Experienced Tremendous Growth**

55. Mobile broadband has become an integral part of the wireless experience, with tremendous growth in mobile broadband usage in recent years. The number of mobile advanced services lines has increased from about 21,000 in 2005 to 20 million in 2008.<sup>118</sup> According to CTIA, data revenue per user<sup>119</sup> accounted for 25.7% of total wireless revenue per user in the first half of 2009, up from 6.8% in the last half of 2005.<sup>120</sup> Marketing and survey figures confirm that Americans are increasingly using mobile broadband services.<sup>121</sup> For example, a 2009 Pew Internet Survey indicated that 19% of all Americans reported accessing the Internet from their mobile device “yesterday.” In 2007 this same figure was 11%.<sup>122</sup>

56. With respect to specific applications, the marketing company comScore noted that the number of daily users assessing news and information from the Internet on their mobile device increased 107% in one year alone, from 10.8 million in 2008 to 22.4 million in 2009. Mobile broadband users accessing social networking and blogging sites increased by 427% over the same time frame.<sup>123</sup>

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<sup>118</sup> FCC High-Speed Services 2009, Table 2.

<sup>119</sup> This includes revenue from text messaging and emails.

<sup>120</sup> CTIA's *Wireless Industry Indices: Mid-Year 2009 Results*, November 2009, p. 116.

<sup>121</sup> According to Chetan Sharma Consulting, the U.S. wireless data market grew 27 percent from third quarter 2008 to 2009 and exceeded \$11.3 billion in mobile data service revenues in third quarter 2009. Chetan Sharma Consulting, *US Wireless Data Market - Q3 2009 Update Presentation*, November 2009 available at <http://chetansharma.com/usmarketupdateq309.htm>.

<sup>122</sup> “Wireless Internet Use,” *Pew Internet & American Life Project*, July 2009, p. 4. (“Pew Wireless 2009”)

<sup>123</sup> “Mobile Internet Becoming a Daily Activity for Many,” *comScore Press Release*, March 16, 2009.

### C. Mobile Broadband Prices Have Declined

57. Declining quality-adjusted prices provide further evidence of vigorous competition among mobile broadband providers. In addition, providers offer a large variety of broadband services and plans to fit different consumer needs, and many of these services were not available even just a few years ago.

58. In 2004, AT&T offered a data plan of \$19.99 for the first 8MB of data.<sup>124</sup> In 2009, AT&T offered a 200 MB mobile broadband plan for \$40, a reduction from \$2.50 per MB to \$0.20 per MB. In 2004, Sprint offered a \$40 data plan for 20MB. In 2009, Sprint's 5GB mobile broadband plan was priced at \$60, a reduction from \$2 per MB to \$0.12 per MB. Analogously, Verizon's unlimited data plan was priced at \$80 in 2004. Its 5 GB plan was priced at \$60 in 2009,<sup>125</sup> an amount of data that could not be conceivably used in 2004. Of course, these prices do not incorporate the improvements in service quality that has occurred over these years, which is itself reflected in the large increases in the usage allowances of mobile data plans.

59. In competitive markets, providers will seek to differentiate themselves from their rivals, often by targeting different types of consumers. Thus, beyond competing by offering lower prices, providers are also competing by offering a range of plans to better fit customer needs. Providers have high usage plans, low usage plans, plans for smartphones, plans for laptops and netbooks, and tethering options where a smartphone can be used to provide Internet access to another device, often a laptop or netbook.<sup>126</sup> For example, Verizon Wireless currently offers plans ranging from as low as 75MB for a day of use to 5GB monthly plans.<sup>127</sup> T-Mobile and AT&T each offer both a 200 MB and 5 GB per month plans, and T-Mobile also offers an unlimited data plan.<sup>128</sup>

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<sup>124</sup> Precise price comparisons over time are hampered by the dramatic improvements in mobile broadband services, making it difficult to find the same type and quality of plan offered over time. For example, in 2004, data plans were primarily for email and text operated at much slower speeds, and much less mobile broadband content was available.

<sup>125</sup> Data from 2004 comes from Gerard Brosnan (2005), "Trends in the Mobile Data Services Market," *The Telecommunications Review*, p. 4. Data for 2009 comes from Verizon Comments to Competition NOI, p. 72.

<sup>126</sup> For example, AT&T offers a smartphone data plan that allows tethering; see <http://www.wireless.att.com/cell-phone-service/cell-phone-plans/pda-personal-plans.jsp> last accessed on December 16, 2009.

<sup>127</sup> See <http://www.verizonwireless.com/b2c/mobilebroadband/?page=plans&lid=//global/plans//mobile+broadband+plan> last accessed on December 14, 2009.

<sup>128</sup> For AT&T see <http://www.wireless.att.com/cell-phone-service/cell-phone-plans/data-connect-plans.jsp>; for T-Mobile see [http://www.t-mobile.com/shop/plans/Cell-Phone-Plans.aspx?catgroup=Internet-Email-cell-phone-plan&WT.z\\_shop\\_plansLP=Internet\\_email](http://www.t-mobile.com/shop/plans/Cell-Phone-Plans.aspx?catgroup=Internet-Email-cell-phone-plan&WT.z_shop_plansLP=Internet_email) last accessed on December 15, 2009.

#### **D. Mobile Wireless Advertising Specifically Promotes Broadband Services and Quality**

60. Mobile wireless providers frequently advertise,<sup>129</sup> and much of this advertising is focused on comparing their broadband networks and the smartphones and other wireless devices available for use on their networks against other providers' service packages. As mentioned above, advertising's general purpose is to increase demand for a firm's products, and these comparative advertising campaigns indicate that wireless providers are promoting their network and device capabilities in an effort to retain and attract subscribers. Key points of competitive differentiation include network coverage, speed, and quality, and providers have been prominently advertising these distinctions to consumers. For example, Verizon is currently running a campaign showing that its footprint of 3G coverage is five times larger than AT&T's.<sup>130</sup> In response, AT&T is running ads claiming to have the nation's fastest 3G network,<sup>131</sup> and Sprint is touting itself as "America's most Dependable 3G network."<sup>132</sup> Clearwire's website claims that its mobile Internet speeds are four times faster than 3G.<sup>133</sup> Smartphones are also prominently featured in wireless provider advertising and marketing efforts, with recent examples including Verizon's Motorola and other Android handsets, Sprint's Palm Pre and Samsung and HTC Android handsets, T-Mobile's Android devices, and AT&T's next-generation iPhones.

#### **E. Mobile Subscribers Can and Do Switch Providers**

61. Wireless subscribers have many options for mobile broadband and other services, and market evidence indicates that they frequently switch providers. Most wireless providers have been reporting churn rates in the range of 1.5% to 3.0% per month, with an average churn rate of 1.9% in first quarter 2008,<sup>134</sup> implying annual churn of more than 22%. This suggests that approximately 60 million subscribers leave their providers each year, providing evidence that subscribers can and do switch providers. Although these churn statistics are for mobile wireless overall, and not specifically for mobile broadband, voice and data plans are often bundled

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<sup>129</sup> See CTIA Comments to Competition NOI, WT Docket No. 09-66, filed September 30, 2009, pp. 52-55. ("CTIA Comments to Competition NOI")

<sup>130</sup> "AT&T Loses First Legal Battle Against Verizon Ads," *CNet News*, November 18, 2009.

<sup>131</sup> See <http://www.att.com/truthabout3g/> last accessed on December 24, 2009.

<sup>132</sup> Sprint homepage, <http://www.sprint.com/index.html> (click on the 'Coverage' tab) last accessed on December 24, 2009.

<sup>133</sup> See <http://www.clear.com/discover> last accessed on December 10, 2009.

<sup>134</sup> Thirteenth CMRS Competition Report ¶181.

together. Clearwire predominately provides mobile broadband, and its churn rates are consistent with those given above, at about 2.6% per month.<sup>135</sup>

62. Consumers switch wireless providers for a variety of reasons, including the pursuit of lower prices, new cutting-edge devices, new features, specialized content, and improved network quality. The ability of consumers to switch providers has several implications for the current debate about network neutrality regulation. First, wireless providers can attract subscribers by developing attractive services, including services targeted to particular types of consumers. The market has already produced bountiful examples of this differentiation – from cell services designed specifically for children to services aimed at older Americans or teenagers. With respect to access to broadband content, consumers likely vary in the degree to which they want their provider to manage their Internet environment and protect them from harmful Internet content such as malware and viruses. In response, providers offer a range of smartphones, some that provide a more controlled environment where the network operator has vetted the available applications and others where consumers have more unfettered choice to download any applications and take on more responsibility for their own Internet security. Second, if a provider were to adopt network management practices or limit content in ways that were not appealing to consumers, consumers could – and would – switch to other providers. This competitive pressure creates a strong disincentive for providers to implement network management and business practices that are not valued by consumers.

#### **F. Wireless Providers have been Innovating and Investing in Next-generation Technologies**

63. As I described above in my discussion of network investment by wireline broadband providers, economists recognize the importance of innovation and investment in technology industries. Deployment of next-generation technologies is a very important indicator of mobile broadband competition. Recent and ongoing technology upgrades have allowed wireless providers to significantly improve the coverage, bandwidth, and the capabilities of their networks and respond to consumer demand for access to more bandwidth-intensive broadband content.

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<sup>135</sup> Macquarie Equities Research, *Clearwire Upgrading to Outperform*, October 15, 2009, Fig. 11. (“Macquarie Clearwire Upgrading 2009”)

64. Since 2001, America's wireless providers have made an average combined investment of more than \$22.8 billion per year to upgrade their networks.<sup>136</sup> Wireless providers have been aggressively expanding their deployment of 3G and 4G technologies and, in the past four years alone, have invested more than \$32.7 billion in acquiring the new spectrum required to implement these technologies.<sup>137</sup> Wireless providers continued to make substantial investments in their networks in 2009, and plan to continue to do so in 2010 and future years. These networks with their increased data throughput allow for expansion in the range of devices, applications, and content accessible to consumers.

65. Verizon Wireless has been heavily investing in next-generation technologies, averaging over \$5.5 billion in infrastructure investment per year.<sup>138</sup> The Verizon Wireless 3G network footprint now covers more than 284 million people,<sup>139</sup> including many who live in rural areas. With respect to 4G, Verizon is relying on LTE, which will permit downloads at peak rates of at least 100 Mbps with low latency. The company already has completed test calls over its 4G network in Boston and Seattle.<sup>140</sup> Verizon also has announced plans to launch 4G service in 30 markets covering a population of 100 million in 2010 and covering its entire 3G footprint by 2013.<sup>141</sup>

66. Other wireless providers have also invested heavily in new technologies. AT&T has spent more than \$38 billion in the past two years to upgrade its wireline and wireless networks,<sup>142</sup> and expected to spend between \$11 and \$12 billion in 2009 on its wireline and wireless infrastructure, part of it going to expand and upgrade its 3G network to HSPA at 7.2 Mbps speeds.<sup>143</sup> As of summer 2009, AT&T provided 3G coverage in about 350 metropolitan areas.<sup>144</sup> Since September

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<sup>136</sup> *Ex Parte* Letter from Christopher Guttman-McCabe, CTIA, to Chairman Julius Genachowski et al., FCC, GN Docket No. 09-51, WT Docket Nos. 08-165, 09-66, July 9, 2009, Attachment, p. 3.

<sup>137</sup> See "Auction of 700 MHz Band Licenses Closes; Winning Bidders Announced for Auction 73," *Public Notice*, DA 08-595, March 20, 2008. "Auction of Advanced Wireless Services Licenses Closes; Winning Bidders Announced for Auction 66," *Public Notice*, DA 06-1882, September 20, 2006. Auction 73's net winning bids were \$18.958 billion. Auction 66's net winning bids were \$13.7 billion.

<sup>138</sup> See [http://aboutus.vzw.com/bestnetwork/network\\_facts.html](http://aboutus.vzw.com/bestnetwork/network_facts.html) last accessed December 24, 2009.

<sup>139</sup> "Verizon Reports Revenue Growth and Continued Improvement in Cash Flow in 2Q," *Verizon Wireless Press Release*, July 27, 2009; Verizon Wireless website available at [http://aboutus.vzw.com/bestnetwork/network\\_facts.html](http://aboutus.vzw.com/bestnetwork/network_facts.html) last accessed January 1, 2005.

<sup>140</sup> Verizon 3Q Investor Quarterly 2009, p. 7; see also archive of Verizon Wireless press releases available at <http://news.vzw.com/news/index.html>.

<sup>141</sup> "Verizon Completes Initial 4G Wireless Test," *CNet News*, August 14, 2009 available at [http://news.cnet.com/8301-1035\\_3-10310232-94.html](http://news.cnet.com/8301-1035_3-10310232-94.html).

<sup>142</sup> "Rinne: AT&T Ready for 4G Jump," *WirelessWeek.com*, September 15, 2009 available at <http://www.wirelessweek.com/News/2009/09/Rinne--AT-T-Ready-for-4G-Jump/>.

<sup>143</sup> "AT&T to Make Faster 3G Technology Available in Six Major Cities This Year," *AT&T Press Release*, September 9, 2009 available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=27068>.

<sup>144</sup> AT&T Comments to Fourteenth Report Public Notice, WT Docket No. 09-66, filed June 15, 2009, p. 25.

2009, AT&T has brought or improved its 3G network to dozens of communities in Virginia, Wisconsin, Vermont, upstate New York, Kentucky, Connecticut, Florida, South Carolina, and others.<sup>145</sup> AT&T will be starting LTE trials in 2010,<sup>146</sup> with commercial deployment beginning in 2011.<sup>147</sup>

67. Sprint's mobile broadband network covered more than 271 million people as of August 2009,<sup>148</sup> and Sprint has recently brought 4G to 27 markets,<sup>149</sup> including Honolulu, Maui, San Antonio, Seattle, and Chicago.<sup>150</sup> The company plans to bring service to multiple additional markets during 2010, including Boston, Houston, New York, San Francisco and Washington, D.C.<sup>151</sup>

68. T-Mobile planned to spend \$5 billion in 2009<sup>152</sup> and expand its 3G network to reach a potential 200 million wireless users by the end of 2009.<sup>153</sup> T-Mobile also expects to have HSPA+ on a nationwide basis by 2010, making it the operator with "the highest data speeds in the largest footprint."<sup>154</sup>

69. Clearwire is entering the market principally as a mobile broadband provider and is a current market leader in providing 4G service. It is backed by a total investment of over \$3.2 billion from Comcast, Time Warner Cable, Bright House Networks, Intel, and Google.<sup>155</sup> Clearwire provides 4G WiMAX mobile broadband, relying on significant spectrum resources in most of the major

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<sup>145</sup> See archive of AT&T's press releases available at [http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsfunction=searchresults&beginning\\_month=9&beginning\\_year=2009&ending\\_month=11&ending\\_year=2009](http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsfunction=searchresults&beginning_month=9&beginning_year=2009&ending_month=11&ending_year=2009).

<sup>146</sup> "AT&T to Speed Its Network in 6 Cities by Year-End," *The New York Times*, September 10, 2009.

<sup>147</sup> "AT&T to Deliver 3G Mobile Broadband Speed Boost," *AT&T Press Release*, May 27, 2009. ("AT&T Speed Boost 2009")

<sup>148</sup> "HTC Touch Pro2 from Sprint Pairs a Dynamic Must-Have Business Device with the Best Value in Wireless," *Sprint Press Release*, August 31, 2009. This figure is inclusive of data roaming.

<sup>149</sup> "Sprint 4G Rollout Blazes on with Maui Launch," *Sprint Nextel Press Release*, December 1, 2009 available at [http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle\\_newsroom&ID=1360459](http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-newsArticle_newsroom&ID=1360459). ("Sprint Maui Launch 2009")

<sup>150</sup> See archive of Sprint's press releases available at [http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-news\\_newsroom&nyo=0](http://newsreleases.sprint.com/phoenix.zhtml?c=127149&p=irol-news_newsroom&nyo=0).

<sup>151</sup> Sprint Maui Launch 2009.

<sup>152</sup> See T-Mobile Comments to Competition NOI, WT Docket No. 09-66, 09-157, and 09-51, filed September 30, 2009, p. 9.

<sup>153</sup> "T-Mobile USA Unveils High-Speed Plans, New Device," *Reuters*, March 25, 2009 available at <http://www.reuters.com/article/ousivMolt/idUSTRE52O0WV20090325>.

<sup>154</sup> "Will T-Mobile USA Become the Dark Horse Mobile Broadband Leader?" *FierceWireless*, September 20, 2009 available at <http://www.fiercewireless.com/node/49583/print>.

<sup>155</sup> "Clearwire Completes Transaction with Sprint Nextel and \$3.2 Billion Investment To Launch 4G Mobile Internet Company," *Clearwire Press Release*, December 1, 2008. Sprint Nextel has a majority stake in Clearwire. See "Sprint CEO Sees Keeping Majority Clearwire Stake," *Reuters*, December 9, 2009. Other investors in Clearwire include Intel, Google, Comcast, Time Warner Cable, and Bright House Networks.

markets.<sup>156</sup> It also offers fixed access for customers who are willing to forego mobility and only want broadband access at home.<sup>157</sup> Clearwire also offers voice services, and, as such, can serve as an alternative to customers needing both voice and data.<sup>158</sup> By September 2009, Clearwire had launched CLEAR 4G WiMAX mobile broadband service in 14 markets with over 10 million people.<sup>159</sup> It plans to cover 120 million people in 80 markets by the end of 2010,<sup>160</sup> and some analysts expect it to expand to cover roughly 155 million people by 2011.<sup>161</sup>

70. Clearwire is also reselling its services to cable companies, enabling them to offer mobile broadband in addition to their other offerings. For example, Clearwire is reselling its 4G services to Comcast and Time Warner Cable. Both cable companies bundle mobile wireless service along with cable broadband in order to add mobility to their traditional wireline offerings.<sup>162</sup> This not only enhances the ability of cable broadband to compete with wireless but also its ability to compete with DSL.<sup>163</sup>

71. Regional providers are also deploying 3G technologies. US Cellular planned on making \$575 million in capital expenditures in 2009. US Cellular had conducted an EV-DO upgrade,<sup>164</sup> and planned to bring this upgrade to 60% of its total cell sites by the end of 2009.<sup>165</sup> MetroPCS planned to spend more than \$700 million in capital expenditures in 2009,<sup>166</sup> and also plans to begin

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<sup>156</sup> "Clearwire's Wolff Embraces 4G as a Whole but Touts Spectrum Position," *Telephony Online*, April 2, 2009.

<sup>157</sup> See <http://www.clear.com/shop/services/home> last accessed December 15, 2009.

<sup>158</sup> See <http://www.clear.com/shop/services/bundles> last accessed December 15, 2009.

<sup>159</sup> "Clearwire Introduces Clear™ 4G WiMAX Internet Service in 10 New Markets," *Clearwire Press Release*, September 1, 2009.

<sup>160</sup> Morgan Stanley, Clearwire Corporation 2Q09 Preview: Market Rollout and Wholesale Launches Progressing, August 10, 2009, p. 4.

<sup>161</sup> UBS Investment Research, Clearwire Corp.: Upgrade to Neutral, Funding Opens the Window a Little Wider, December 1, 2009, p. 2.

<sup>162</sup> "Comcast Begins National Rollout of High-Speed Wireless Data Service," *Comcast Press Release*, June 29, 2009 available at <http://www.comcast.com/About/PressRelease/PressReleaseDetail.ashx?PRID=887&fss=Portland>; "Time Warner Cable to Resell WiMAX Service," *CNet News*, July 30, 2009 available at [http://news.cnet.com/8301-1035\\_3-10300017-94.html](http://news.cnet.com/8301-1035_3-10300017-94.html).

<sup>163</sup> "Comcast COO Says Wireless Internet Snags DSL Users," *The Associated Press*, August 6, 2009 available at <http://www.cnbc.com/id/32318015>.

<sup>164</sup> Zacks Equity Research, *US Cellular Dragged Down by Low Sales*, November 6, 2009 available at <http://www.zacks.com/stock/news/27006/US+Cellular+Dragged+Down+by+Low+Sales?print=print>.

<sup>165</sup> "US Cellular accelerates EV-DO push, weighing LTE trial," *Telephony Online*, May 6, 2009 available at <http://telephonyonline.com/wireless/news/us-cellular-evdo-upgrade-0506>.

<sup>166</sup> "MetroPCS Reports Third Quarter 2009 Results," *MetroPCS Press Release*, November 5, 2009 available at <http://investor.metropcs.com/phoenix.zhtml?c=177745&p=irol-newsArticle&ID=1351455>.

to deploy LTE technology by the second half of 2010.<sup>167</sup> Leap Wireless introduced 3G service in Washington, D.C., Maryland, and Louisiana in the second half of 2009.<sup>168</sup>

72. Rural wireless providers are also pursuing 3G upgrades. Cellular South continued its multi-million dollar 3G deployment in 2009<sup>169</sup> and planned to add “324 new 3G cell sites in Mississippi alone” by the end of 2009.<sup>170</sup> Stelera Wireless expected to deploy HSPA<sup>171</sup> data services to 55 cities by the end of 2009, specifically to underserved rural communities.<sup>172</sup> Alaska Communications System Group and GCI, both of which provide mobile broadband to Alaska, both announced in 2008 that they had launched EV-DO Rev A technology and services.<sup>173</sup> Other rural providers, like Bluegrass Cellular, which operates in rural Kentucky,<sup>174</sup> and nTelos<sup>175</sup> which operates in Virginia, West Virginia, Kentucky, Ohio, Tennessee, Maryland, and North Carolina have also deployed 3G technology.

