

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of)
)
Inquiry Concerning the Deployment of Advanced) GN Docket No. 15-191
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)

ELEVENTH BROADBAND PROGRESS NOTICE OF INQUIRY

Adopted: August 6, 2015

Released: August 7, 2015

Comment Date: September 8, 2015

Reply Comment Date: September 23, 2015

By the Commission: Chairman Wheeler and Commissioners Clyburn and Rosenworcel issuing separate statements; Commissioner Pai approving in part, dissenting in part, and issuing a separate statement; Commissioner O’Rielly approving in part, concurring in part, and issuing a separate statement.

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I. INTRODUCTION

1. Section 706 of the Telecommunications Act of 1996 (the 1996 Act), as amended, requires the Commission to determine and report annually on “whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion.”¹ With this Notice of Inquiry (Inquiry), we initiate the next annual assessment of the “availability of advanced telecommunications capability to all Americans (including, in particular, elementary and secondary schools and classrooms)”² by requesting comment on the current state of its deployment and availability.³

2. The *2015 Broadband Progress Report* found that advanced telecommunications capability was not being deployed to all Americans in a reasonable and timely fashion.⁴ In particular, the Commission found that approximately 55 million Americans lacked access to broadband services that provided advanced telecommunications capability, and that inadequate progress was being made to eliminate this gap. Moreover, the *2015 Broadband Progress Report* highlighted the existence of a persistent “digital divide” with Americans in rural areas and on Tribal lands disproportionately lacking access to broadband, even at speeds below the threshold for advanced telecommunications capability.⁵ Additionally, the Commission found that schools and libraries continue to lack sufficient access to advanced telecommunications capability, “preventing students and staff from taking full advantage of the immense benefits of broadband.”⁶ The Commission noted that “[a]lthough public- and private-sector initiatives continue to advance [broadband] deployment, these advances are not occurring broadly enough or quickly enough.”⁷

3. As we begin this year’s Inquiry, we expect that the assessment of the availability of advanced telecommunications capability will differ from prior proceedings in a number of aspects. Most significantly, the Commission anticipates that use of the revised FCC Form 477 (Form 477) broadband deployment data along with other sources, as discussed below, will allow for more comprehensive consideration of mobile broadband service and potentially satellite broadband as well. As part of this

¹ 47 U.S.C. § 1302. Section 706 of the Telecommunications Act of 1996, Pub. L. No. 104-104, § 706, 110 Stat. 56, 153 (1996), as amended by the Broadband Data Improvement Act, Pub. L. No. 110-385, 122 Stat. 4096 (2008), as codified in Title 47, Chapter 12 of the United States Code. See 47 U.S.C. § 1301 *et seq.*

² 47 U.S.C. § 1302(b).

³ For simplicity, past Broadband Progress Reports have sometimes used the term “broadband” to refer to “advanced telecommunications capability.” However, “advanced telecommunications capability” is a statutory term with a definition that differs from, and in fact includes, the term “broadband.” See, e.g., *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*, GN Docket No. 14-126, 2015 Broadband Progress Report and Notice of Inquiry on Immediate Action to Accelerate Deployment, 30 FCC Rcd 1375, 1376-77, para. 1 n.1 (2015) (*2015 Broadband Progress Report*). In this Inquiry, we no longer equate the term “broadband” with the statutory term “advanced telecommunications capability,” but do necessarily consider the availability of various broadband services, that contribute to advanced telecommunications capability, in our analysis under the statute.

⁴ *Id.* at 1378, 1452-55, paras. 4-6, 133-40.

⁵ *Id.* at 1378, 1454, paras. 5-6, 133-36.

⁶ *Id.* at 1454-55, paras. 138, 140.

⁷ *Id.* at 1378, para. 4.

inquiry, the Commission expects to examine the availability of both fixed broadband (which includes fixed terrestrial and satellite) and mobile broadband service. Following up on statements in the *2015 Broadband Progress Report*,⁸ we seek comment on whether “advanced telecommunications capability” should be defined to account for consumer needs and features associated with mobile broadband service and, if so, whether “advanced telecommunications capability” should be deemed to include consumer access to both fixed and mobile broadband service. In this regard, we note in this