73. Beyond demonstrating the competitive rivalry of wireless providers in trying to improve their networks, the ongoing deployment of 3G and 4G technologies highlights the importance of investment incentives to the competitive dynamic. Mobile broadband is an evolving technology that involves expensive investment well ahead of demand, and proper incentives must be in place to encourage deployment of new and more efficient technology. As the Commission recognizes,

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<sup>167</sup> “MetroPCS Taps Samsung, Ericsson for network”, *Dallas Morning News*, September 16, 2009 available at <http://www.dallasnews.com/sharedcontent/dws/bus/industries/techtelecom/stories/091609dnbusmetropcs.1861a9b69.html>.

<sup>168</sup> For New Orleans see “Leap Brings Cricket Unlimited Wireless Services to Lake Charles, La.,” *Leap Wireless International Press Release*, November 17, 2009 available at [http://investor.leapwireless.com/phoenix.zhtml?c=95536&p=irol-newsArticle\\_Print&ID=1356548](http://investor.leapwireless.com/phoenix.zhtml?c=95536&p=irol-newsArticle_Print&ID=1356548); for Washington, DC and Maryland see “Leap Brings Cricket Unlimited Wireless Services to Washington D.C. and Baltimore,” *Leap Wireless International Press Release*, June 23, 2009 available at <http://phx.corporate-ir.net/phoenix.zhtml?c=191722&p=irol-newsArticle&ID=1301347&highlight=>.

<sup>169</sup> “Cellular South to Expand Availability of Advanced 3G Mobile Broadband Services Throughout Much of Mississippi”, *Cellular South Press Release*, March 10, 2009 available at <https://www.cellularsouth.com/news/2009/20090310.html>.

<sup>170</sup> “Cellular South Expands Advanced 3G Mobile Broadband Network in Carroll County,” *Cellular South Press Release*, December 9, 2009, <https://www.cellularsouth.com/news/2009/20091209.html>.

<sup>171</sup> The combination of HSUPA and HSDPA is commonly referred to as HSPA. See RYSAVY Research, *EDGE, HSPA, and LTE: The Mobile Broadband Advantage*, September 2007, p. 3.

<sup>172</sup> “Stelera Selects Ceragon IP Solutions to Backhaul Wireless Broadband in Rural America,” *PR Newswire*, May 4, 2009 available at [http://www.breitbart.com/article.php?id=prnw.20090504.UKSU004B&show\\_article=1](http://www.breitbart.com/article.php?id=prnw.20090504.UKSU004B&show_article=1).

<sup>173</sup> “ACS Launches Rev A Technology; Provides Fastest Mobile Data Speeds Available in the Nation,” *Alaska Communications System Press Release*, July 31, 2008 available at <http://www.acsalaska.com/assets/releases/2008-07-31.pdf>; “GCI Achieves Wireless Milestone with 100,000 Customers,” *General Communication, Inc. Press Release*, February 3, 2009 available at <http://www.gci.com/investors/wirelessmilestoneannouncement.pdf>; GCI announced that it spent more than \$85 million on total capital expenditures through the first three quarters of 2009. “GCI Issues Third Quarter 2009 Earnings,” *GCI Press Release*, November 4, 2009 available at <http://www.gci.com/investors/investors.htm>.

<sup>174</sup> “Bluegrass Cellular Announces New 3G Coverage In Cumberland County,” *Bluegrass Cellular Press Release*, April 22, 2009 available at [http://bluegrasscellular.com/about/news/bluegrass\\_cellular\\_announces\\_new\\_3g\\_coverage\\_in\\_cumberland\\_county/](http://bluegrasscellular.com/about/news/bluegrass_cellular_announces_new_3g_coverage_in_cumberland_county/).

<sup>175</sup> “NTELOS Holdings Corp. Reports Third Quarter 2008 Operating Results,” *nTelos Press Release*, November 4, 2008 available at <http://www.ir-site.com/images/library/ntelos/11-04-08.html>.

regulations that reduce incentives for wireless providers to invest in their networks will be welfare reducing in the long term.

#### G. **Competition, Innovation and Investment in Other Parts of the Mobile Wireless Ecosystem**

74. Competition among wireless broadband providers is linked to a “mobile value chain” that includes wireless devices, operating systems, and applications. As I describe in the next several sections, within each of these segments of the mobile wireless ecosystem there is vigorous competition among existing players and new entrants, significant innovation and investment, and considerable experimentation, evidenced by a variety of business models.<sup>176</sup>

75. Moreover, as with the broadband ecosystem as a whole, these segments of the wireless industry are still nascent, and as a result the imposition of net neutrality regulation is not only unnecessary but also threatens to undermine the consumer benefits that market forces have produced. Competition and innovation in these segments has greatly increased the capabilities of mobile broadband service and provided consumers with a wide range of innovative products and services. In addition, wireless devices, operating systems and applications have become an important part of the competitive rivalry among wireless providers, with providers entering into a range of business relationships with device makers and operating system and applications developers. This competitive environment has provided consumers with a wide range of options for using wireless devices to access broadband content.

76. **Smartphones:** Smartphones are increasingly sophisticated devices that can access a wide range of broadband content, and their capabilities have been steadily increasing. For example, this past summer, both Sprint and Verizon Wireless indicated that all of their future phones would include WiFi capability.<sup>177</sup>

77. The smartphone business is still in its very early stages yet is highly competitive, with major consumer electronics manufacturers (Motorola, Samsung, LG, Nokia, RIM, Apple, and many others) operating in a global market and competing aggressively against each other for market

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<sup>176</sup> For additional discussion of innovation and competition in these segments of the wireless ecosystem see Topper (2009) and CTIA Comments to Competition NOI.

<sup>177</sup> “Sprint, Verizon to Include Wi-Fi in all Future Phones,” *Wired*, July 10, 2009 available at <http://www.wired.com/gadgetlab/2009/07/sprint-verizon/>. (“Wired 2009”)

share.<sup>178</sup> There has been considerable entry into the device marketplace by new manufacturers, including the notable recent example of Apple, and manufacturer market shares have changed considerably over time.<sup>179</sup> Search giant Google has also announced its own entry into the smartphone market, offering the Nexus One handset, which it will sell both directly to consumers and through wireless provider partners.<sup>180</sup>

78. Smartphone sales have grown rapidly, and consumers have considerable choice in smartphones. As of December 2009, each of the four nationwide providers offered about 17 different smartphones. According to CTIA, regional providers offered anywhere from 4 to 9 different smartphones as of May 2009,<sup>181</sup> and many of these are state of the art.<sup>182</sup> As noted above, Google is also independently marketing its own Android-based phone

79. Smartphones are an important dimension of competition among wireless broadband providers. Indeed, an early 2009 Bernstein Research study found that 34% of people switching providers cited devices as their primary reason for switching.<sup>183</sup> AT&T's initial success with the Apple iPhone has led other wireless providers and device makers to develop a wide range of competing smartphones, including several high-profile offerings in the second half of 2009. For example, the Apple 3Gs iPhone was launched on AT&T's network in June 2009,<sup>184</sup> the BlackBerry Tour was unveiled in June 2009 and is now available on several different networks,<sup>185</sup> Palm

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<sup>178</sup> U.S. wireless providers do not own equity in any of the major smartphone manufacturers.

<sup>179</sup> For an analysis of the change in worldwide manufacturer shares over time, see Robert Hahn and Hal Singer (2009), "Why the iPhone Won't Last Forever and What the Government Should Do to Promote its Successor," *Georgetown Center for Business and Public Policy Working Paper*, p. 11.

<sup>180</sup> "Google Offers New Model for Consumers to Buy a Mobile Phone," *Google Press Release*, January 5, 2010.

<sup>181</sup> CTIA Comments to the Fourteenth Report Public Notice, WT Docket No. 09-66, filed June 15, 2009, p. 33.

<sup>182</sup> The BlackBerry Curve is available on regional networks like Cellular South, U.S. Cellular, MetroPCS, and NTELOS. See the BlackBerry Curve 8300 website indicating where to buy the device.

<http://na.blackberry.com/eng/devices/blackberrycurve8300/> last accessed December 9, 2009. The BlackBerry Tour is available on the U.S. Cellular and Cellular South networks. See [http://na.blackberry.com/eng/devices/blackberrytour/tour\\_wherebuy.jsp](http://na.blackberry.com/eng/devices/blackberrytour/tour_wherebuy.jsp), last accessed December 9, 2009. The HTC Hero is available on the Cellular South network. See "Cellular South Announces Launch of the HTC Hero; Android-Powered Smartphones Poised for Success," *Cellular South Press Release*, September 21, 2009.

<sup>183</sup> "US Telecom: Defensive or Cyclical? A Sector View for 2009," *Bernstein Research Conference Call Transcript*, January 26, 2009, p. 14.

<sup>184</sup> "Apple Announces the New iPhone 3GS - The Fastest, Most Powerful iPhone Yet," *Apple Press Release*, June 8, 2009.

<sup>185</sup> "RIM Introduces the BlackBerry Tour Smartphone," *BlackBerry Press Release*, June 16, 2009. See [http://na.blackberry.com/eng/devices/blackberrytour/tour\\_wherebuy.jsp](http://na.blackberry.com/eng/devices/blackberrytour/tour_wherebuy.jsp) last accessed December 9, 2009.

introduced its Pixi for the Sprint network in September of 2009,<sup>186</sup> and Motorola unveiled the DROID for Verizon Wireless in October 2009.<sup>187</sup>

80. Wireless providers and device makers are experimenting with a variety of business models and vertical relationships. For example, some devices such as the Apple iPhone are sold exclusively on one network, while other devices such as the Blackberry Tour are sold on multiple networks. Smartphones also vary in their “openness”, with some providing a more controlled environment where the network operator has vetted the available applications and others permitting more unfettered choice to download any applications and take on more responsibility for their own Internet security. Consumers thus have numerous choices, with the ability to choose various options from a given provider or to switch providers to take advantage of a device that better meets their needs. Proposed network neutrality regulations may limit the flexibility of wireless providers to offer different options to different types of consumers and, in so doing, disrupt the competitive process within both the wireless provider and smartphone segments.

81. **Mobile Operating Systems:** Mobile operating systems serve as the platform for other applications. Currently, there are a large number of different operating systems including Apple’s, Microsoft’s, Blackberry’s, Palm’s, Google’s Android, Nokia’s Symbian, and Linux’s LiMo. Already, competition between these systems has been fierce,<sup>188</sup> and this variety in operating systems serves as another point of differentiation for wireless broadband providers.

82. Mobile operating systems, like devices, have experienced considerable innovation. Open operating systems like LiMo and Android are relatively new, and Android has already been deployed on devices introduced by HTC, Samsung and Motorola, including the new Motorola Droid.<sup>189</sup> In a relatively short period of time, two of the newest operating systems – Apple’s iPhone OS and Google’s Android – have obtained a combined market share of 15%.<sup>190</sup>

83. **Applications:** Improvements in mobile operating systems have facilitated another significant development in the mobile wireless value chain – the growing use of applications from

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<sup>186</sup> “Thin Palm Pixi Phone Puts Fast, Intuitive Communication at Fingertips,” *Palm Press Release*, September 9, 2009.

<sup>187</sup> “Hello Humans: DROID by Motorola Arrives Next Week,” *Motorola Press Release*, October 28, 2009. (“Motorola 2009”)

<sup>188</sup> “The Battle for the Smart-Phones Soul,” *The Economist*, November 22, 2008.

<sup>189</sup> Motorola 2009.

<sup>190</sup> Combined market share as of 2Q 2009. See CTIA Comments to Innovation NOI, GN Docket Nos. 09-157 and 09-51, filed September 30, 2009, p. 36.

wireless provider, device manufacturer, and third-party stores associated with various operating systems. Applications have exploded in terms of sheer product diversity. As of November 2009, the Apple App Store alone had a selection of over 100,000 applications and total downloads of well over 2 billion.<sup>191</sup> Apple's success has spurred application initiatives for Google's Android platform, Nokia's Symbian platform,<sup>192</sup> Palm's PalmOS platform,<sup>193</sup> Palm's WebOS platform,<sup>194</sup> and Research in Motion's BlackBerry platform.<sup>195</sup> For example, Google's Android application store has doubled to 20,000 total apps available in just five months.<sup>196</sup> As reported, Verizon is planning its own Vcast App Store,<sup>197</sup> and Microsoft is planning a store for its Windows Mobile platform.<sup>198</sup> Although in some cases the same application is available over multiple operating systems, difference in applications available for devices are another form of product differentiation for devices and ultimately mobile broadband providers.

84. Although most applications have been developed by outside parties, providers are involved in this market as well. For example, AT&T has collaborated with other developers to create applications that let customers pay bills from their handsets. AT&T is also working on applications that will allow users to view the location of the handsets of other family members on a map that can be accessed either on the computer or on the user's own handset.<sup>199</sup>

85. Applications have become an increasingly important dimension of competition among wireless providers, and provide consumers with the ability to customize their wireless broadband experience. Notably, the rapid development of applications has occurred in a market environment where providers and device makers have had flexibility to experiment with different business practices. Although any developer can create software for the iPhone, distribution of the

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<sup>191</sup> "Apple Announces Over 100,000 Apps Now Available on the App Store," *Apple Press Release*, November 4, 2009.

<sup>192</sup> "Nokia's Gigantic App Store," *Forbes*, May 7, 2009 available at <http://www.forbes.com/2009/05/07/nokia-ovi-store-technology-wireless-nokia.html>.

<sup>193</sup> See Palm application store websites [http://software.palm.com/us/html/top\\_products\\_treo.jsp?device=10035300025](http://software.palm.com/us/html/top_products_treo.jsp?device=10035300025) and <http://appstore.pocketgear.com/palm/> last accessed on December 25, 2009.

<sup>194</sup> See <http://developer.palm.com/> last accessed on December 25, 2009.

<sup>195</sup> See BlackBerry App World Website <http://na.blackberry.com/eng/services/appworld/?> last accessed on December 25, 2009.

<sup>196</sup> "Google Android App Market Catching Up," *RedHerring.com*, December 16, 2009 available at <http://redherring.com/Home/26255>.

<sup>197</sup> "Verizon challenges Apple with Vcast app store," *CNet News*, July 28, 2009 available at [http://news.cnet.com/8301-1035\\_3-10297904-94.html](http://news.cnet.com/8301-1035_3-10297904-94.html).

<sup>198</sup> "Microsoft Windows Mobile 6.5 Will Debut on 3 LG Electronics Smartphones," *eWeek.com*, September 3, 2009 available at <http://www.eweek.com/c/a/Mobile-and-Wireless/Microsoft-Windows-Mobile-65-Will-Debut-on-3-LG-Electronics-Smartphones-120351/>.

<sup>199</sup> See AT&T Comments to the Innovation NOI, GN Docket Nos. 09-157 and 09-51, September 30, 2009, p. 38.

application must meet Apple's approval. In this way, Apple can offer customers security and can ensure that applications meet a certain minimum level of quality. Android, however, has adopted an open publication process. Developers need only to register, upload, and then publish their applications.<sup>200</sup> There is no approval process. This flexibility with respect to business practices gives consumers a range of options: Apple's process, which guarantees a minimum level of quality and security, or Android's process, which will allow for a greater amount of variety and flexibility. The Commission should be careful about adopting network neutrality regulations that would take these decisions outside the realm of marketplace competition and put them in the hands of regulators.

86. **Aircard Devices:** Nationwide wireless providers and many regional providers also offer aircard devices that provide mobile broadband access when coupled with a computer. Netbooks, a relatively recent development, are small, light-weight computers that can access wireless broadband. They are starting to be sold in packages with mobile broadband plans, and customers can subsidize the price of a netbook with a corresponding wireless broadband contract.<sup>201</sup> Even without the purchase of a packaged plan, a user can purchase wireless broadband access for her own separately purchased netbook simply through the use of a wireless USB device. Some providers, such as Cincinnati Bell, offer a rebate when a separately purchased netbook is used with their service plans.<sup>202</sup> Bandwidth requirements for laptops and netbooks will pressure wireless providers to continue to improve the capabilities of their network. Both aircards and netbooks are manufactured by third parties, setting the stage for competitive forces similar to those currently experienced by smartphone manufacturers.

87. Mobile broadband access with netbooks and other computers using aircards is starting to resemble wireline broadband capabilities. As I discuss in the next section, these developments, along with the deployment of 3G and 4G technology, are increasing the overlap of wireless and wireline broadband capabilities.

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<sup>200</sup> Eric Chu, "Android Market: A User-Driven Content Distribution System," *Android Developers Blog*, August 8, 2008 available at <http://android-developers.blogspot.com/2008/08/android-market-user-driven-content.html>.

<sup>201</sup> See "Dell and AT&T Energize On-The-Go Lifestyles with Special Offer for Select \$99 Inspiron Mini 9," *Dell Press Release*, January 9, 2009.

<sup>202</sup> See for example [http://www.cincinnati-bell.com/shared\\_content/pdf/zoomtown/netbook\\_012410.pdf](http://www.cincinnati-bell.com/shared_content/pdf/zoomtown/netbook_012410.pdf) last accessed on December 14, 2009.

88. **Other Devices:** Providers are also involved in developing applications for devices beyond smartphones and personal computers – devices that will further alter the competitive landscape, advance important public policy goals, and foster further investment and innovation. Verizon Wireless has launched its Open Development Initiative, to provide customers on its nationwide network the option to use wireless devices, software and applications not offered by the company.<sup>203</sup> Similarly, Alcatel-Lucent has helped launch the NG Connect Program to bring together infrastructure, device, application and content companies to develop next-generation services and applications.<sup>204</sup> Finally, Sprint, through its Open Device Initiative has certified more than 300 third-party devices for use on its mobile broadband network.<sup>205</sup>

89. Beyond these openness initiatives, there are specific examples of providers moving beyond the smartphone market to combine mobile data capability with special-use devices to respond to marketplace demand. Amazon's Kindle device initially utilized Sprint's mobile broadband network for users to download books, newspapers, and other media. For its next-generation Kindle, Amazon switched to AT&T's network,<sup>206</sup> and Kindle's success has led to rival e-book offerings.<sup>207</sup> AT&T has collaborated with Garmin in bringing to market a GPS device with built in wireless capabilities so that users will have mobile broadband access to Google search, weather, and traffic information.<sup>208</sup> T-Mobile has developed a new type of durable SIM card for use in building smart electrical grids.<sup>209</sup>

90. In the health care space, Verizon Wireless has launched an innovation center and has already approved a wireless tablet on its network that helps health care providers access patient

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<sup>203</sup> See Welcome to Open Development, Verizon Wireless available at <https://www22.verizon.com/opendev/> last accessed on December 25, 2009.

<sup>204</sup> See NG Connect Program available at <http://www.ngconnect.org/about-us/index.htm> last accessed on December 25, 2009.

<sup>205</sup> "Sprint, M2M DataSmart, Partner to Push Wireless Applications," *Kansas City Business Journal*, September 1, 2009 available at <http://kansascity.bizjournals.com/kansascity/stories/2009/08/31/daily16.html>.

<sup>206</sup> Bernstein Research, *US Wireless Industry Scorecard: The Haves and the Have-Nots Diverge Industry Growth Stabilizes at 4.2% in Q3*, November 6, 2009, p. 17.

<sup>207</sup> See the Nook by Barnes and Nobles available at <http://www.barnesandnoble.com/nook/compare/?cids2Pid=30195> last accessed on December 24, 2009. See also the Archos available at [http://www.archos.com/products/imt/archos\\_5it/index.html?country=us&lang=en](http://www.archos.com/products/imt/archos_5it/index.html?country=us&lang=en) last accessed December 24, 2009.

<sup>208</sup> "Garmin nuvi 1690 and nuLink! to Connect Drivers to Real Time Data through AT&T Wireless Network", *AT&T Press Release*, Sept. 17, 2009 available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=27141>.

<sup>209</sup> "T-Mobile Goes for Smart Grids," *CNet News*, April 23, 2009 available at [http://news.cnet.com/8301-1035\\_3-10226418-94.html](http://news.cnet.com/8301-1035_3-10226418-94.html).

data from a portable medical chart.<sup>210</sup> Sprint also has teamed with GE Healthcare, a division of GE, to offer in-building voice and data transmission.<sup>211</sup>

91. As the building of wireless networks involves large fixed costs, it appears that providers have entered the applications market in connection with devices outside of smartphones in order to expand their customer base and distribute costs over a larger base. This is also a way for wireless providers to differentiate their services in order to enhance their competitiveness. In addition, these developments have occurred in an environment without network neutrality regulations, where providers have had the flexibility to enter into various business arrangements with other firms in the broadband ecosystem. Network neutrality regulations that limit the flexibility of wireless providers and other firms could hamper future development of such products.

#### **IV. Mobile Wireless Providers and Firms Using Other Intermodal Technologies Increasingly Compete with Wireline Broadband**

92. Mobile wireless broadband services are a competitive alternative to wireline broadband even at relatively lower throughput speeds; many consumers will choose wireless broadband in order to have the flexibility to use their service outside their home or office, and the prospect of that occurring constrains the behavior of wireline broadband providers.<sup>212</sup> Moreover, wireless broadband providers are rapidly improving their networks to increase speeds, further increasing their competitive role. With 3G and 4G capabilities complemented by a wide range of mobile devices and applications, wireless broadband is becoming a viable alternative to wireline providers for a larger range of broadband users and uses.

93. The history of mobile voice services is instructive. In its early stages, wireless voice served more as an add-on to wireline voice, but, as wireless technologies improved, many consumers cut the cord and viewed wireless voice as a replacement for wireline or, alternatively, have shifted more of their voice calling from wireline to wireless. In early 2005, about 6.7% of households were wireless-voice only; this has grown to 21.1% by the end of 2008,<sup>213</sup> and this trend is likely to

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<sup>210</sup> "@CTIA: Verizon on mHealth 4G," *MobileHealthNews*, April 1, 2009 available at <http://mobihealthnews.com/1112/ctiaverizon-on-mhealth-4g/>.

<sup>211</sup> "Hospitals Becoming Wireless Hotbeds," *Telephony Online*, September 23, 2009 available at <http://telephonyonline.com/3g4g/news/hospitals-becoming-wireless-0923/>.

<sup>212</sup> This increasing competition has been recognized by the Justice Department. See *Economic Issues in Broadband Competition*, pp. 8-11.

<sup>213</sup> Blumberg, Stephen, and Julian Luke, "Wireless Substitution: Early Release of Estimates from the National Health Interview Study, January – June 2009," National Center for Health Statistics, Center for Disease Control, December 16,

continue.<sup>214</sup> In addition, households who have not cut the cord often have a choice of whether to make calls from home using wireless or wireline service. A recent CDC report finds that of all American homes with a landline, 14.7% primarily used their wireless phones for calls.<sup>215</sup> This substitution may also be occurring for certain types of data as the popularity of mobile email and text messaging grows. A Pew Internet Study finds that 43% of cell phone/PDA owners sent or received text messages and that 15% sent or received email on a typical day in 2009. This contrasts to 31% who sent or received text messages and 8% who sent or received email on a typical day in 2007.<sup>216</sup>

94. From the perspective of economics, wireless broadband services do not need to be perfect substitutes for wireline broadband services to exert competitive pressure on wireline services.<sup>217</sup> As wireless broadband services continue to improve, one way for consumers to substitute wireless broadband service for wireline is to “cut the cord” and rely on their wireless devices for access to broadband content. Another way for consumers to substitute wireless broadband service for wireline is to shift more of their broadband usage from wireline providers to wireless providers. Competition for both these types of consumers can serve as a powerful incentive for providers to offer attractive prices, improved services and open access to content. If a user can access content with her wireless broadband service that she can’t get with wireline service, then she’ll use her wireless for that, which makes her wireline broadband service less valuable (and vice versa). That is a form of competitive discipline that helps ensure that wireline and mobile providers alike make open access available.<sup>218</sup>

95. Already, recent growth in wireless broadband subscribers has greatly exceeded growth in wireline broadband. The number of mobile wireless advanced services lines has increased from 21,000 in 2005 to 20.2 million in 2008, a 1,000 fold increase.<sup>219</sup> In comparison, wireline telco advanced services lines grew about 100% and cable advanced services lines grew by about 66% in

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2009. (“CDC 2009”); Blumberg, Stephen, and Julian Luke, “Wireless Substitution: Early Release of Estimates from the National Health Interview Study, January – June 2008,” National Center for Health Statistics, Center for Disease Control, December 17, 2008.

<sup>214</sup> “Cutting the Cord,” *The Economist*, August 15, 2009.

<sup>215</sup> CDC 2009.

<sup>216</sup> Pew Wireless 2009, p. 24.

<sup>217</sup> See, e.g., Carlton and Perloff (2005), pp. 644-648.

<sup>218</sup> Some consumers also have access to broadband services at work or at school.

<sup>219</sup> FCC High-Speed Services 2009, Table 2.

that time.<sup>220</sup> As the capabilities of wireless broadband continue to improve, current wireline-only broadband customers represent a large potential market for wireless providers.

### 1. 3G and 4G Technology

96. Upgrades to 3G and 4G technologies have greatly enhanced the mobile data capabilities of wireless networks and are making wireless broadband an even more effective alternative for wireline broadband. 3G networks offer appealing data speeds for many Internet uses. WCDMA, the 3G technology used by AT&T, T-Mobile and other providers, allows maximum data transfer speeds of 2 Mbps<sup>221</sup> and when combined with HSPA technology like those deployed by AT&T can allow maximum speeds of 7.2 Mbps.<sup>222</sup> EV-DO Rev. A, the 3G technology used by Verizon Wireless, Sprint, and others, allows maximum throughput speeds of 3.1 Mbps.<sup>223</sup>

97. 4G technology is significantly faster than 3G technology, and exceeds the speeds of some DSL and cable broadband offerings. WiMAX, the 4G technology used by Sprint and Clearwire, can support maximum download speeds of 63 Mbps and maximum upload speeds of 28 Mbps.<sup>224</sup> In terms of actual performance, Clearwire advertises its 4G service speed to have average download speeds of 3 to 6 Mbps with peak spikes of 10 Mbps,<sup>225</sup> and directly markets itself as an alternative to wireline providers in the home.<sup>226</sup> LTE, the 4G technology being deployed by Verizon Wireless, AT&T, T-Mobile and others, supports speeds up to 173 Mbps and 58 Mbps for downloads and uploads, respectively.<sup>227</sup> Verizon's initial 4G tests demonstrated peak download speeds of 50 to 60 Mbps.<sup>228</sup>

98. Consumer demand for broadband access is heterogeneous, depending on the span of content and applications used by different consumers. For most users, the speeds provided by 3G are sufficient for regular use of many online tasks. According to the Pew Internet Project, the most popular online activities include sending email (58% of adult internet users do this daily), using a

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<sup>220</sup> FCC High-Speed Services 2009, Table 2. Wireline telco numbers include ADSL, SDSL, Traditional Wireline, and Fiber.

<sup>221</sup> Thirteenth CMRS Competition Report, ¶¶ 131-132.

<sup>222</sup> AT&T Speed Boost 2009.

<sup>223</sup> Thirteenth CMRS Competition Report, ¶¶ 131-132.

<sup>224</sup> Thirteenth CMRS Competition Report, ¶ 133.

<sup>225</sup> Clearwire Website <http://www.clear.com/discover/network> last accessed on December 9, 2009.

<sup>226</sup> See <http://www.clear.com/shop/services/home> last accessed on December 15, 2009.

<sup>227</sup> Thirteenth CMRS Competition Report, ¶ 133.

<sup>228</sup> "Verizon Expects 4G Launch Next Year," *CNet News*, February 18, 2009 available at [http://reviews.cnet.com/8301-13970\\_7-10166622-78.html](http://reviews.cnet.com/8301-13970_7-10166622-78.html).

search engine (50%), getting news (38%), checking the weather (33%), and using social networking sites (27%).<sup>229</sup> Another study from Mediamark Research & Intelligence confirms this finding that the most popular online activities are using email and getting news.<sup>230</sup> These online activities function well at common 3G wireless speeds.<sup>231</sup> Thus consumers find wireless access to these activities – with the added feature of mobility – to be a reasonable substitute for wired access. As of 2007, for example, 6 Mbps for wireline broadband was considered more than sufficient for the average user.<sup>232</sup> A more recent presentation from the Commission’s Omnibus Broadband Initiative team documents that 5 Mbps is generally sufficient for web browsing, audio streaming, voice over internet, some online games, and even varying video conferencing and streamed video technologies.<sup>233</sup> Thus, even 3G speeds are more than sufficient for the common user and offer a viable substitute to wireline broadband in most cases. And in the very near future, the deployment of 4G services will make the mobile broadband experience that much faster and more in line with today’s wireline broadband offerings.

## **2. Other Developments Further Increase Competition Between Wireless and Wireline Broadband Services.**

99. In addition to the added feature of mobility and rapidly increasing speeds, other recent developments have contributed to the increasing competition between wireline and wireless broadband alternatives. First, deployment of next-generation technology has enabled wireless providers to increase mobile broadband usage allowances to levels that meet the needs of most broadband users. In 2008, Comcast noted that the median residential user of its wireline broadband service consumed between 2 GB and 3 GB per month.<sup>234</sup> Currently, Sprint, Verizon Wireless, and AT&T mobile broadband plans for netbooks and laptops allow a maximum of 5 GB per month,<sup>235</sup> with additional data transfer available for purchase. Data plans associated with

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<sup>229</sup> Pew Research Center’s Internet & American Life Project, *Online Activities, Daily* available at: <http://www.pewinternet.org/Static-Pages/Trend-Data/Online-Activities-Daily.aspx> last accessed on December 25, 2009. These results were based on September 2009 and April 2009 surveys.

<sup>230</sup> “Research: Time Spent Online - What do we do Most, Which Activities Grow Fastest?” *Copypaste Media.com*, January 28, 2009 available at <http://www.copypaste.nl/747/research-time-spent-online-what-do-we-do-most-which-activities-grow-fastest/> last accessed on December 25, 2009.

<sup>231</sup> FCC Presentation 2009, p. 23 (showing that basic download usage, which includes email and web browsing, requires 0.1-0.3 Mbps to perform well).

<sup>232</sup> “More Bandwidth than You Can Use,” *BusinessWeek*, May 29, 2007.

<sup>233</sup> FCC Presentation 2009, p. 23.

<sup>234</sup> “Comcast to Cap Monthly Consumer Broadband,” *CNet News*, August 28, 2008 available at [http://news.cnet.com/8301-17939\\_109-10028506-2.html](http://news.cnet.com/8301-17939_109-10028506-2.html).

<sup>235</sup> See carrier websites for more information. Last accessed December 14, 2009.

smartphones generally do not have usage allowances. Sprint, AT&T and T-Mobile offer smartphone data plans with unlimited Internet access.<sup>236</sup> Verizon Wireless smartphone plans currently have a 5 GB per month usage allowance, and extra data exceeding the allowance can also be purchased.<sup>237</sup> The increasing deployment of 4G technology should lead to even higher usage allowances as network capacity grows. Wireless providers have also been expanding usage allowances at lower levels of usage. For example, in May 2009 Verizon Wireless increased its data usage allowances on its entry level plan from 50MB to 250MB.<sup>238</sup>

100. Second, the emergence of licensed-spectrum aircards brings wireless broadband directly to netbooks and laptops, making them an even more viable alternative to a wireline-broadband-connected computer. Given the comparable speeds of 4G and even 3G to the most common wireline offerings, the distinction between wireline and wireless broadband has begun to blur. The main advantage of wireless broadband for consumers is obviously mobility. As the speed capabilities of wireless broadband improve, consumers who highly value mobility will forego wireline broadband even if it offers somewhat higher speeds. In addition, mobility will likely become more prized as more applications are developed that utilize location data and customize information for users. Moreover, smartphones have made it easy for consumers to integrate voice, messaging, email, and broadband onto one device. The growing importance of mobility and the ease with which consumers can add mobile broadband to existing devices is putting competitive pressure on wireline providers to improve service and lower prices to compensate.

101. Third, a new group of wireline broadband providers are beginning to develop additional mobile broadband capabilities of their own in recognition of the importance of mobility to their customers' experience. As mentioned previously, Comcast and Time Warner either plan to resell or are already reselling Clearwire's wireless 4G services through bundles with their own wireline

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<sup>236</sup> For Sprint see [http://nextelonline.nextel.com/NASApp/onlinestore/en/Action/DisplayPlans?filterString=Any\\_Mobile\\_Anytime\\_Filter&id12=UHP\\_PlansTab\\_Link\\_AnyMobileAnyTime](http://nextelonline.nextel.com/NASApp/onlinestore/en/Action/DisplayPlans?filterString=Any_Mobile_Anytime_Filter&id12=UHP_PlansTab_Link_AnyMobileAnyTime); For AT&T see <http://www.wireless.att.com/cell-phone-service/cell-phone-plans/pda-personal-plans.jsp>; For T-Mobile see [http://www.t-mobile.com/shop/plans/Cell-Phone-Plans.aspx?catgroup=Internet-Email-cell-phone-plan&WT.z\\_shop\\_plansLP=Internet\\_email](http://www.t-mobile.com/shop/plans/Cell-Phone-Plans.aspx?catgroup=Internet-Email-cell-phone-plan&WT.z_shop_plansLP=Internet_email) last accessed on December 15, 2009.

<sup>237</sup> See <http://www.verizonwireless.com/b2c/mobilebroadband/?page=plans&lid=//global//plans//mobile+broadband+plan> last accessed on December 14, 2009.

<sup>238</sup> "Verizon Wireless Changes Mobile Broadband Plans and Introduces its Portable WiFi Hotspot," *Current Analysis Competitive Intelligence Report*, May 11, 2009 available at <http://www.currentanalysis.com/h/2009/VZW-MiFi2200-Hotspot.asp> last accessed on December 14, 2009.

broadband offerings, most recently in Dallas, Chicago and Seattle.<sup>239</sup> Comcast is testing its own WiFi service at NJ Transit stations.<sup>240</sup> Cox Communications has plans to build its own cellular network,<sup>241</sup> potentially at the 4G level.<sup>242</sup> In the meantime, Cox intends to utilize Sprint's network to provide wireless service.<sup>243</sup> Cablevision has spent \$300 million to deploy WiFi access points across its footprint.<sup>244</sup> Cable companies have understood the threat of mobility and are already taking steps to remain competitive.

102. Fourth, content providers of every variety are adapting their offerings for the unique aspects of wireless – such as mobility and smaller screens – and therefore further blurring the lines between wireline and wireless broadband. For example, the New York Times, YouTube, ESPN, and many other websites have applications and online access that is optimized for smartphones.<sup>245</sup> The evolution of this “mobile web” also is significant because it heightens consumer awareness about differences across broadband services, including differences in access to content, and enables consumers to make comparisons between wireline and wireless broadband services in terms of access to content. Even for consumers who do not have both types of service, comparative information is available in the marketplace from other consumers, industry publications, and consumer reporting groups to help facilitate these comparisons. In addition, as the current marketplace dynamic demonstrates, competitors are likely to use advertising to bring any disadvantage of a particular service provider – whether wireline or wireless -- to light.

### **3. Competition from Providers Using Other Wireless Technologies**

103. In addition to mobile wireless services, providers using several other wireless technologies provide intermodal competition with wireline and traditional licensed wireless broadband

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<sup>239</sup> “WiMax Blooms in Chicago, Seattle, Dallas,” *Multichannel News*, December 1, 2009 available at [http://www.multichannel.com/article/391314-WiMax\\_Blooms\\_In\\_Chicago\\_Seattle\\_Dallas.php](http://www.multichannel.com/article/391314-WiMax_Blooms_In_Chicago_Seattle_Dallas.php).

<sup>240</sup> “Comcast, Cablevision Turn to WiFi to Retain Customers,” *nj.com*, February 28, 2009 available at [http://www.nj.com/business/index.ssf/2009/02/comcast\\_turns\\_to\\_wifi\\_to\\_retai\\_1.html](http://www.nj.com/business/index.ssf/2009/02/comcast_turns_to_wifi_to_retai_1.html).

<sup>241</sup> “Cox Plans to Launch a Cellular Network,” *The Wall Street Journal*, April 8, 2009.

<sup>242</sup> “Cox to Launch Next Generation Bundle with Wireless in 2009,” *Cox Enterprises Press Release*, Oct. 27, 2008 available at <http://coxenterprises.mediaroom.com/index.php?s=43&item=19>. (“Cox 2009”)

<sup>243</sup> Cox 2009.

<sup>244</sup> Morgan Stanley Research, *Cable/Satellite Downgrade: This Defense Not the Best Offense*, January 23, 2009, p. 19; “Q4 2008 Cablevision Systems Corp. Earnings Conference Call,” *FD (Fair Disclosure) Wire*, February 26, 2009, p. 6; “Cablevision’s Optimum WiFi Arrives in New Jersey,” *Cablevision News Release*, March 3, 2009.

<sup>245</sup> For the New York Times see <http://www.nytimes.com/services/mobile/index.html> last accessed on January 2, 2010; for YouTube see <http://www.google.com/mobile/products/youtube.html#p=default> last accessed on January 2, 2010; for ESPN see <http://espn.go.com/mobileespn/products?productid=3059185> last accessed on January 2, 2010.

provision.<sup>246</sup> These other technologies are in various stages of development and deployment. For some of them, one reason for their lack of full deployment is the already existing competitive environment within the wireless and wireline industries. However, the prospect of fuller deployment of these technologies can apply competitive pressure and constrain the behavior of current wireline and wireless broadband providers. If wireline and wireless providers begin engaging in practices that consumers dislike, these technologies may be ready to grow and become a viable alternative to the current prevailing providers. The recent entry of providers using new technologies – such as Clearwire with WiMAX – demonstrates the relative speed with which such new competition can occur. Some analysts expect Clearwire to grow to over 15 million total subscribers by 2015.<sup>247</sup> This entry demonstrates the competitive discipline that emerging technologies may provide.

104. One prominent alternative technology is WiFi. WiFi relies on unlicensed spectrum to provide short-distance, portable broadband access, and unlicensed WiFi services and devices continue to proliferate. Many business establishments, such as cafes, restaurants, and hotels, currently offer free or inexpensive WiFi hotspots. Consumers can access the Internet at a WiFi hotspot by using a WiFi equipped smartphone, or by using a netbook or laptop computer. It is also available in other devices, such as the Apple iPod Touch. WiFi capability is an increasingly common feature of consumer electronics. It is a standard feature in laptop computers and is showing up in many wireless handsets. As noted earlier, Sprint and Verizon Wireless have both stated that all of their handsets going forward will support WiFi.<sup>248</sup>

105. WiFi is a growing and evolving segment. Consumers are still learning how to incorporate its growing benefits into their broadband needs. In 2008 analysts reported that T-Mobile has experienced 20% to 30% growth in customers and a 50% to 70% growth in usage of its WiFi hotspots.<sup>249</sup> Although for most consumers these hotspots cannot fully substitute for dedicated wireline or wireless access, they offer useful broadband access services to many consumers, with

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<sup>246</sup> There also is additional actual or potential competition from other wireline sources. Broadband delivered over power lines (“BPL”) has been under development for several years. According to the United Power Line Council and the Utilities Telecom Council, at last count in December 2009 there were about 150 BPL providers. See <http://www.bpldatabase.org/> last accessed December 16, 2009. Some consumers with relatively simple Internet browsing needs are still using narrowband dial-up Internet service. To the extent that narrowband remains an option for some consumers, it may serve as a constraint on the pricing of lower end broadband services.

<sup>247</sup> Macquarie Clearwire Upgrading 2009, Figure 7.

<sup>248</sup> Wired 2009.

<sup>249</sup> Yankee Group, *Hotspotting Along the Track to Anywhere*, July 2008, p. 10. (“Yankee Group 2008”)

the benefit of mobility. And as WiFi technology continues to develop, at least some consumers may choose to be WiFi only or shift more of their broadband usage to WiFi, putting pricing pressure on broadband providers.

106. WiFi hotspots are also proliferating. AT&T maintains hotspot locations in many businesses such as Starbucks locations where customers can access the Internet through AT&T's WiFi network. Increasingly, many businesses are offering free Wi-Fi to consumers. McDonalds has recently announced that it will offer free WiFi to 11,000 locations starting in January 2010,<sup>250</sup> and since July, Borders<sup>251</sup> and Barnes & Noble<sup>252</sup> have both announced free WiFi at more than 1,200 locations nationwide.<sup>253</sup> Airport authorities in Philadelphia, San Jose, Denver, and other locations also provide free WiFi for travelers.<sup>254</sup> JiWire, a firm that helps companies advertise to consumers when they log onto a public WiFi network, counts almost 71,767 public WiFi hotspots in the U.S. within its registry.<sup>255</sup> Among regular internet users in 2008, 7% access it regularly through a public WiFi hotspot.<sup>256</sup>

107. Many universities also provide campus-wide WiFi connections to students, faculty, staff, and guests.<sup>257</sup> Dartmouth College installed campus-wide WiFi several years ago,<sup>258</sup> and the University of South Carolina plans to extend campus-wide WiFi by August 2010.<sup>259</sup> In Summer 2009, Northern Michigan University deployed one of the largest active regional WiMAX networks in the country, providing nearly 100% coverage of the City of Marquette, Michigan.<sup>260</sup> Paired with its longstanding laptop program, the network provides wireless broadband access to nearly

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<sup>250</sup> Tony Bradley (2009), "McDonald's Free Wi-Fi a No-Brainer Win-Win," *PCWorld BizFeed*, December 17, 2009 available at [http://www.pcworld.com/businesscenter/article/184939/mcdonalds\\_free\\_wifi\\_a\\_nobrainier\\_winwin.html](http://www.pcworld.com/businesscenter/article/184939/mcdonalds_free_wifi_a_nobrainier_winwin.html).

<sup>251</sup> "Borders Signs Agreement with Verizon to Offer Free Wi-Fi," *Borders Group Press Release*, September 29, 2009 available at [http://www.borders.com/online/store/BGIView\\_irnewsreleases](http://www.borders.com/online/store/BGIView_irnewsreleases).

<sup>252</sup> "Barnes & Noble Stores Nationwide to Offer Complimentary AT&T Wi-Fi In-Store Access to Over 700,000 eBooks on World's Largest eBookstore," *Barnes and Noble Press Release*, July 28, 2009 available at [http://www.barnesandnobleinc.com/press\\_releases/2009\\_july\\_27\\_wi-fi.html](http://www.barnesandnobleinc.com/press_releases/2009_july_27_wi-fi.html).

<sup>253</sup> Borders has announced free WiFi at 500 stores, and Barnes and Noble has announced free WiFi at over 700 stores.

<sup>254</sup> See <http://www.wififreespot.com/airport.html> last accessed on December 9, 2009.

<sup>255</sup> See <http://v4.jiwire.com/search-hotspot-locations.htm> last accessed on December 21, 2009.

<sup>256</sup> Yankee Group 2008, p. 12.

<sup>257</sup> See, e.g., "AT&T Brings Wi-Fi Access to Pennsylvania State University Campuses," *AT&T Inc. Press Release*, August 24, 2009 available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=27046>.

<sup>258</sup> "Dartmouth: Creating a Wi-Fi Monster," *Wi-FiPlanet.com*, April 20, 2005 available at <http://www.wi-fiplanet.com/columns/article.php/3499271>.

<sup>259</sup> "USC to Have Campus-Wide Wi-Fi," *Dailygamecock.com*, November 4, 2009 available at <http://www.wi-fiplanet.com/columns/article.php/3499271>. See also "University of South Carolina Chooses AT&T to Provide Campus Wi-Fi Access," *AT&T Press Release*, July 30, 2009 available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26980>.

<sup>260</sup> "NMU Launches New WiMAX Network," *Presidents Council State Universities of Michigan Press Release*, August 20, 2009 available at <http://www.pcsum.org/currentnews/mid/374/newsid374/156/>.

the entire student population, on campus and across town. Campus-wide and municipal WiFi programs offer users another platform for broadband access, and when it is available provides competitive discipline for wireline and wireless service providers.

108. Broadband access is also provided by wireless Internet service providers (WISPs) who use fixed wireless technology to provide broadband service. Although I have been unable to find aggregate industry-wide data, the Wireless Internet Service Providers Association estimates that Wireless ISPs “[u]sing primarily license-free frequencies authorized under Part 15 of the Commission’s Rules ... provide fixed wireless broadband services to more than 2,000,000 people in residences, businesses, hospitals, first responders and educational facilities.”<sup>261</sup> Some of these WISPs have actively acquired other providers in order to expand their footprints and take advantage of returns to scale and scope. ERF Wireless, a Texas based WISP, expanded its footprint into the Texas panhandle with the acquisition of Centramedia Inc. in 2008.<sup>262</sup> In addition, it appears that establishing new WISPs may not require very large startup costs. Pasty.net, a wireless provider in Michigan’s Upper Peninsula, was started in 1999 by a man and his son unhappy with their Internet access. With the help of a mini-grant, the two helped their county purchase wireless relay stations. Most recently, with a \$1 million grant from the federal government, the company is expanding to adjacent counties.<sup>263</sup> Some industry analysts expect the number of fixed wireless broadband subscribers to grow to over 5.5 million by 2011.<sup>264</sup>

109. Satellite is another alternative technology for providing broadband. Satellite broadband services are currently available nationwide from at least two providers, Hughes and Wild Blue (which ViaSat recently agreed to purchase for more than \$565 million).<sup>265</sup> Hughes advertises

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<sup>261</sup> WISPA Comments to NBP Public Notice #6, GN Docket Nos. 09-47 and 09-137, filed October 23, 2009, p. 2.

<sup>262</sup> “ERF Wireless Continues Aggressive Acquisition Strategy with Acquisition of Centramedia, Inc.,” *ERF Press Release*, January 6, 2009.

<sup>263</sup> “Pasty.Net Turns 10,” *Great Lakes IT Report*, May 18, 2009 available at <http://www.wvj.com/Pasty-Net-Turns-10/4418733>.

<sup>264</sup> In-Stat, *In-Depth Analysis Broadband Gets Big: Global Broadband Subs hit 285 Million*, May 2007, p. 21. (“In-Stat 2007”)

<sup>265</sup> For Hughes see <http://www.hughesnet.com/> last accessed December 20, 2009. For Wild Blue see <http://wildblue.com/about/Wildblue/index.jsp> last accessed December 20, 2009. For ViaSat purchase see “ViaSat to Buy WildBlue for \$568 Million,” *SpaceNews.com*, October 1, 2009. Other providers of satellite broadband service include: VSAT Systems, Spacenet, Skycasters, and Ground Control. For VSAT Systems see <http://www.vsat-systems.com/high-speed-internet/index.html> last accessed December 20, 2009. For Spacenet see SpaceNet brochure available at <http://www.spacenet.com/pdfs/about.pdf> last accessed December 20, 2009. For Skycasters see <http://www.skycasters.com/the-company.html> last accessed on December 20, 2009. For Ground Control see “Ground Control Systems, Inc., Awarded Oregon Satellite Contract,” *Ground Control Press Release*, October 26, 2009. For Skycasters, see <http://www.skycasters.com/the-company.html> last accessed on December 20, 2009.

download speeds of 1 to 5 Mbps, and Wild Blue advertises download speeds of 1.5 Mbps and upload speeds of 256 Kbps.<sup>266</sup> According to Hughes, there are “[a]pproximately one million US customers being served by Hughes and WildBlue.”<sup>267</sup> The capability of satellite broadband is increasing. Current generation satellites support 10 Gbps total bandwidth, and next-generation satellites such as Hughes’ Jupiter and ViaSat-1 will be able to support 100+ Gbps.<sup>268</sup> The Satellite Industry Association states that as of 2Q2009, “over 1 million Americans” use satellite broadband services.<sup>269</sup> Some industry analysts predict that U.S. satellite broadband subscribers will reach about 1.5 million by 2011.<sup>270</sup>

110. The Commission has granted authority for several Mobile Satellite Service (“MSS”) operators to provide terrestrial service. Ancillary Terrestrial Component (ATC) systems allow satellite service to be combined with terrestrial services, so that satellite broadband providers can augment their service in places with weak signals.<sup>271</sup> Current terrestrial offerings by MSS operators are primarily targeted at commercial, government, and maritime customers. But some providers also offer data services for retail consumers. For example, StarBand – which offers satellite broadband service throughout the U.S.<sup>272</sup> – recently partnered with Omnicity, a WISP operating in the Midwest, to allow Omnicity to rebrand and resell its satellite internet broadband services as Omnicity’s own.<sup>273</sup> AT&T and Terrestrial Networks announced plans earlier this year to offer an integrated solution combining AT&T’s primary cellular wireless connectivity with the

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For Ground Control, see “Ground Control Systems, Inc., Awarded Oregon Satellite Contract,” *Ground Control Press Release*, October 26, 2009.

<sup>266</sup> For Hughes see <http://www.hughesnet.com/> last accessed December 20, 2009. For Wild Blue see <http://wildblue.com/about/Wildblue/index.jsp> last accessed December 20, 2009.

<sup>267</sup> Dean Mason, Senior VP & General Counsel, Hughes, *Satellite Broadband: Presentation to the Federal Communications Bar Association*, October 16, 2009, p. 2. (“Hughes FCBA Presentation”) See also NRTC Comments, *Rural Broadband Strategy*, GN Docket No. 09-29, FCC filed March 25, 2009. (WildBlue serves over 340,000 homes and businesses, including 82,000 served by NRTC members.)

<sup>268</sup> Hughes FCBA Presentation p. 5.

<sup>269</sup> Satellite Industry Association, Ex Parte Presentation, GN Docket No. 09-51, filed November 20, 2009, p. 2.

<sup>270</sup> In-Stat 2007, p. 24. Pike and Fischer estimate satellite broadband will serve 1.3 million people by 2012. “Satellite Broadband to Serve Nearly 1.3 Million by 2012, Report Concludes,” *MarketWire.com*, February 13, 2008 available at [http://www.marketwire.com/mw/rel\\_us\\_print.jsp?id=820809&lang=E1](http://www.marketwire.com/mw/rel_us_print.jsp?id=820809&lang=E1).

<sup>271</sup> “Satellite’s Time Has Come,” *Telephony Online*, January 22, 2007 available at [http://telephonyonline.com/access/commentary/telecom\\_satellites\\_time/index.html](http://telephonyonline.com/access/commentary/telecom_satellites_time/index.html).

<sup>272</sup> See StarBand’s website for a description of its services. <http://www.starband.com/about/> last accessed on December 14, 2009.

<sup>273</sup> “Omnicity Inks ‘No Home Left Behind’ Comprehensive Satellite Internet Delivery Deal,” *Omnicity Press Release*, October 7, 2009. Omnicity has plans to offer this satellite service to households where its wireless broadband services are currently not available.

ability to connect to Terrestrial's satellite network as a backup, using one phone number and one smartphone device.<sup>274</sup>

## V. Implications of the Competitive Environment for Network Neutrality Regulation

111. Economists and policy makers have long recognized that competitive markets best serve consumers, and that regulation can distort economic decision making.<sup>275</sup> Economists' concerns about the costs of regulation are heightened in competitive market settings where consumer demand, underlying technologies, and business models are rapidly changing.<sup>276</sup> In competitive markets, prices and the characteristics of service offerings are determined by the decision-making of many market participants, and consumers can "vote with their feet" about the business practices of service providers. The competitive process determines which provider practices will succeed. Consistent with these views, the bipartisan Antitrust Modernization Committee ("AMC") recently concluded that "public policy should favor free-market competition over industry-specific regulation of prices, costs, and entry... In general, Congress should be skeptical of claims that economic regulation can achieve an important societal interest that competition cannot achieve."<sup>277</sup> Likewise, a 1999 policy paper authored by a member of the Commission's Office of Plans and Policy noted that "[t]he Commission's instinct, as it has always been, should be to permit market forces to work, because competition leads to the widest variety of consumer choices."<sup>278</sup>

112. In regulated markets, by contrast, explicit decisions must be made by the regulators about their vision for appropriate prices, service offerings, business practices, and other dimensions of the marketplace. Network neutrality regulations of the sort proposed here would place the

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<sup>274</sup> "AT&T Announces Agreement with TerreStar to Offer Integrated Cellular / Satellite Solution," *AT&T Press Release*, September 30, 2009 available at <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=27180>; see also "TerreStar Announces Distribution Agreement with AT&T," *TerreStar Press Release*, September 30, 2009 available at <http://www.TerreStar.com/press/20090930.html>.

<sup>275</sup> For some of the costs associated with regulation see Paul Joskow and Nancy Rose (1989), "The Effects of Economic Regulation," in R. Schmalensee and R. Willig (eds.) *Handbook of Industrial Organization*, North Holland, Ch. 25, Vol. 2, p. 1477: "When regulation is less than ideal, as it necessarily is in practice, its implementation may give rise to a host of production distortions." See also Roger Noll (1989), "Economic Perspectives on the Politics of Regulation," in R. Schmalensee and R. Willig (eds.) *Handbook of Industrial Organization*, North Holland, Ch. 22, Vol. 2.

<sup>276</sup> For example, see Shelanski (2007), p. 77: "[T]he benefits of regulation diminish as markets become competitive, while the costs of regulation remain and even increase as that transition occurs. Also, see William Baumol, et al (2007), "Economists' Statement on Network Neutrality Policy," AEI-Brookings Joint Center for Regulatory Studies, Related Publication 07-08, March 2007, p. 1: "Regulation of prices and services has often resulted in costs that exceed benefits, especially in competitive markets. Highly dynamic markets, such as those for high-speed Internet services, pose particular problems because they change so quickly."

<sup>277</sup> AMC Report, p. 22.

<sup>278</sup> Jason Oxman (1999), "The FCC and the Unregulation of the Internet," *Office of Plans and Policy Working Paper*, July 1999, p. 26.

Commission in the position of selecting the broadband provider practices that will prevail. These decisions are difficult to make in general, because regulators inevitably operate with limited, imperfect information about the demand and cost conditions that characterize an industry.<sup>279</sup> In the broadband context, rapid technological change, entry by new players, the wide variety of broadband content, diverse consumer preferences, and innovative new business models make targeted application of new regulation, without unintended consequences, virtually impossible. The FTC has specifically cautioned about this and has warned that the consequences of regulatory errors can be long lasting: “Further, such regulatory schemes inevitably will have unintended consequences, some of which may not be known until far into the future. Once a regulatory regime is in place, moreover, it may be difficult or impossible to undo its effects.”<sup>280</sup> Moreover, some of the proposed network neutrality regulations amount to regulation of product quality, which economists view as very difficult to regulate.<sup>281</sup>

113. For these reasons, even if the Commission were to find, contrary to the marketplace evidence, that there is not effective broadband competition, it does not follow that network neutrality regulation should necessarily be implemented because the costs associated with any regulatory misstep may well exceed any incremental value to the market delivered by the regulation.

**A. Network Neutrality Regulations are Unwarranted in the Current Broadband Market Environment**

114. The Notice of Proposed Rulemaking states that the purpose of the proposed network neutrality regulations is to “preserv[e] a free and open Internet.”<sup>282</sup> Thus, by its terms, the Notice of Proposed Rulemaking recognizes that the current competitive environment has already provided broadband consumers with options to openly access a wide range of Internet content, as well as options to access broadband content in more controlled environments. Marketplace evidence

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<sup>279</sup> See W. Kip Viscusi, Joseph Harrington, and John Vernon (2005), *Economics of Regulation and Antitrust*, 4<sup>th</sup> ed., p 552: “Even in a static setting, a regulatory agency must attempt to set the socially optimal price in spite of having very limited information about cost and demand conditions. The problems become even more difficult when the environment changes in significant ways over time.”

<sup>280</sup> FTC Staff Report 2007, p. 11.

<sup>281</sup> See, e.g., Viscusi, Vernon and Harrington (2005), pp. 361–362: “One reason for the minimal use of quality regulation is the cost of implementing it. To control any variable, the relevant economic agents have to be able to agree on what the variable is and what restrictions are placed on it.... However, quality is typically neither so well defined nor so easily observed.... Generally, economic regulation has not placed severe restrictions on the quality of products or services that firms offer with the notable exception of product safety.”

<sup>282</sup> NPRM, ¶ 16.

bears this out and demonstrates that network neutrality regulation is not necessary to preserve a free open and Internet, because market forces are doing so successfully.

115. Competition and innovation by broadband providers, device makers, applications developers and content providers have resulted in new and faster services, new access devices (such as smartphones, aircards and netbooks), access to a wide range of content and applications, falling prices, and improved service quality. Next-generation technologies, including wireline telco FTTH, cable DOCSIS 3.0, wireless 3G and 4G, and WiFi are rapidly being developed and deployed, providing more broadband choices and better broadband capabilities to the majority of consumers. In short, the current broadband environment, which has relied primarily on market forces rather than regulation, has delivered rapid innovation, consumer choice, and substantial consumer benefits.

116. The current broadband market environment, relying on market forces and with limited regulation, also has created incentives for industry players to adapt to changes in technology, changes in the way broadband content is accessed, and changes in the role of complementary devices, applications, and content. One hallmark of the current market environment is that providers, device makers, software developers, and content providers have been able – or forced by the market – to experiment with a variety of business and pricing models, as they seek to differentiate their products and attract consumers. This flexibility has led to product differentiation in many dimensions and has allowed users to extensively customize and improve their individual experiences. There is no single pricing plan for broadband access. Instead, broadband access can be postpaid, prepaid, bundled, unlimited, or sold for just a few hours. There is also no single business model. Users can sign long term contracts for subsidized devices or buy their own device and bring it to a network.

117. Consumers also face real choices with respect to “openness” as a result of current broadband competition. Personal computers offer many advantages as devices to access broadband content, but they can be threatened with malware and viruses that disable applications. Some smartphones, such as the Apple iPhone, operate in a more controlled network environment, with a provider and/or operating system developer vetting all applications before distribution. Other smartphones, such as those running Android, require no approval, and developers simply develop, upload, and publish. This provides consumers with a choice of environments, ranging from completely open

where the consumer takes primary responsibility for security to an environment where more security features are handled by the broadband provider but user flexibility may be more limited.

118. As these various marketplace developments show, existing competition for broadband services has created incentives for broadband providers, device makers and applications developers to experiment with different business arrangements and to innovate and invest in new technologies in order to attract consumers to their networks. The fact that the broadband marketplace is already providing consumers with open access to the Internet, as well as a range of other options, suggests that competitive forces are working properly and that expansion of the Commission's current Internet Policy Statement into a set of prescriptive regulatory rules is not necessary.

#### **B. The Proposed Network Neutrality Rules Are Likely To Harm Consumer Welfare**

119. Network neutrality regulations are not only unnecessary given the current competitive environment for broadband, but, by limiting flexibility, they may also jeopardize future broadband investment and innovation, limit consumer options, and harm consumer welfare. Given the dynamism of the broadband marketplace, there is still considerable uncertainty regarding what the range of best practices will be, and those efficient practices are likely to evolve over time. Experimentation and observing the corresponding consumer response has been and will be an essential business practice for competitors in this space.<sup>283</sup> Economists and competition authorities are particularly skeptical of claims of the need for prophylactic regulation in advance of competitive problems.<sup>284</sup>

120. There are many varieties of network neutrality. Many of the network neutrality proposals in the NPRM would restrict the business practices of broadband network providers in ways that could lead to consumer welfare harms. Proposals to adopt restrictions on network management,

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<sup>283</sup> Other economists have made similar points. See, e.g., Shelanski (2007), p. 102: "[C]ompetition drives networks away from anticompetitive, anti-consumer vertical discrimination. But competition would allow discriminatory deals where they are in the interests of consumers and new producers that consumers would like to see in the marketplace. Competition is therefore preferable to regulation for determining the appropriate degree of net neutrality." See, also, Robert Hahn and Scott Wallsten (2006), "The Economics of Net Neutrality," *AEI-Brookings Joint Center for Regulatory Studies*, June 2006, p. 5; Christopher Yoo (2008), "Network Neutrality, Consumers, and Innovation," *The University of Chicago Legal Forum*; Michael Katz (2009), "Investment, Innovation, and Competition in the Provision of Broadband Infrastructure," attachment to Comments of Verizon and Verizon Wireless, GN Docket 09-51, filed June 8, 2009.

<sup>284</sup> For example, the FTC noted: "[I]ndustry-wide regulatory schemes - particularly those imposing general, one-size-fits-all restraints on business conduct - may well have adverse effects on consumer welfare, despite the good intentions of their proponents. FTC Staff Report 2007, p. 11.

pricing and vertical contractual relationships with device, applications, and content providers all raise such risks. The economics literature recognizes that network operator practices such as network management, differential pricing, and vertical contracting can be procompetitive, solve incentive problems, and promote investment, even when the network operator is a monopolist.<sup>285</sup>

121. Network neutrality proposals that prescribe a “one size fits all” approach to network management are likely to reduce consumer welfare. Given heterogeneity in consumer preferences and broadband technologies, one choice in network architecture, network management, or business model will not best fit the needs for all consumers or uses of broadband content. As such, it is harmful to consumer welfare for the Commission to mandate a particular network neutrality regime as “the approach” to broadband provision. For example, some consumers might prefer open access to the Internet with little security management, while other consumers might prefer that broadband providers manage access and address Internet security issues. Some consumers might prefer a service with different speeds available for different types of content and applications, while other consumers might prefer one-speed-fits-all broadband service. Network neutrality regulations will artificially limit providers’ ability to tailor services to different consumers needs and therefore can harm consumer welfare.<sup>286</sup>

122. Restrictions on network management practices also may cause harms by precluding broadband providers from dealing effectively with network congestion. Network congestion is a significant and growing problem for broadband providers,<sup>287</sup> particularly wireless providers, and requires business flexibility to ensure quality consumer service experiences. For example, AT&T is reportedly considering ways to encourage customers to use less data as it struggles with congestion on its wireless network.<sup>288</sup> Network neutrality regulations may well restrict the ability of providers to manage their networks and remove potential tools for providers to address

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<sup>285</sup> See, e.g., Farrell and Weiser (2003), “Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age,” *Harvard Journal of Law and Technology*, Vol. 17; James Cooper, Luke Froeb, Dan O’Brien, and Michael Vita (2005), “Vertical Antitrust Policy as a Problem of Inference,” *International Journal of Industrial Organization*, September 2005, Vol. 23. The economics literature also recognizes that in certain circumstances a platform monopolist may have the incentive and ability to engage in practices can harm competition and consumers. See, e.g., Farrell and Weiser (2003). But virtually all of the scenarios where vertical relationships theoretically may harm consumers arise when there is significant market power at one level in the vertical chain of production. Here, given the increasingly vigorous competition between broadband providers, carrier practices are far more likely to be procompetitive and pro-consumer than anticompetitive.

<sup>286</sup> Benjamin Hermalin and Michael Katz (2006), “The Economics of Product-Line Restrictions with an Application to the Network Neutrality Debate,” *UC Berkeley Competition Policy Center Working Paper*, July 28, 2006.

<sup>287</sup> Gerald Faulhaber (2007), “Network Neutrality: The Debate Evolves,” *International Journal of Communication*, Vol. 1, p. 684.

<sup>288</sup> “AT&T to Urge Customers to Use Less Wireless Data,” *The New York Times*, December 10, 2009.

congestion. Economists recognize that the ability to price differentially could be particularly useful for content providers who would like to achieve priority delivery of their content.<sup>289</sup> With a differential price, the broadband provider could ensure high priority delivery even in periods of peak congestion, which also is a way for the provider to differentiate its service.

123. Network neutrality regulations would also have the adverse consequence of deterring network investment by broadband access providers. In order to recoup their large investment costs and spread the costs among more parties, broadband providers may seek to offer new types of services to content and applications providers, such as prioritized access.<sup>290</sup> By prohibiting broadband providers from collecting differential revenues, or in some proposals any revenues at all, from content providers who would benefit from these new services, network neutrality rules proposed in the NPRM have the potential to diminish the returns associated with a carrier's network investment.<sup>291</sup> This ultimately reduces the incentives for innovation and investment for both incumbents and potential new entrants. In addition, given the virtuous cycle that exists where next-generation broadband networks stimulate innovation in applications and content, requiring more bandwidth, and in turn encouraging even more advanced networks, a reduction in network infrastructure investment can potentially stifle content and application innovation, as well. Moreover, prohibiting pricing to content providers shifts the burden of supporting new investment onto the shoulders of end consumers.

124. Beyond the effects of the virtuous cycle, network neutrality regulation can thwart innovation in other ways. With regulations prohibiting differential pricing for quality of service, broadband providers would be less able to guarantee quality of service for certain types of content.<sup>292</sup> A variety of broadband applications may benefit from quality of service guarantees, including streaming video, voice over Internet protocol telephony (VOIP), and telemedicine. For example, Hahn and Wallsten (2006) point to telemedicine as a specific example, asking “[W]ho wants to risk remote surgery or emergency medical advice if the video stream is sluggish and jerky because

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<sup>289</sup> See, e.g., Gregory J. Sidak (2006), “A Consumer-Welfare Approach to Network Neutrality Regulation of the Internet,” *Journal of Competition Law and Economics*, Vol. 2, p. 353.

<sup>290</sup> Philip Weiser (2008), “The Next Frontier for Network Neutrality,” *Administrative Law Review*, Vol. 60, p. 11.

<sup>291</sup> See, e.g., Robert Atkinson and Philip Weiser (2006), “A ‘Third Way’ on Network Neutrality,” The Information Technology and Innovation Foundation, May 30, 2006, pp. 5–6 available at <http://www.itif.org/files/netneutrality.pdf>.

<sup>292</sup> For a discussion of quality of service (QoS) in broadband networks, see Litan and Singer (2007). See also Bruce Owen and Gregory Rosston (2003), “Local Broadband Access: Primum Non Nocere or Primum Processi? A Property Rights Approach,” Stanford Law School Working Paper No. 263, July 2003, p. 20.

of congestion caused by an online game of Doom?”<sup>293</sup> The development of new and enhanced broadband applications such as telemedicine will likely require significant coordination among network providers, content providers and applications developers, and regulations restricting quality of service pricing will make such coordination harder to achieve.

125. Network neutrality regulations could also negatively impact competition in broadband service. Reducing the flexibility for broadband providers to act in creative ways could homogenize broadband service and make all the broadband providers look more like one another. Homogenization could lead to increased market concentration, as this industry is characterized by high fixed costs and increasing returns to scale. If providers are unable to differentiate themselves from one another except through price, the largest provider will tend to prevail in an industry with increasing returns to scale.<sup>294</sup> Therefore, in considering network neutrality regulations, regulators need to weigh the possibility of such regulation decreasing the extent of competition which in turn could raise prices, reduce access, and impede expansion and innovation.

### C. Specific Concerns Raised in the NPRM

126. The NPRM raises several specific concerns about broadband provider practices that network neutrality regulations are intended to address, noting that “[s]upporters of open Internet policies contend that market forces alone are unlikely to ensure that broadband Internet access service providers will discriminate in socially efficient ways.”<sup>295</sup> First, the issues that the NPRM raises are hypothetical possibilities rather than features of the current broadband marketplace. Since the Commission adopted its Internet Policy Statement in 2005, there has been just one instance in which the Commission found it necessary to enforce its policy principles. In that case, Comcast was blocking certain BitTorrent peer-to-peer applications. Comcast discontinued the practices under dispute following public disclosure – even in the absence of prescriptive rules of the sort at issue here. Thus, specific violations of the Internet Policy Statement principles have been few and far between, as market forces have led providers to adopt network management and business practices that are procompetitive and benefit consumers.

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<sup>293</sup> See Hahn and Wallsten (2006), p. 4.

<sup>294</sup> George Ford, Thomas Koutsky and Lawrence Spiwak (2006), “Network Neutrality and Industry Structure,” Phoenix Center Policy Paper, No. 24, p. 2: “[P]olicymakers should avoid mandates that may ‘commoditize’ broadband access services since such a policy approach is likely to deter facilities-based competition, reduce the expansion and deployment of advanced communications networks, and increase prices.” See, also, Yoo (2008), p. 213. Jean Tirole (2000), “The Theory of Industrial Organization,” MIT Press, Ch. 7.

<sup>295</sup> NPRM, ¶ 67.

127. Moreover, the broadband provider practices at issue have procompetitive justifications, and are unlikely to be anticompetitive given the current competitive environment for broadband provision. I discuss below several of the specific concerns raised in the NPRM and explain why they are misplaced from an economic perspective.

### **1. Market Forces Will Deter Inefficient Pricing**

128. The NPRM expresses the concern that, absent network neutrality regulation, broadband service providers may charge prices to content and applications that are inefficiently high.<sup>296</sup> The NPRM posits that even with market competition, inefficient pricing could still exist. These concerns are misguided.

129. In addressing this issue it is useful to consider the economics of two-sided markets. Broadband providers operate in a two-sided market with consumers on one side and application and content providers on another.<sup>297</sup> Broadband providers are eager to attract as many consumers as possible, since more consumers provide more subscription fees and make the broadband network more attractive to applications and content providers. Under current pricing arrangements, broadband providers charge only the consumer side of the market for the delivery of content of applications.<sup>298</sup>

130. Currently, the price charged by network providers to the other side of the market, content and application providers for delivery or downloads of content or application to end users over the Internet, is effectively zero. However, this zero price may not be the most efficient. Contractual pricing arrangements between broadband providers and application and content providers may result in the provision of new and better services. A two-sided pricing model where both consumers and content providers pay fees may also be a more efficient way for network providers to recover the substantial fixed costs of building, improving, and maintaining broadband access networks.<sup>299</sup> In addition, charging content providers a fee may well shift costs away from the

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<sup>296</sup> “Even where there is effective competition in the Internet access market, individual broadband Internet access providers may charge inefficiently high prices to content, application, and service providers ...”, NPRM, ¶ 68.

<sup>297</sup> For further discussion of two-sided markets, see David Evans (2003), “The Antitrust Economics of Multi-Sided Markets,” Yale Journal of Regulation; Jean-Charles Rochet and Jean Tirole (2007), “Two-Sided Markets: A Progress Report,” Rand Journal of Economics.

<sup>298</sup> Broadband providers charge end-user subscribers for Internet access and also charge content providers that are directly connected to the broadband provider. However, a broadband provider generally does not charge a content provider for access to its end-user subscribers.

<sup>299</sup> See, e.g., Sidak (2006), p. 362: “[E]ach party in a two-sided market can contribute to the recovery of the sunk costs required to build a broadband network. There is certainly no basis in economic theory to presume that it would be

consumer market, which may prove appealing to many end users and open the door to more innovative pricing regimes for the end user market.

131. Moreover, competition among broadband providers alleviates concerns about inefficient pricing. Consider a hypothetical broadband access provider A that charges a content provider a price that is “too high” for priority delivery. The content provider can choose to have its content delivered by provider A at lower access speeds or quality of service, while delivering its content with priority delivery via other broadband access providers. By charging a “too high” price, provider A will be at a competitive disadvantage in attracting and retaining consumers who value that content. Competition among broadband service providers allows end users to choose the broadband provider who delivers the appropriate mix of content, speed, and service quality. In this way, competition imposes pricing discipline on providers and creates incentives for them to offer competitive prices to content providers and end-users.

132. The NPRM also raises the concern that “[i]f allowed to do so, broadband Internet service providers may attempt to extract some of the profit earned by content, applications, and service providers by charging them fees for providing access (or prioritized access) to the broadband Internet access service providers’ subscribers,”<sup>300</sup> thus reducing incentives for content and applications providers to innovate. It is important to remember that broadband content/applications and broadband access are complements, and that in addition to innovation by content/applications providers, the provision of content/applications to end-users also involves significant investment and innovation on the part of broadband providers. In this case, one would expect broadband providers and upstream content and applications providers to enter into mutually advantageous contractual agreements, with bargaining over the division of potential future profits. Vertical contracting can promote investment by both broadband providers and upstream applications providers. Economists recognize that vertical contracts can align incentives and promote pro-consumer activities. For example, if both broadband providers and content/applications providers need to make relationship specific investments in order to deliver services to the end user, an *ex ante* contract between the content provider and carrier will ensure

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socially optimal for end-users to pay for all of the cost of building a high-speed broadband network while the companies that deliver content or applications to those same end-users over that network – and therefore derive substantial economic advantage from its use – pay nothing.”

<sup>300</sup> NPRM, ¶ 68.

the best outcome for the consumer.<sup>301</sup> Far from being a problem, a sharing of profits among contractual parties is a central feature of an efficient market system.<sup>302</sup>

## **2. Collective Action Problems Regarding Prioritization Fees Are Not a Rationale for Network Neutrality Regulation**

133. The NPRM voices the concern that it might be in the collective interest of competing broadband providers not to implement prioritization fees to content or applications providers, but that it might be in the self-interest of an individual broadband provider to charge a prioritization fee to content or applications provider.<sup>303</sup> The NPRM calls this a collective action problem.

134. First, as discussed above, it is far from economically obvious that a regime with no prioritization fees would benefit consumers, content/applications providers, or broadband providers. Competitive forces deliver strong incentives for broadband providers to offer attractive access arrangements to content providers. Contractual pricing arrangements between broadband providers and application and content providers can result in the provision of new and better services that benefit the broadband provider, the content provider, and consumers. As competing broadband providers strive to differentiate their networks and offer attractive service packages to consumers, and as competing content/applications providers attempt to differentiate themselves in the marketplace, the ability to enter into contracts for prioritized service can increase competitive rivalry. Because consumers can “vote with their feet” which broadband provider supplies the best access to content, competition will allow prioritization fees when they are in the interest of consumers. Network neutrality regulation that sets prioritization fees at zero would be replacing market choices by broadband providers, content/applications providers, and consumers with choices made by the regulator.<sup>304</sup>

135. Collective actions problems can arise in markets when there are externalities – that is, when consumers or firms do not bear the full costs or realize the full benefits of their actions on

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<sup>301</sup> Patrick Bolton and Mathias Dewatripont, (2005) *Contract Theory*, p. 560–564. For further discussion of the benefits of vertical contracting, see Patrick Rey and Jean Tirole (2007), “A Primer on Foreclosure,” *Handbook of International Organization*, Vol. III, Ch. 33.

<sup>302</sup> See Bolton and Dewatripont (2005).

<sup>303</sup> “Although it might be in the collective interest of competing broadband Internet access service providers to refrain from charging access or prioritization fees to content, application, and service providers, it is in the interest of each individual access provider to charge a fee, and given multiple providers, it is unlikely that access providers could tacitly agree not to charge such fees.” NPRM, ¶ 69.

<sup>304</sup> As noted by Shelanski (2007), p. 102: “Competition is therefore preferable to regulation for determining the appropriate degree of net neutrality.”

others.<sup>305</sup> Externalities can be negative, as in the case of drivers causing congestion for other drivers on local highways, or positive, as in the case of a homeowner who fixes up the exterior of her home and her yard, providing benefits to her neighbors. Positive externalities arise in the context of broadband access because of network effects;<sup>306</sup> the decision by consumers to subscribe to broadband access depends on the content that is made available by content providers, and the decision by content providers to invest in and provide content depends on the number of broadband subscribers that they can reach. Negative externalities can also arise in the broadband context, such as when a bandwidth-intensive user causes congestion for other users.

136. Externalities typically arise because of a lack of well defined property rights. For example, network resources like bandwidth are a resource that is shared across users, and, no one user has exclusive right to a certain amount of bandwidth. A bandwidth-intensive user on an all-you-can-eat broadband access plan is claiming a temporary right to these shared network resources that may prevent other users from having adequate network capacity. While some externalities may require government solutions, in many situations the market can solve externality problems through various forms of pricing or contracting. This is especially true when property rights are well defined, as they are in the case of content and broadband access. For example, usage-based pricing can force those who use the most network resources to bear the costs they impose on other users.

137. As another example, consider a new broadband application that requires innovation and investment both by a broadband provider and by a complementary applications provider.<sup>307</sup> Consumer value is created only if both parties undertake complementary investments. Positive externalities can arise when the broadband provider's investment benefits applications providers, and the application provider's investments benefit other broadband providers. Because the broadband (applications) provider does not account for the benefit that accrues to the applications (broadband) provider, investment might not take place that would benefit both parties, and would benefit consumers. Because property rights are well defined both for the broadband and

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<sup>305</sup> See, e.g., Carlton and Perloff (2005), p. 82.

<sup>306</sup> For additional discussion of network effects, see Joseph Farrell and Paul Klemperer (2007), "Coordination and Lock-In: Competition with Switching Costs and Network Effects," *Handbook of Industrial Organization*, Vol. III, Ch. 31.

<sup>307</sup> For discussion of the relationship between Apple and AT&T that led to the iPhone, see Michael Katz (2009), "An Economic Analysis of the Rural Cellular Association's Petition for Rulemaking Regarding Exclusivity Arrangements Between Commercial Wireless Carriers and Handset Manufacturers," Attached to AT&T Comments, In the Matter of Petition for Rulemaking Regarding Exclusivity Arrangements Between Commercial Wireless Carriers and Handset Manufacturers, RM-11497, February 2, 2009.

content/applications provider, the economics literature recognizes that various forms of vertical contracting between firms can solve this externality problem and otherwise align incentives, without the need for government intervention.<sup>308</sup>

138. The specific collective action problem raised in the NPRM is that if broadband providers do not take into account the effect of prioritization fees on the incentives of content/applications providers, then the quality and quantity of Internet content/applications may be reduced, reducing the overall value of the Internet, and the demand for broadband Internet services.<sup>309</sup> As discussed above, in a competitive market setting, prioritization fees are likely to arise when they benefit content providers, broadband providers and consumers. Broadband providers and content/applications providers will enter into contractual arrangements that align incentives and solve externality problems. Other contractual arrangements may also arise. For example, content delivery networks such as Akamai cache frequently requested web content at many locations throughout the Internet, allowing faster delivery of content and reducing problems with latency.<sup>310</sup> Content and applications providers pay Akamai for this service, which is a form of prioritized access. Economics predicts that firms will enter into a variety of arrangements to solve incentive problems, and in a competitive market setting, such arrangements are almost always pro-consumer. In today's (and tomorrow's) broadband marketplace, the best public policy is to allow firms to experiment with a variety of business arrangements and pricing schemes, and not impose a regulatory pricing rule on prioritized service.

### **3. Market Forces Will Prevent Best-Efforts Access from Languishing**

139. The Commission's NPRM also raises the possibility that, if broadband providers are able to charge content suppliers, broadband providers may have incentives to improve access that is paid for, but allow best-effort access that is not paid for to languish.<sup>311</sup> The NPRM voices the concern that this problem could manifest itself even with market competition. This concern also is misplaced from an economic perspective.

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<sup>308</sup> See Hahn and Singer (2009); Carlton and Perloff (2005), Ch. 12.

<sup>309</sup> NPRM, ¶ 69.

<sup>310</sup> For additional discussion of content delivery networks and Akamai, see Yoo (2008), p. 199.

<sup>311</sup> "[B]roadband Internet access service providers generally, and particularly broadband Internet access service providers with market power, may have the incentive and ability to reduce or fail to increase the transmission capacity available for standard best-effort Internet access service, particularly relative to other services they offer, in order to increase the revenues obtained from content, application, and service providers or individual users who desire a higher quality of service." NPRM, ¶ 71.

140. As an initial matter, there is no reason to believe that all consumers want or are willing to pay for the same broadband speeds. The marketplace evidence I summarize above demonstrates that broadband providers offer multiple tiers of service to consumers, with the tiers often varying by access speed. This reflects the fact that consumer demand for broadband service is not homogenous, but instead varies considerably depending on many factors.

141. Just as this is true with respect to consumers, it also is true with respect to content providers. There is no economic reason that all applications should be subject to the same quality of service. Some services, such as streaming video, VOIP, and online gaming may require low latency and higher quality of service. Other services such as email or web browsing may work fine with standard best-efforts access. Here, too, there presumably would be a difference in the willingness and ability of various actors to pay for prioritized access, which should be encouraged – not prohibited – in order to maximize consumer welfare.<sup>312</sup>

142. Despite wide variance in demand for bandwidth and other performance characteristics among both consumers and content providers, marketplace evidence also demonstrates that there is significant demand for best-efforts service. Far from allowing such service to languish, wireline and wireless broadband access providers have been steadily increasing the speeds with which they offer standard best-efforts Internet access. Given competition among broadband providers, there is every reason to expect standard best-efforts offerings to continue improving going forward.

143. Competition creates incentives for broadband providers to provide high quality service to all content providers. Quite simply, a broadband provider who delivers faster access to higher quality content will attract and retain more consumers to its network. Consumers benefit when they have access to more content and applications. In a competitive environment, a provider has no incentive to let its best-efforts service languish. If it did, it would lose subscribers and subscriber revenue. This effect is only strengthened as more broadband competition emerges.<sup>313</sup>

144. Rules that prohibit everything but best-efforts service are not only unnecessary given competitive forces, but would limit the flexibility of broadband providers to provide services that may be valuable to consumers. In a world where certain content, such as telemedicine or streaming video, requires higher priority bandwidth, the possibility of network congestion

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<sup>312</sup> See, e.g., Weiser (2008), p. 10: “For the Internet to develop effectively, it is important for policymakers to appreciate that QoS assurances are not an unfortunate development, but a necessary one that may well be good for customers.”

<sup>313</sup> Shelanski (2007), p. 102.

problems create incentives for broadband providers to offer more reliable, high-speed service.<sup>314</sup> For example, streaming video requires reduced latency to function most effectively, and in the absence of sufficiently high quality of service, an online video service may not be of sufficient quality to be viable. Similarly, certain telemedicine applications may require a high quality of service to function effectively.

145. Multiple tiers of service exist in other industries, as well, such as parcel delivery. For example, both UPS and FedEx have many different levels of service, with various delivery speeds and guarantees. However, they have incentives to compete on all levels of service and, as such, have ensured high quality even at the least expensive levels.<sup>315</sup> Similarly, airlines offer different levels of service, and compete for consumers at all their service levels.

#### **4. Anticompetitive Exclusion is Unlikely in the Competitive Broadband Environment**

146. The NPRM also expresses a concern that vertically integrated or affiliated broadband providers may have the incentive and ability to exclude services offered by competing, unaffiliated content and application providers.<sup>316</sup> As discussed above, economists recognize that vertical integration and vertical contracting is often motivated by procompetitive and pro-consumer reasons. For example, vertical integration or contracting can align investment incentives between a network operator and a content developer. In addition, virtually all scenarios where vertical integration or vertical contracting harms consumers arise when there is significant market power at one level.<sup>317</sup> Even in a monopoly market setting, anticompetitive exclusion only occurs under specific conditions.<sup>318</sup> Moreover, although some broadband providers may have ownership interests in content businesses or have entered into vertical contracts with certain content businesses, none has even come close to achieving a dominant position. Further, the competitiveness of the content and applications markets, with a multitude of choices available to consumers, means that a broadband provider's upstream affiliate would benefit little from any

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<sup>314</sup> See Hahn and Wallsten (2006), p. 4 and Sidak (2006), p. 353.

<sup>315</sup> Faulhaber (2007), p. 690 makes a similar point.

<sup>316</sup> "Broadband Internet access service providers have an incentive to use this gatekeeper role to make it more difficult or expensive for end users to access services competing with those offered by the network operator or its affiliates." NPRM, ¶ 72.

<sup>317</sup> Daniel Spulberand and Christopher Yoo (2008), "Rethinking Broadband Internet Access," *Harvard Journal of Law and Technology*, Fall 2008, p. 34.

<sup>318</sup> See Farrell and Weiser (2003).

restrictions on unaffiliated content. In sum, given that the markets for broadband providers, applications developers, and content providers are competitive, vertical integration is far more likely to be procompetitive and pro-consumer than anticompetitive.

## **5. There is not a Terminating Monopoly Problem in Broadband Provision**

147. The NPRM also raises the concern that after an end user has chosen her Internet service provider, that provider has an effective “terminating monopoly” on this end user and can leverage this power to collect monopoly profits from content and application providers.<sup>319</sup> Again, the competitive environment of the broadband industry alleviates these concerns.

148. For background, it is helpful to consider terminating access fees charged by local exchange carriers to complete voice calls. Once a consumer subscribes to local telephone service from a local exchange carrier (LEC), that LEC was viewed as a “monopolist” for anyone who wants to reach that consumer over the wireline telephone network.<sup>320</sup> The access charges are levied on the interexchange carrier (IXC) that originates the call, and passed on to the calling party, but the called party does not face these access charges and has little incentive to switch to a competing LEC with lower access fees. The ability and incentives of LECs to, in certain situations, charge high terminating access fees was known as the “terminating monopoly” problem.

149. The local telephone service regulatory environment exacerbates these issues. First, basic local telephone service is subject to price regulation that may hold prices below profit maximizing levels. In addition, regulation requires IXCs to rate average across consumers, so that an IXC cannot charge higher rates to customers that make more calls that face high terminating access fees. As a result, access charges are averaged among all IXC’s subscribers. As a result of the regulatory environment, there is little competitive pressure on an LEC that charges high terminating access fees. Economists and Commission staff have raised a number of ways in which a terminating monopoly for voice calls could harm consumers.<sup>321</sup> For these reasons, Commission staff have proposed a “bill and keep” regime where carriers interconnect, but where terminating

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<sup>319</sup> “[E]ven if there is competition among broadband Internet access service providers, once an end-user customer has chosen to subscribe to a particular broadband Internet access service provider, this may give that broadband Internet access service provider the ability, at least in theory, to favor or disfavor any traffic destined for that subscriber.” NPRM, ¶73.

<sup>320</sup> This discussion draws on the analysis in Brito and Ellig (2007).

<sup>321</sup> Patrick DeGraba (2002), “Central Office Bill and Keep as a Unified Inter-Carrier Compensation Regime,” *Yale Journal on Regulation*; Jerry Ellig (2005), “Inter-carrier Compensation and Consumer Welfare,” *Journal of Law, Technology & Policy*.

LECs could not impose access charges on other telecommunications carriers, but instead only collect revenue from its own subscribers.<sup>322</sup>

150. Network neutrality regulation proponents have posited that a similar situation could arise in the broadband context if broadband providers could charge content providers fees for accessing consumers.<sup>323</sup> However, the regulatory environment for broadband provision is very different from that of local telephone service, and competitive forces are likely to deter any effort by a broadband provider to charge inefficiently high access charges for delivering broadband content to a consumer.<sup>324</sup> No such rate averaging regulation exists, and most consumers have access to several choices for broadband service. If a broadband provider attempted to charge “inefficiently high” prices to content suppliers to serve certain consumers, the content provider could choose to pass this cost on to the users of their services who subscribe to the broadband provider. Consumers would be directly impacted by the price increase, and could switch to another broadband provider. Or the content provider could choose not to offer its content to consumers of that broadband provider. Again, consumers would be directly impacted by the loss of content, and could switch to another broadband provider. A competing broadband service provider who charges a lower price to the same content providers will be able to make that content available to end users at higher speeds or quality of service. As evidenced by the high churn rates of wireline and wireless broadband providers, consumers can and do switch providers when faced with more attractive options, and this competitive discipline deters providers from charging “inefficiently high” prices.

151. Network neutrality proponents also worry that content/applications providers may be reluctant to pass on access charges to subscribers or refuse to deliver traffic to a broadband provider that charges access fees, thus limiting the ability of competition to discipline inefficient access fees.<sup>325</sup> However, in a two-sided market setting, competition on both sides of the market can discipline prices. Broadband providers operate as intermediaries, with subscribers on one side and content/applications providers on the other side. Parties on both sides can contribute to the significant costs of building and maintaining a broadband network, and by having the flexibility to contract with content/applications providers, competing broadband providers will have an

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<sup>322</sup> DeGraba (2002).

<sup>323</sup> FTC Staff Report, p. 77.

<sup>324</sup> See, Faulhaber (2007), fn. 24.

<sup>325</sup> NPRM, fn. 160.

incentive to lower subscription fees to consumers. As described by Brito and Ellig (2007), “it is difficult to understand why any rents the access providers might earn from charges on content or applications providers would not be returned to consumers in the form of lower prices for Internet access.”<sup>326</sup>

## VI. Conclusion

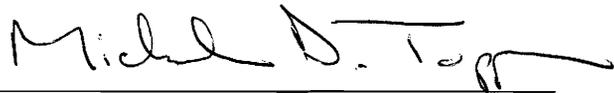
152. My review of the marketplace evidence suggests that network neutrality regulations of the type at issue here are not warranted. The broadband provider practices challenged by proponents of network neutrality regulation have many procompetitive justifications, and vigorous competition among broadband providers creates a strong disciplining effect on potentially anticompetitive broadband provider practices. As economists have long recognized, competitive markets create proper incentives for investment, innovation, pricing and entry.

153. Moreover, proposed network neutrality regulations have the potential to reduce incentives to innovate and invest, and to distort the current competitive process. Among other drawbacks, network neutrality regulations are likely to reduce incentives for investment, restrict network management practices in ways that could exacerbate network congestion, and bind the hands of broadband providers when faced with changes in technology or the nature of Internet traffic. Given the current competitive environment, and the potential consumer welfare costs of *ex ante* network neutrality regulation, a better approach than broad, *ex ante* network neutrality regulation is to rely on industry players disclosing their practices and government intervention only when faced with evidence of anticompetitive behavior arising from service provider practices that threatens to harms consumers.

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<sup>326</sup> See Brito and Ellig (2007), p. 29. See also, Sidak (2006), pp. 361–362.

I declare under penalty of perjury that the foregoing is true and correct.

A handwritten signature in black ink that reads "Michael D. Topper". The signature is written in a cursive style with a horizontal line extending from the end of the name.

Michael D. Topper  
Executed January 14, 2010

**Declaration of Michael D. Topper**  
**Attachment A**

**MICHAEL D. TOPPER**  
**Vice President**

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**ACADEMIC BACKGROUND**

- 1991      **Stanford University**      Stanford, California  
*Ph.D., Economics, 1991; M.A., Economics, 1989*  
Specialized in labor economics, public finance, industrial organization and econometrics.
- 1982      **Stanford University**      Stanford, California  
*M.S., Engineering-Economic Systems*
- 1981      **University of Virginia**      Charlottesville, Virginia  
*B.S., Systems Engineering, with Highest Distinction*  
Member, Tau Beta Pi

**PROFESSIONAL EXPERIENCE**

- 1994 – Present      **Cornerstone Research, Inc.**      Menlo Park, California  
*Vice President (Partner)*  
*Head, Antitrust & Competition Practice*  
Manage and conduct economic analysis for complex business litigation, regulatory and public policy matters, with specialization in antitrust, intellectual property, class certification and breach of contract.  
Industry expertise includes telecommunications, media, Internet, information technology, energy, transportation, and financial services.  
Expertise includes econometrics, analysis of large datasets and consumer survey design and analysis.  
Services to clients include expert testimony, identifying experts, clarifying economic and financial issues, identifying and analyzing data, supporting experts in the preparation of expert reports and testimony, and analyzing opposing expert reports and testimony.
- 1993 – 2003      **Stanford University**      Stanford, California  
*Lecturer in Economics*  
Taught courses in microeconomics and antitrust policy for the Department of Economics.
- 1991 – 1994      **College of William and Mary**      Williamsburg, Virginia  
*Assistant Professor of Economics*  
Conducted academic research on the economics of education and training programs. Developed new courses in labor and development economics. Helped launch the new graduate program in public policy. Taught core courses in economics and statistics. Supervised graduate and undergraduate students.

**MICHAEL D. TOPPER**  
**Vice President**

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**PROFESSIONAL EXPERIENCE (CONT.)**

- Summer 1986 **Rand Corporation** Santa Monica, California  
*Summer Research Intern, Telecommunications Policy Group*  
Developed models for estimating the demand for telecommunications services.
- Summer 1985 **International Institute for Applied Systems Analysis (IIASA)** Vienna, Austria  
*Summer Research Intern, Systems Modeling Group*  
Programming and analysis for dynamic simulation models.
- 1981 – 1984 **Bell Laboratories/Bell Communications Research** Holmdel, New Jersey  
*Systems Engineer*  
Conducted cost/benefit, technical feasibility and economic cost analyses for advanced switching services based on caller ID.

**PUBLICATIONS**

- “3G Standards Policy: Government Shouldn’t Intervene in Debate,” *Wireless Week*, December 21, 1998.
- “Student Loans, Debt Burdens, and Choice of Major,” *New Directions for Higher Education*, 85, pp. 115–124, 1994.
- “The Impact of the Demographic Transition on Government Spending,” with John Shoven and David Wise, In David Wise, ed., *Economics of Aging*, University of Chicago Press, 1994.
- “The Cost of Capital in Canada, the U.S. and Japan,” with John Shoven, In John Shoven and John Whalley, eds. *Canada-U.S. Tax Policy Issues*, University of Chicago Press, 1992.

**WORKING PAPERS**

- “An Antitrust Analysis of the Case for Wireless Network Neutrality,” with Gregory L. Rosston, *Stanford Institute for Economic Policy Research Discussion Paper 08-040*, July 2009. Accepted, *Information, Economics and Policy*
- “Economic White Paper on National Third Generation Wireless Standards,” with Joseph Farrell, *Mimeo*, November, 1998.

**CONFERENCE PARTICIPATION, PANEL PARTICIPATION AND INVITED TALKS**

- “Modernization of Antitrust Law,” Stanford University Conference, May 29–30, 2008, Panelist/Discussant.
- “Third Generation Wireless Standards Policy,” Presentations in Washington D.C., December 1998.
- “Higher Education and the American Worker,” Christopher Wren Society, Williamsburg, VA, April 1993.
- “The Impact of the Demographic Transition on Government Spending on Individuals,” with John Shoven and David Wise, NBER Conference on the Economics of Aging, July 1992.

**MICHAEL D. TOPPER**  
**Vice President**

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**CONFERENCE PARTICIPATION, PANEL PARTICIPATION AND INVITED TALKS (CONT.)**

“Ethnic Differences in Schooling Attainment in Malaysia—A Difference in Differences Approach,”  
Paper presented at Southeast Asian Educators Workshop, Stanford University, July 1991.

“The Cost of Capital in Canada, the U.S. and Japan,” with John Shoven, NBER Conference on  
Canada–U.S. Tax Comparisons, July 1990.

**EXPERT TESTIMONY**

*Federal Communications Commission, Mobile Wireless Competition Notice of Inquiry, WT Docket  
No. 09-66.* Filed declaration on behalf of client Verizon Wireless, September 2009.

*Copyright Royalty Board, In the Matter of Distribution of the 2004 and 2005 Cable Royalty Funds,  
Docket No. 2007-3 CRB CD 2004-2005.* Filed testimony on behalf of client National Association of  
Broadcasters, December 2009.

**FELLOWSHIP AND AWARDS**

Center for Economic Policy Research, Stanford University  
*Visiting Scholar, 1993–1994*

Department of Economics, Stanford University  
*Distinguished Teaching Award, 1989*

Rand Corporation  
*Graduate Student Summer Fellowship, 1986*

International Institute for Applied Systems Analysis  
*American Academy of Sciences Young Scientists’ Summer Program Fellowship, 1985*

Bell Laboratories  
*Graduate Fellowship, 1981–1982*

**Declaration of Michael D. Topper**  
**Attachment B**

**ATTACHMENT B**  
**Wireline Broadband Availability in Verizon's Local Service Territory**  
**(as of 2009)**

State	Total Households (HH) in VZ Territory	Total HH in Wire Centers with VZ BB or Cable Modem	Total HH in Wire Centers with VZ Broadband	Total HH in Wire Centers with Both VZ BB and Cable Modem
CA	2,859,458	2,825,393	2,782,637	2,718,958
CT	13,559	13,559	13,559	13,559
DC	241,212	241,212	241,212	241,212
DE	326,791	326,791	326,256	326,256
FL	1,539,312	1,539,312	1,539,312	1,533,476
MA	2,483,041	2,483,041	2,483,041	2,460,642
MD	2,123,195	2,123,195	2,123,184	2,077,753
NJ	3,090,218	3,090,218	3,090,218	3,090,218
NY	6,413,509	6,412,094	6,322,021	6,320,682
PA	4,066,232	4,066,232	4,064,874	4,046,420
RI	446,218	446,218	446,218	445,715
TX	1,145,461	1,107,179	839,558	784,818
VA	2,487,682	2,416,465	2,400,317	2,220,398
<b>Total</b>	<b>27,235,887</b>	<b>27,090,909</b>	<b>26,672,406</b>	<b>26,280,106</b>

	% of Total HH	% of Wireline BB HH	% of Wireline BB HH
CA	98.8%	98.5%	96.2%
CT	100.0%	100.0%	100.0%
DC	100.0%	100.0%	100.0%
DE	100.0%	99.8%	99.8%
FL	100.0%	100.0%	99.6%
MA	100.0%	100.0%	99.1%
MD	100.0%	100.0%	97.9%
NJ	100.0%	100.0%	100.0%
NY	100.0%	98.6%	98.6%
PA	100.0%	100.0%	99.5%
RI	100.0%	100.0%	99.9%
TX	96.7%	75.8%	70.9%
VA	97.1%	99.3%	91.9%
<b>Total</b>	<b>99.5%</b>	<b>98.5%</b>	<b>97.0%</b>

*Sources:* Data regarding total households in Verizon's territory and households in wire centers in Verizon's territory with Verizon Broadband (which includes both DSL and FiOS) are from internal Verizon sources; data regarding cable modem broadband were obtained from Communications Media Advisors based on information from *Warren's Television and Cable TV Factbook (2009)*. Communications Media Advisors used mapping software to analyze the overlap between the availability of Verizon broadband (which was available by wire center) and cable modem broadband (which was available by local franchise area). For purposes of this analysis, where Verizon broadband or cable modem was available anywhere in a wire center, it was assumed to be available throughout the wire center.

**Attachment II**

**Reply Declaration of Michael D. Topper  
April 8, 2010**

**GN Docket 09-191, WC Docket No. 07-52**

**Reply Declaration of Michael D. Topper**

**April 8, 2010**

## I. Introduction and Summary

1. In my initial Declaration,<sup>1</sup> I examined the status of competition in the provision of broadband services, including the extensive and growing cross-platform competition for both wireline broadband and wireless broadband service, and increasingly between wireline and wireless broadband alternatives. In this Reply Declaration, I have been asked by Verizon to update my analysis and to respond to certain claims that some parties have made in this proceeding. In particular, some parties have argued that wireless broadband services do not compete with wireline broadband services.<sup>2</sup> In my initial Declaration, however, I explained that it is important to take a forward-looking perspective of broadband competition; that the competitive landscape for broadband provision is rapidly changing with the deployment of 4G wireless services; and that cross-platform competition is not just a hypothetical possibility but is already occurring. In this Reply Declaration I provide further evidence of such competition, including the recent rollout of 4G wireless broadband services by Clearwire, Sprint, and cable companies.
2. My initial Declaration also demonstrated that, according to the Commission's own data, the majority of U.S. households had access to broadband services from at least two wireline broadband providers. Some parties have criticized such data as not being sufficiently granular to determine where broadband services are available.<sup>3</sup> The Commission's recent High-Speed Internet Services Report provides data at a more granular level, however, and as I explain here confirms my original conclusions.
3. In summary, my findings are:
  - 4G wireless broadband service is already available in many metropolitan areas in the U.S. Currently, Clearwire, Sprint, Comcast and Time Warner Cable are offering 4G services in certain areas. The deployment of 4G wireless technology coupled with its

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<sup>1</sup> Declaration of Michael D. Topper, "Broadband Competition and Network Neutrality Regulation," Attachment C to Comments of Verizon and Verizon Wireless, In the Matter of Preserving the Open Internet, GN Docket No. 09-191, WC Docket No. 07-52, January 14, 2010 ("Topper Declaration"). My qualifications were provided in my initial Declaration.

<sup>2</sup> See Comments of the Ad Hoc Telecommunications User Committee, GN Docket No. 09-191 and WC Docket No. 07-52, dated January 14, 2010, p. 9; Comments of Google Inc., GN Docket No. 09-191 and WC Docket No. 07-52, dated January 14, 2010, p. 21; Comments of Vonage Holdings Corp., GN Docket No. 09-191 and WC Docket No. 07-52, dated January 14, 2010, p. 8. ("Vonage Comments")

<sup>3</sup> Vonage Comments, p. 7; Comments of Free Press, GN Docket No. 09-191 and WC Docket No. 07-51, p. 52.

increasing availability will enable even more effective and robust cross-platform competition between wireless and wireline broadband.

- 4G availability is expected to grow significantly in the future, with Clearwire, Sprint, Comcast and Time Warner Cable planning to deploy 4G services in many additional metropolitan areas throughout 2010. In addition, other firms, including Cox Communications, Verizon Wireless, AT&T, and MetroPCS are planning to offer 4G services in the near future, expanding its availability and capabilities, and providing consumers with more 4G choices.
  - Currently available 4G services offer comparable download and upload speeds to many wireline broadband offerings, and plans are available with unlimited monthly usage. With the increased speeds of 4G and unlimited monthly usage plans, wireless broadband becomes an even more viable alternative to wireline providers for a larger range of broadband users and uses.
  - Current 4G prices are comparable to the prices of cable modem and DSL wireline broadband services, and 4G providers are marketing their 4G services as an alternative to wireline broadband access.
  - The Commission's recent High-Speed Internet Services Report, which is based on data collected at the census tract level, confirms the Commission's earlier zip code analysis, as well as marketplace evidence, showing that most Americans have choice of wireline broadband access providers as well as multiple wireless broadband alternatives.
  - The recent deployment of 4G services provides additional evidence that the Commission's current policy framework, which has relied primarily on market forces rather than regulation, works and that expansion of the Commission's current Internet Policy Statement into a set of prescriptive regulatory rules is unsound.
4. Support for these opinions is provided in the remainder of this paper.

## **II. 4G Deployment**

5. As I discussed in my initial Declaration, competition in the provision of broadband services is developing across multiple platforms. Cable companies, local exchange carriers, wireless providers, and providers of other broadband technologies like satellite are increasingly competing against one another.<sup>4</sup> The deployment of 4G wireless technology coupled with its increasing availability will enable even more effective and robust cross-platform competition between wireless and wireline broadband. Given the rapid pace of change and innovation in broadband technologies, including the deployment of 4G, assessment of competition requires a forward-looking analysis that accounts for changing industry conditions. In such a setting, a static snapshot

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<sup>4</sup> Topper Declaration, ¶¶ 7, 17, 92-110.

of historical or current market conditions is a poor indicator of future competitive conditions and, as such, serves as a poor basis for the development of regulatory policy with respect to broadband provision. The Department of Justice made a similar recommendation in its recent *ex parte* submission to the Commission in the Broadband NOI proceeding.<sup>5</sup>

6. 4G wireless broadband service is already available in many metropolitan areas in the U.S. As described in my initial Declaration, Clearwire – which is backed by Sprint, Intel, Google, Comcast, Time Warner Cable and Bright House Networks – has deployed 4G WiMAX technology in many metropolitan areas, like Chicago, Philadelphia, and Dallas-Fort Worth.<sup>6</sup> As of December 2009, Clearwire offered 4G services under the CLEAR brand in at least 27 metropolitan areas in 11 different states, covering more than 34 million people with its 4G network, with recent product launches in Honolulu, Maui and Seattle-Tacoma.<sup>7</sup> By the fourth quarter of 2009, total subscribers reached 688,000, with 438,000 of those in 4G markets.<sup>8</sup> In addition, Sprint is using Clearwire’s facilities to offer 4G service. As of December 2009, Sprint offered 4G service in the same 27 metropolitan areas as Clearwire. Cable companies Comcast and Time Warner Cable are also using Clearwire’s facilities to offer 4G services. Comcast’s High-Speed 2go 4G service is currently available in 7 metropolitan areas, and Time Warner Cable’s Road Runner Mobile 4G service is available in 9 other metropolitan areas. See Table 1 for additional details.

7. 4G availability is expected to grow significantly in the near future, with these providers planning to deploy 4G services in many additional metropolitan areas throughout 2010. According to a recent statement by Sprint Nextel CEO Dan Hesse: “2010 is really the year of 4G for Sprint. We have roughly 30 million POPs built out at the end of ’09. We hope to have roughly four times that many built by the end of this year, 2010.”<sup>9</sup> Sprint has announced plans to launch its 4G service in multiple metropolitan areas in 2010, including Boston, Cincinnati, Cleveland,

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<sup>5</sup> *Ex Parte* Submission of the United States Department of Justice in the Matter of Economic Issues in Broadband Competition, GN Docket No. 09-51, January 4, 2010, p. 6: “In any industry subject to significant technological change, it is important that the evaluation of competition be forward-looking rather than based on static definitions of products and services. Insight can best be gained by looking at product life cycles, the replacement of older technologies by newer ones, and the barriers facing suppliers that offer those newer technologies.”

<sup>6</sup> Topper Declaration, ¶¶ 69-70.

<sup>7</sup> “Q4 2009 Clearwire Corporation Earnings Conference Call,” *Thomson StreetEvents*, February 24, 2010, p. 3. (“Clearwire Q4 2009 Conference Call”) See Table 1 for a list of places where Clearwire offers service.

<sup>8</sup> This includes 46,000 wholesale customers from Comcast, Sprint, and Time Warner Cable. “Clearwire Reports Fourth Quarter and Full Year 2009 Results,” *Clearwire Press Release*, February 24, 2010. (“Clearwire Press Release February 2010”)

<sup>9</sup> *Sprint Nextel Corporation at Citi Global Entertainment, Media, and Telecommunications Conference – Final*, FD (Fair Disclosure) Wire, Transcript 010610a2651459.759 (Jan. 6, 2010) (statement by Sprint Nextel Corp. CEO Dan Hesse).

Denver, Houston, Kansas City, Los Angeles, Miami, Minneapolis, New York, Pittsburgh, St. Louis, Salt Lake City, San Francisco and Washington, D.C.<sup>10</sup> Clearwire plans to cover 120 million people in 80 markets by the end of 2010,<sup>11</sup> and some analysts expect it to expand to cover roughly 155 million people by 2011.<sup>12</sup> Clearwire expects its 4G subscribership to triple during 2010,<sup>13</sup> as it launches in the same major markets as Sprint.<sup>14</sup> Comcast and Time Warner Cable are also planning to expand their 4G service offerings in 2010. According to Comcast COO Steve Burke: “As of year-end, we are offering the product in more than 9 million of our homes passed, and we look to significantly expand that by the end of 2010.”<sup>15</sup> And Time Warner Cable COO Landel Hobbs recently noted that Time Warner “expect[s] to launch Road Runner Mobile in a sizable fraction of [its] footprint in 2010.”<sup>16</sup>

8. In addition to the providers that have already deployed 4G commercially, other firms also are planning to offer 4G services in the near future, expanding its availability and capabilities, and providing consumers with more 4G choices. Cable provider Cox Communications has been conducting LTE trials in Phoenix and San Diego since the fourth quarter of 2009.<sup>17</sup> Cox spent more than \$550 million for AWS and 700 MHz spectrum licenses to support its wireless plans, which include wireless broadband.<sup>18</sup>

9. Verizon Wireless has been testing its 4G network in Boston and Seattle since August 2009 and has announced plans to launch 4G service using the LTE standard in 25 to 30 markets, covering a population of about 100 million, in 2010.<sup>19</sup> AT&T will be starting LTE trials in 2010,<sup>20</sup>

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<sup>10</sup> “Sprint 4G Expansion Plans to Stretch Coast-to-Coast from Los Angeles to Miami”, *Sprint Press Release*, March 23, 2010.

<sup>11</sup> Morgan Stanley, Clearwire Corporation 2Q09 Preview: Market Rollout and Wholesale Launches Progressing, August 10, 2009, p. 4.

<sup>12</sup> UBS Investment Research, Clearwire Corp.: Upgrade to Neutral, Funding Opens the Window a Little Wider, December 1, 2009, p. 2.

<sup>13</sup> Clearwire Press Release February 2010.

<sup>14</sup> “Clearwire Extends 4G Leadership in the United States,” *Clearwire Press Release*, March 23, 2010.

<sup>15</sup> Thomson StreetEvents, *CMCSA – Q4 2009 Comcast Corporation Earnings Conference Call*, Transcript at 9 (Feb. 3, 2010) (statement by Comcast Corp. COO Steve Burke).

<sup>16</sup> *Q4 2009 Time Warner Cable, Inc. Earnings Conference Call – Final*, FD (Fair Disclosure) Wire, Transcript 012810a2623705.705 (Jan. 28, 2010) (Time Warner Cable COO Landel Hobbs).

<sup>17</sup> The company has not yet disclosed when it expects to offer LTE services. Cox News Release, *Cox Successfully Demonstrates the Delivery of Voice Calling, High Definition Video Via 4G Wireless Technology* (Jan. 25, 2010), <http://cox.mediaroom.com/index.php?s=43&item=469>; Todd Spangler, *Cox Tests 4G Wireless Voice, Video*, Multichannel News, at 21 (Feb. 1, 2010).

<sup>18</sup> In addition to its plans to offer 4G services, Cox is also offering 3G wireless service in several metropolitan areas. Cox News Release, *Cox Successfully Demonstrates the Delivery of Voice Calling, High Definition Video Via 4G Wireless Technology* (Jan. 25, 2010), <http://cox.mediaroom.com/index.php?s=43&item=469>.

<sup>19</sup> “Verizon Wireless’ 4G LTE Network Testing Promises Significantly Faster Speeds than Current 3G Networks,” *Verizon Press Release*, March 8, 2010.

with commercial deployment beginning in 2011.<sup>21</sup> MetroPCS plans to begin to deploy LTE technology by the second half of 2010,<sup>22</sup> and LEAP plans to test LTE technology in 2010.<sup>23</sup> In addition, T-Mobile has upgraded its 3G service to HSPA+ in parts of the Philadelphia area and plans to upgrade its national 3G HSPA network to HSPA+ capabilities in 2010.<sup>24</sup>

10. 4G technologies greatly enhance the mobile data capabilities of wireless networks and are making wireless broadband an even more effective alternative for wireline broadband. Even at the relatively lower throughput speeds offered by 3G, mobile wireless broadband services are a competitive alternative to wireline broadband for some consumers, who choose wireless broadband in order to have the flexibility of mobility and the ability to use their service outside their home or office. Wireline providers have recognized the advantages of mobility as evidenced by the cable companies' own offerings of 4G mobile broadband described above.

11. With the increased speeds of 4G, wireless broadband becomes an even more viable alternative to wireline providers for a larger range of broadband users and uses.<sup>25</sup> Clearwire advertises its 4G service speed to have average download speeds of 3 to 6 Mbps with peak spikes of 10 Mbps and Sprint also advertises its 4G service to have average download speeds of 3 to 6 Mbps with peaks of 10 Mbps. Comcast and Time Warner Cable advertise similar speeds for their 4G services. See Table 2.

12. Current 4G throughput speeds are comparable to those advertised by wireline broadband providers. For example, Verizon advertises its "Starter DSL" and "Power DSL" services to have download speeds of 1 Mbps and 2 Mbps, respectively. Comcast advertises its "Economy" and "Performance" cable modem services to have download speeds of 1 Mbps and 12 Mbps, respectively, and Time Warner Cable advertises its "Road Runner Lite," "Road Runner Basic,"

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<sup>20</sup> "AT&T to Speed Its Network in 6 Cities by Year-End," *The New York Times*, September 10, 2009.

<sup>21</sup> "AT&T to Deliver 3G Mobile Broadband Speed Boost," *AT&T Press Release*, May 27, 2009. ("AT&T Speed Boost 2009")

<sup>22</sup> "MetroPCS Taps Samsung, Ericsson for network", *Dallas Morning News*, September 16, 2009 available at <http://www.dallasnews.com/sharedcontent/dws/bus/industries/techtelecom/stories/091609dnbusmetropcs.1861a9b69.html>.

<sup>23</sup> Leap Wireless International, 2009 Form 10-K, filed March 1, 2010, p. 6.

<sup>24</sup> Some analysts expect download speeds of about 10 Mbps under good conditions. See "Hands-on with T-Mobile's Super-3G HSPA+ Network", *PCMag.com*, September 25, 2009. See also, "T-Mobile's Ray Promises National HSPA+ Deployment by mid-2010," *FierceWireless.com*, September 18, 2009, available at <http://www.fiercewireless.com/node/49541/print>.

<sup>25</sup> See, e.g., *Ex Parte* Submission of the United States Department of Justice in the Matter of Economic Issues in Broadband Competition, GN Docket No. 09-51, January 4, 2010, pp. 8-10.

and High Speed Online services to have average download speeds of 768 kbps, 1.5 Mbps and 7 Mbps, respectively. See Table 3.

13. Although 4G speeds are not yet comparable to the high-end speeds available on state of the art wireline broadband networks, which have speeds above 20 Mbps, 4G speeds are sufficient for most users and most applications. For example, a 2009 presentation from the Commission's Omnibus Broadband Initiative team documents that 5 Mbps is generally sufficient for web browsing, audio streaming, voice over internet, some online games, and even varying video conferencing and streamed video technologies.<sup>26</sup> In addition, the Commission's National Broadband Plan has set a universal availability target of 4 Mbps download speeds and 1 Mbps upload speeds, claiming that this speed represents "what the typical broadband subscriber receives today, and what many consumers are likely to use in the future, given past growth rates."<sup>27</sup> The Commission's recent survey of broadband usage provides further evidence that many consumers use broadband primarily for applications and services that require speeds well within the range that wireless broadband offers.<sup>28</sup> Survey respondents reported that communicating with friends and family was their most important internet activity followed by keeping up with news in their community.<sup>29</sup> 4G speeds should be sufficient for these types of activities.

14. It is not longer speculation that 4G service will generate substitution from wireline broadband for some consumers – it is already happening in the marketplace. The CCO of Clearwire, Mike Sievert, stated in Clearwire's recent analyst conference call "And so roughly half the customers come on and use it [Clearwire's services] as a – overall as a replacement to whatever it is that they were having before, which is a combination usually of DSL or cable broadband."<sup>30</sup>

15. Prices for 4G service are competitive with prices for comparable wireline broadband services offered by cable companies and telcos. For example, Clearwire offers home 4G services for \$25 to \$45/month, and mobile 4G services for \$35 to \$55/month, as well as various bundles of home, mobile and voice services. Sprint offers its 4G service for \$59.99/month. These prices are

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<sup>26</sup> FCC Presentation 2009, p. 23.

<sup>27</sup> FCC, National Broadband Plan, p. 135, available at <http://download.broadband.gov/plan/national-broadband-plan-chapter-8-availability.pdf>

<sup>28</sup> John Horrigan, Broadband Adoption and Use in America, Federal Communications Commission OBI Working Paper Series No. 1, February 2010. ("Broadband Adoption and Use in America")

<sup>29</sup> Broadband Adoption and Use in America, p. 19.

<sup>30</sup> Clearwire Q4 2009 Conference Call, p. 9.

comparable to prices for wireline broadband services with similar speeds. For example, Verizon's services range in price from \$34.99 to \$44.99, and its FIOS Fast service is available for \$54.99. Comcast's cable modem services range in price from \$24.95 to \$42.95. In addition Clearwire, Sprint, Comcast and Time Warner Cable offer 4G plans with unlimited usage allowances. See Table 4 to 9.

16. Advertising by 4G providers offers further evidence of competition between 4G services and wireline broadband offerings. As described in my initial Declaration, advertising's general purpose is to increase demand for a firm's products.<sup>31</sup> Aggressive advertising that directly compares prices and services is strongly indicative of firms' attempts to change market perceptions and to increase market share. Recent marketing materials and advertising campaigns by Clearwire compares its 4G service to wireline broadband offerings from cable companies and telcos. For example:

- "Discover a wireless alternative to DSL or cable internet service at home. No drilling, digging or waiting for installation. Average download speeds of 3 to 6 mbps. Enjoy a fast, easy and affordable alternative to cable and DSL."<sup>32</sup>
- "CLEAR offers speeds comparable to cable and DSL for home and up to 4x faster than you can get with mobile broadband from a cellular company. To provide you with the Internet you want, where you want it. CLEAR supports average download speeds up to 3-6 Mbps and upload speeds up to 1Mbps."<sup>33</sup>
- CLEAR: "Our average mobile speeds are 4 times faster than the ones you get from a cell phone company. So, you can do the same things on the go as you normally do at home."<sup>34</sup>
- CLEAR's "Basic Home Internet" plan is \$25 per month; CLEAR states that "[t]his affordable plan is perfect if you use the internet mainly for checking email or surfing the web."<sup>35</sup>

17. Sprint also advertises its 4G service as a fast service with applications that can serve as an alternative to wireline broadband offerings.

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<sup>31</sup> Topper Declaration, ¶¶ 41, 60.

<sup>32</sup> Clearwire website available at <http://www.clear.com/shop/services>. See "Clear - Service Plans.pdf" in attachment [A].

<sup>33</sup> CLEAR, *Mobile Internet: Unlimited Mobile Internet FAQs*, <http://www.clear.com/shop/services/mobile?id=226&market=42>.

<sup>34</sup> CLEAR, *Discover: Faster Network*, <http://www.clear.com/discover/network>.

<sup>35</sup> CLEAR, *Service Plans: Basic Home Internet*, <http://www.clear.com/shop/services/home>. See "Clear - Home Internet - Basic Internet.pdf" and "Clear - Compare Home Internet Plans.pdf" in attachment [A].

- Sprint offers a “4G Desktop Modem CPEi25150 by Motorola” which is “[a] great solution when you need [to] get a reliable Internet connection up and running with minimal hassle.”<sup>36</sup>
- “Sprint 4G services dramatically increases [sic] download speeds for photos, videos and large files. You can download a favorite song, picture, sitcom or large video in seconds, not minutes, or watch live streaming video – all while on the go, not just from the home or office.”<sup>37</sup> Sprint goes on to cite examples of 4G use including real estate agents conducting virtual property tours, construction teams sharing schematics with engineers online, and healthcare professionals using 4G services to remotely monitor patients.
- “Turbo charge your productivity with an even faster Mobile Broadband connection. Download mammoth files and video conference without the lag.”<sup>38</sup>

18. In sum, the bandwidth and pricing of 4G services, along with the added feature of mobility, make wireless broadband an increasingly viable alternative to wireline broadband for many consumers. Its rapid deployment by new entrant Clearwire, existing wireless providers such as Sprint, and cable providers such as Comcast and Time Warner Cable underscore market participants’ view of its competitive viability. This along with advertising activity suggests that 4G is increasing cross-platform competition for the provision of broadband access.

### III. High-Speed Internet Services Report

19. The Commission recently issued its latest High-Speed Internet Services Report,<sup>39</sup> relying on a new methodology that collects data at a more granular census tract level.<sup>40</sup> This new methodology confirms the Commission’s earlier analysis showing that most Americans have choice of wireline broadband access providers and multiple alternatives for wireless broadband services.<sup>41</sup> The recently collected data show that as of December 2008, 95.7% of census tracts had

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<sup>36</sup> Sprint, *Single-mode 4G Devices*, [http://nextelonline.nextel.com/en/solutions/mobile\\_broadband/mobile\\_broadband\\_4G\\_singlemode\\_devices.shtml](http://nextelonline.nextel.com/en/solutions/mobile_broadband/mobile_broadband_4G_singlemode_devices.shtml).

<sup>37</sup> Sprint, Sprint 4G Mobile Broadband Press Kits, [http://www2.sprint.com/mr/cda\\_pkDetail.do?id=1260](http://www2.sprint.com/mr/cda_pkDetail.do?id=1260). See “Sprint – 4G Press Kit.pdf” in attachment [A].

<sup>38</sup> See Sprint website at [http://www.nextel.com/en/solutions/mobile\\_broadband/mobile\\_broadband\\_4G.shtml](http://www.nextel.com/en/solutions/mobile_broadband/mobile_broadband_4G.shtml). See “Sprint – 4G Overview.pdf” in attachment [A].

<sup>39</sup> FCC Industry Analysis & Technology Division, Wireline Competition Bureau, High-Speed Services for Internet Access: Status as of December 31, 2008, February 2010. (“FCC High-Speed Services 2010”)

<sup>40</sup> For discussion of the new data collection methodology see, FCC High-Speed Services 2010, pp. 2-4.

<sup>41</sup> For the Commission’s prior analysis of wireline broadband access providers see FCC Industry Analysis & Technology Division, Wireline Competition Bureau, High-Speed Services for Internet Access: Status as of June 30, 2008, July 2009. For the Commission’s prior analysis of wireless broadband providers see FCC, Thirteenth Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services, January 16, 2009, ¶146.

one or more ADSL providers, and that 91.4% of census tracts had one or more cable modem providers.<sup>42</sup> This suggests that at a minimum, 87.1% of census tracts have both a cable modem and an ADSL provider.<sup>43</sup> In the Commission’s prior High-Speed Internet Services Reports, it collected data on the number of broadband providers at a zip code level. In its report as of June 2008, the Commission found that 68.1% of zip codes have at least 2 providers of ADSL and/or cable broadband.<sup>44</sup> This suggests that the zip code data previously used by the Commission did not overestimate the extent of overlap between wireline providers.

20. These data collected at the more granular census tract level confirm the extent of overlap between wireline broadband providers that I reported in my initial Declaration.<sup>45</sup> In addition, most Americans have access to several mobile wireless providers offering 3G wireless services,<sup>46</sup> with 77% of the U.S. population living in census tracts with 3 or more 3G mobile providers as of November 2009.<sup>47</sup>

21. The most recent High-Speed Internet Services Report also confirms that the number of “advanced services” lines has continued to increase.<sup>48</sup> In my initial Declaration, I reported statistics as of June 2008 from the Commission’s prior High-Speed Internet Services Report.<sup>49</sup> In the six months from June 2008 to December 2008, the number of “advanced services” cable modem lines increased 6.8%, from 37.8 million to 40.4 million, the number of ADSL “advanced services” lines increased 1.6%, from 26.1 million to 26.6 million, and the number of fiber to the premises “advanced services” lines increased 22.7% increase, from 2.3 million lines to 2.9 million lines.<sup>50</sup> Marketplace evidence presented in my initial Declaration suggests that the overall number of fixed advanced services continued to increase in the fifteen months since December 2008.

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<sup>42</sup> FCC High-Speed Services 2010, Table 13.

<sup>43</sup> 95.7% of census tracts have at least one aDSL provider. If all of the 4.3% of census tracts without an ADSL provider have a cable modem provider, the total percent of census tracts with both types of providers is 87.1%. (87.1% = 91.4% - 4.3%). If, as is likely, some census tracts without an ADSL provider also do not have a cable modem provider, then the total percentage of census tracts with both types of providers will be higher. Calculations are based on data provided in FCC High-Speed Services 2010, Table 13.

<sup>44</sup> FCC Industry Analysis & Technology Division, Wireline Competition Bureau, High-Speed Services for Internet Access: Status as of June 30, 2008, July 2009, Table 16.

<sup>45</sup> Topper Declaration, ¶¶ 14-15.

<sup>46</sup> Topper Declaration, ¶ 53.

<sup>47</sup> FCC, National Broadband Plan, p. 39, available at <http://download.broadband.gov/plan/national-broadband-plan-chapter-4-broadband-competition-and-innovation-policy.pdf>.

<sup>48</sup> The Commission defines advanced services lines as those capable of over 200 kbps in both directions.

<sup>49</sup> Topper Declaration, ¶¶ 9, 11, citing statistics from FCC Industry Analysis & Technology Division, Wireline Competition Bureau, High-Speed Services for Internet Access: Status as of June 30, 2008, July 2009, Table 2.

<sup>50</sup> FCC High-Speed Services 2010, Table 2.

22. The Commission also reports that as of December 2008 there were 14.5 million mobile wireless advanced services lines.<sup>51</sup> Because the Commission changed its Form 477 reporting methodology for mobile wireless carriers, these numbers are not comparable to earlier years. However, as discussed in my initial Declaration, there is substantial marketplace evidence that consumers are increasingly using mobile broadband services.

#### **IV. Implications of 4G Services for Network Neutrality Regulation**

23. As discussed in my initial Declaration, competition and innovation by broadband providers, device makers, applications developers and content providers have resulted in new and faster services, expanded capabilities, new access devices (such as smartphones, aircards and netbooks), innovative content and applications, falling prices, and improved service quality. Both the latest results of the Commission's High-Speed Services report, which documents continued growth in broadband choice and availability, and the expanding deployment of 4G services provide further evidence for this.

24. Beyond just being an example of innovation wrought by the current competitive environment, the story of 4G is an informative example of the evolution of cross-platform competition in broadband provision. The faster speeds of 4G provide a competitive advantage to Clearwire and Sprint in their competition with other wireless providers. In addition, with 4G services Clearwire and Sprint are an increasingly viable alternative to traditional wireline access. Moreover, by incorporating 4G services into their own service offerings, cable providers Comcast and Time Warner Cable are enhancing their own ability to compete with the mobility offered by other wireless providers. The current competitive framework has delivered countless examples (of which 4G is just one) of competition inspiring new innovation, which, itself, changes the competitive marketplace leading to new and better customer experiences. This suggests that the Commission's current policy framework, which has relied primarily on market forces rather than regulation, works and that expansion of the Commission's current Internet Policy Statement into a set of prescriptive regulatory rules is unsound.

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<sup>51</sup> FCC High-Speed Services 2010, Table 2.

I declare under penalty of perjury that the foregoing is true and correct.

*Michael D. Topper*

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Michael D. Topper  
Executed April 8, 2010

**TABLE 1. 4G SERVICE OFFERINGS**

<b>State</b>	<b>City</b>	<b>Sprint 4G</b>	<b>Clearwire CLEAR</b>	<b>Comcast High-Speed 2go</b>	<b>Time Warner Cable Road Runner Mobile</b>
<b>Georgia</b>	Atlanta	Aug. 2009	June 2009	July 2009	
	Milledgeville	Oct. 2009	available		
<b>Hawaii</b>	Honolulu	Dec. 2009	Dec. 2009		Jan. 2010
	Maui	Dec. 2009	Dec. 2009		Jan. 2010
<b>Idaho</b>	Boise	Sept. 2009	available		
<b>Illinois</b>	Chicago	Nov. 2009	Nov. 2009	Dec. 2009	
<b>Maryland</b>	Baltimore	Oct. 2008	available		
<b>Nevada</b>	Las Vegas	Aug. 2009	July 2009		
<b>North Carolina</b>	Charlotte	Nov. 2009	Nov. 2009		Dec. 2009
	Durham & Chapel Hill	Nov. 2009	Nov. 2009		Dec. 2009
	Greensboro-High Point	Nov. 2009	Nov. 2009		Dec. 2009
	Raleigh-Cary	Nov. 2009	Nov. 2009		Dec. 2009
	Winston-Salem	Nov. 2009	available		available
<b>Oregon</b>	Portland	Aug. 2009	Jan. 2009	July 2009	
	Salem	Oct. 2009	available	available	
<b>Pennsylvania</b>	Philadelphia	Oct. 2009	available	Nov. 2009	
<b>Texas</b>	Abilene	Oct. 2009	available		
	Amarillo	Oct. 2009	available		
	Austin	Nov. 2009	Nov. 2009		
	Corpus Christi	Oct. 2009	available		
	Dallas-Fort Worth	Nov. 2009	Nov. 2009		4Q 2009
	Killeen-Temple	Oct. 2009	available		
	Lubbock	Oct. 2009	available		
	Midland	Oct. 2009	available		
	Odessa	Oct. 2009	available		
	San Antonio	Nov. 2009	Nov. 2009		available
	Waco	Oct. 2009	available		
Wichita Falls	Oct. 2009	available			
<b>Washington</b>	Bellingham	Sept. 2009	available	available	
	Seattle-Tacoma (incl. Everett)	Dec. 2009	Dec. 2009	Dec. 2009	

**TABLE 1. 4G SERVICE OFFERINGS**

<b>State</b>	<b>City</b>	<b>Sprint 4G</b>	<b>Clearwire CLEAR</b>	<b>Comcast High-Speed 2go</b>	<b>Time Warner Cable Road Runner Mobile</b>
<p><i>Sources:</i> Sprint, <i>Press Kits: Sprint 4G Mobile Broadband</i>, <a href="http://www2.sprint.com/mr/cda_pkDetail.do?id=1260">http://www2.sprint.com/mr/cda_pkDetail.do?id=1260</a>; Clearwire Press Release, <i>Clearwire Introduces Clear™ 4G Mobile Internet Service to Portland</i> (Jan. 6, 2009), <a href="http://newsroom.clearwire.com/phoenix.zhtml?c=214419&amp;p=irol-newsArticle&amp;ID=1240894&amp;highlight=">http://newsroom.clearwire.com/phoenix.zhtml?c=214419&amp;p=irol-newsArticle&amp;ID=1240894&amp;highlight=</a>; Clearwire Press Release, <i>Clearwire Introduces CLEAR™ 4G Mobile Internet Service to Atlanta</i> (June 16, 2009), <a href="http://newsroom.clearwire.com/phoenix.zhtml?c=214419&amp;p=irol-newsArticle&amp;ID=1299662&amp;highlight=">http://newsroom.clearwire.com/phoenix.zhtml?c=214419&amp;p=irol-newsArticle&amp;ID=1299662&amp;highlight=</a>; Clearwire Press Release, <i>Clearwire Introduces CLEAR™ 4G Mobile Internet Service to Las Vegas</i> (July 21, 2009), <a href="http://newsroom.clearwire.com/phoenix.zhtml?c=214419&amp;p=irol-newsArticle&amp;ID=1309444&amp;highlight=">http://newsroom.clearwire.com/phoenix.zhtml?c=214419&amp;p=irol-newsArticle&amp;ID=1309444&amp;highlight=</a>; Clearwire &amp; Sprint Press Release, <i>Clearwire, Comcast, and Sprint To Launch 4G in Chicago, Philadelphia and Seattle</i> (Oct. 22, 2009), <a href="http://newsreleases.sprint.com/phoenix.zhtml?c=127149&amp;p=irol-newsArticle_newsroom&amp;ID=1345732&amp;highlight=">http://newsreleases.sprint.com/phoenix.zhtml?c=127149&amp;p=irol-newsArticle_newsroom&amp;ID=1345732&amp;highlight=</a>; Clearwire Corporation, Form 10-Q, at 29 (SEC filed Nov. 10, 2009); Thomson StreetEvents, <i>CMCSA – Q4 2009 Comcast Corporation Earnings Conference Call</i>, Transcript at 9 (Feb. 3, 2010) (statement by Comcast Corp. COO Steve Burke); Comcast, <i>High-Speed 2go FAQs: Where Can I Use Comcast High-Speed 2go 4G Service?</i>, <a href="http://www.comcast.com/highspeed2go/#/faq">http://www.comcast.com/highspeed2go/#/faq</a>; Comcast, <i>High-Speed 2go: Coverage</i>, <a href="http://www.comcast.com/highspeed2go/#/coverage">http://www.comcast.com/highspeed2go/#/coverage</a>; Time Warner Cable Press Release, <i>Time Warner Cable Brings 4G Wireless to North Carolina with Fastest Wireless Speeds Available</i> (Oct. 14, 2009), <a href="http://www.timewarnercable.com/corporate/about/inthenewsdetails.ashx?PRID=2706&amp;MarketID=0">http://www.timewarnercable.com/corporate/about/inthenewsdetails.ashx?PRID=2706&amp;MarketID=0</a>; Oceanic Time Warner Cable Press Release, <i>Oceanic Time Warner Cable To Launch Road Runner Mobile 4G Service on January 4, 2010</i> (Dec. 21, 2009), <a href="http://www.beckercommunications.com/App_Content/Documents/OTWC%20NR%20RoadRunnerMobileLaunch.121809.pdf">http://www.beckercommunications.com/App_Content/Documents/OTWC%20NR%20RoadRunnerMobileLaunch.121809.pdf</a>; Time Warner Cable, <i>Find the Right Plan</i>, <a href="http://4gactivation.timewarnercable.com/service.html">http://4gactivation.timewarnercable.com/service.html</a>.</p>					

**TABLE 2. 4G SPEEDS**

	<b>Sprint 4G</b>	<b>Clearwire CLEAR</b>	<b>Comcast High-Speed 2go</b>	<b>Time Warner Cable Road Runner Mobile</b>
Downstream	3-6 Mbps (average) over 10 Mbps (peak)	3-6 Mbps (average), bursts over 10 Mbps	3-6 Mbps	3-6 Mbps (average), bursts up to 10 Mbps
Upstream	1 Mbps (average)	500 kbps-1 Mbps	1 Mbps	1 Mbps
<p><i>Sources:</i> Sprint, <i>Shop: Sprint 4G</i>, <a href="http://www.nextel.com/en/solutions/mobile_broadband/mobile_broadband_4G.shtml">http://www.nextel.com/en/solutions/mobile_broadband/mobile_broadband_4G.shtml</a>; Todd Rowley, Sprint 4G VP, <i>Bringing 4G to You</i>, 2009 FBR Capital Markets Fall Investor Conference Presentation, at 6 (Dec. 1, 2009), <a href="http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9MjE4MDR8Q2hpbGRJRjD0tMXxUeXBIPtM=&amp;t=1">http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9MjE4MDR8Q2hpbGRJRjD0tMXxUeXBIPtM=&amp;t=1</a>; CLEAR, <i>Discover: Faster Network</i>, <a href="http://www.clear.com/discover/network">http://www.clear.com/discover/network</a>; CLEAR, <i>Mobile Internet: Unlimited Mobile Internet FAQs</i>, <a href="http://www.clear.com/shop/services/mobile?id=226&amp;market=42">http://www.clear.com/shop/services/mobile?id=226&amp;market=42</a>; CLEAR, <i>Services: Home Internet</i>, <a href="http://www.clear.com/shop/services/home">http://www.clear.com/shop/services/home</a>; Comcast, <i>High-Speed 2go: Frequently Asked Questions</i>, <a href="http://www.comcast.com/highspeed2go/#/faq">http://www.comcast.com/highspeed2go/#/faq</a>; Time Warner Cable, <i>Learn: How Road Runner Mobile Works for You</i>, <a href="http://4gactivation.timewarnercable.com/howitworks.html">http://4gactivation.timewarnercable.com/howitworks.html</a>.</p>				

**TABLE 3. 4G AND WIRELINE BROADBAND SERVICE PLAN PRICES**

Provider	Plan	Monthly Price		Speed		Price per Mbps*	
		4G Wireless	Wireline	Downstream	Upstream	Downstream	Upstream
Clearwire	CLEAR Basic Home Internet	\$25		1 Mbps	500 kbps	\$25	\$50
	CLEAR Fast Home Internet	\$30		3 Mbps	1 Mbps	\$10	\$30
	CLEAR Faster Home Internet	\$45		6 Mbps	1 Mbps	\$8	\$45
	CLEAR Unlimited Mobile Internet	\$30 <sup>P</sup> / \$45		3-6 Mbps (average)	500 kbps-1 Mbps	\$6-13	\$38-75
Sprint	Mobile Broadband Connection 3G/4G	\$59.99		3-6 Mbps (average)	1 Mbps (average)	\$10-20	\$60
Verizon	Starter DSL		\$34.99	1 Mbps	384 kbps	\$35	\$91
	Power DSL		\$44.99	3 Mbps	768 kbps	\$15	\$59
	FiOS Fast		\$54.99	15 Mbps	5 Mbps	\$4	\$11
Comcast	Economy		\$24.95	1 Mbps	384 kbps	\$25	\$65
	Performance		\$19.99 <sup>P</sup> / \$42.95	15 Mbps	3 Mbps	\$2	\$11
Time Warner Cable	Road Runner Lite		\$27.95	768 kbps	128 kbps	\$36	\$218
	Road Runner Basic		\$37.95	1.5 Mbps	256 kbps	\$25	\$148
	High Speed Online		\$54.95	7 Mbps	384 kbps	\$8	\$143
Cox	Essential		\$29.99 (online)- \$32.99	3 Mbps	768 kbps	\$10-11	\$39-43
Cablevision	Optimum Online		\$29.95	15 Mbps	2 Mbps	\$2	\$15

<sup>P</sup> Promotional rate for the first 6 months

\*For plans with a promotional rate, the Price per Mbps reflects the monthly average for the first year

Sources: See Tables 2,4-9 (CLEAR, Sprint); Verizon, *Verizon High Speed Internet*, <http://www22.verizon.com/Residential/HighSpeedInternet/Plans/Plans.htm> (DSL-only service with a 1-year agreement and no Verizon home phone service); Verizon, *Verizon FiOS Internet*, <http://www22.verizon.com/Residential/FiOSInternet/Plans/Plans.htm> (FiOS-only service with a 1-year agreement and no Verizon home phone service); Time Warner Cable, *Pricing & Packaging*, <http://www.timewarnercable.com/Carolinas/shop/pricing.html?menu=31049> (zip code 27601); Time Warner Cable, *Order Services: Road Runner High Speed Online*, <http://www.yourtwc.com/order/order.aspx?existcust=N&referencetype=CarolinasSmtBox> (zip code 27601); Comcast, *Product: Faster Internet*, <https://www.comcast.com/shop/buyflow2/productsexisting.csp?SourceP&>; Cox, *Internet*, <http://ww2.cox.com/residential/northernvirginia/internet.cox>; Optimum, *Optimum Online*, <http://www.optimum.com/online/pricing.jsp>; Optimum Online *Faster Internet*, <https://www.optimum.com/online/why/faster.jsp>.

**TABLE 4. SPRINT 4G MONTHLY PRICING**

<b>Plan</b>	<b>Price</b>	<b>4G Usage</b>	<b>3G Usage</b>
Mobile Broadband Connection Plan 3G/4G	\$59.99/month	unlimited	5 GB/month or 300 MB/month while off-network roaming \$0.05/add'l MB (on-network)
24-Hour 4G Day Pass	\$9.99/day	unlimited	
Additional charges for static IP address (\$3 per month per address and a one-time set-up fee of \$250 per block of addresses for reserved static IP; \$3 per month per address and no set-up fee for standard static IP). <i>Sources:</i> Sprint, <i>Shop: Plans</i> , <a href="http://nextelonline.nextel.com/NASApp/onlinestore/en/Action/DisplayPlans">http://nextelonline.nextel.com/NASApp/onlinestore/en/Action/DisplayPlans</a> ; Sprint, <i>4G Day Pass</i> , <a href="http://www.nextel.com/en/solutions/mobile_broadband/mobile_broadband_4G_daypass.shtml">http://www.nextel.com/en/solutions/mobile_broadband/mobile_broadband_4G_daypass.shtml</a> ; Sprint, <i>Static IP for Mobile Applications</i> , <a href="http://nextelonline.nextel.com/en/solutions/static_ip.shtml">http://nextelonline.nextel.com/en/solutions/static_ip.shtml</a> .			

**TABLE 5. CLEAR MONTHLY PRICING**

<b>Group</b>	<b>Plan</b>	<b>Monthly Price</b>	<b>4G Usage</b>	<b>3G Usage</b>
Mobile Internet	Unlimited Mobile Internet	\$30 (1st 6 months)/ \$45	unlimited	
	2GB Mobile Internet	\$35	2 GB \$10/month per additional GB	
	4G+ Mobile Internet	\$55	unlimited	5 GB \$0.05/additional GB
CLEAR Professional	Fast Office	\$55	unlimited	
	Faster Office	\$75	unlimited (no download speed cap)	
	Professional 2GB Mobile Internet	\$40	2 GB \$10/month per additional GB	
	Professional Unlimited Mobile Internet	\$50	unlimited	
	4G+ Mobile Internet	\$55	unlimited	5 GB \$0.05/additional GB
	15GB Shared Mobile Internet	\$100 (for 2 users; add'1 users \$22.50/month)	15 GB \$10/month per additional GB	
	30GB Shared Mobile Internet	\$120 (for 2 users; add'1 users \$20/month)	30 GB \$10/month per additional GB	
Home Internet	Basic Home Internet (1 Mbps/500 kbps)	\$25	unlimited	
	Fast Home Internet (3 Mbps/1 Mbps)	\$30	unlimited	
	Faster Home Internet (6 Mbps/1 Mbps)	\$45	unlimited	
Bundle & Save	Pick 2 Unlimited: Home + Mobile	\$50 (per month for life)	unlimited	
	Pick 2 Unlimited: Mobile + Mobile	\$50 (per month for life)	unlimited	
	Pick 2 Unlimited: Home + Voice	\$50	unlimited	
	Pick 3 Unlimited: Home + Mobile + Voice	\$70	unlimited	
	Pick 3 Unlimited: Home + Mobile + Mobile	\$70 (per month for life)	unlimited	

*Sources:* CLEAR, *Service Plans: Mobile Internet*, <http://www.clear.com/shop/services/mobile>; CLEAR, *Service Plans: CLEAR Professional*, <http://www.clear.com/shop/services/business>; CLEAR, *Service Plans: Home Internet*, <http://www.clear.com/shop/services/home>; CLEAR, *Service Plans: Bundle & Save*, <http://www.clear.com/shop/services/bundles>.

<b>TABLE 6. COMCAST HIGH-SPEED 2GO STANDARD MONTHLY PRICING Mobile Broadband Only</b>				
<b>Plan</b>	<b>Customers</b>	<b>Monthly Price</b>	<b>4G Usage</b>	<b>3G Usage*</b>
Metro (4G only)	with Comcast High-Speed Internet	\$30	unlimited	
	without Comcast High-Speed Internet	\$50	unlimited	
Nationwide (incl. 3G coverage)	with Comcast High-Speed Internet	\$50	unlimited	5GB \$0.10/add'l MB
	without Comcast High-Speed Internet	\$80	unlimited	
<p>* Domestic 3G Roaming: \$1 per MB above 100 MB            International 3G Roaming (Mexico &amp; Canada): \$10/5 MB            International 3G Roaming (Other countries where service is available): \$20/5 MB            Source: Comcast, <i>High-Speed 2go Standard Pricing</i>, <a href="http://customer.comcast.com/Pages/FAQViewer.aspx?seoid=High-Speed-2go-Standard-Pricing&amp;fss=high-speed%202go">http://customer.comcast.com/Pages/FAQViewer.aspx?seoid=High-Speed-2go-Standard-Pricing&amp;fss=high-speed%202go</a>; Comcast Business Class Wireless Plans and Pricing, <a href="http://business.comcast.com/highspeed2go/wireless_plans.aspx">http://business.comcast.com/highspeed2go/wireless_plans.aspx</a>.</p>				

<b>TABLE 7. COMCAST HIGH-SPEED 2GO FAST PACK BUNDLES MONTHLY PRICING Home + Mobile Broadband</b>				
<b>Fast Pack Bundle</b>	<b>Home Broadband Speed/Offering Name</b>			
	<b>12 Mbps Performance</b>	<b>16 Mbps Blast!</b>	<b>22 Mbps Ultra</b>	<b>50 Mbps Extreme 50</b>
High-Speed 2go Fast Pack Metro	\$49.99 <sup>P</sup> / \$72.95	\$59.99 <sup>P</sup> / \$82.95	\$69.99 <sup>P</sup> / \$92.95	\$106.99 <sup>P</sup> / \$129.95
High-Speed 2go Fast Pack Nationwide (incl. 3G Coverage)*	\$69.99 <sup>P</sup> / \$92.95	\$79.99 <sup>P</sup> / \$102.95	\$89.99 <sup>P</sup> / \$112.95	\$126.99 <sup>P</sup> / \$149.95
<p>*Includes 5GB of 3G usage; \$0.10/MB thereafter  <sup>P</sup> Promotional rate for the first 12 months            Source: Comcast, <i>Which Fast Pack Is For You?</i>, <a href="http://www.comcast.com/highspeed2go/#/fastpack">http://www.comcast.com/highspeed2go/#/fastpack</a>; See "Comcast – Brochure.pdf" in attachment [A].</p>				

<b>TABLE 8. COMCAST HIGH-SPEED 2GO FOR COMCAST BUSINESS CLASS INTERNET CUSTOMERS</b>				
<b>Plan</b>	<b>Customers</b>	<b>Monthly Price</b>	<b>4G Usage</b>	<b>3G Usage*</b>
High-Speed 2go Nationwide (4G/3G)	with \$99 bundle	\$50	unlimited	5 GB on-network, 100 MB domestic roaming \$0.10/add'l MB on-network, \$1/add'l MB for off- network roaming
	with Internet only	\$50	unlimited	
<p>Source: Comcast Business, <i>Wireless Plans &amp; Pricing</i>, <a href="http://business.comcast.com/highspeed2go/wireless_plans.aspx">http://business.comcast.com/highspeed2go/wireless_plans.aspx</a>.</p>				

**TABLE 9. TIME WARNER CABLE ROAD RUNNER MOBILE MONTHLY PRICING  
North Carolina**

<b>Plan</b>	<b>Monthly Price*</b>	<b>4G Usage</b>	<b>3G Usage</b>
Road Runner Mobile 4G Choice	\$29.95-\$39.95	2 GB \$0.05/add'l MB	
Road Runner Mobile 4G Elite	\$39.95-\$54.95	unlimited	
Road Runner Mobile 4G National Elite	\$59.95-\$74.95	unlimited	domestic roaming: \$0.30/MB

\*The lower end of the range is based on a bundle with other Time Warner Cable services.

Sources: Time Warner Cable, *Mobile Selection Guide: Carolinas*, <http://www.timewarnercable.com/Carolinas/learn/mobile/guide.html>; Time Warner Cable, *Road Runner Mobile 4G National Elite*, <http://www.timewarnercable.com/carolinas/learn/mobile/4gnationalelite.html>; *Road Runner Mobile Pricing*, <http://www.yourtwc.com/mobile/contractcomparison.cfm?emp=N>.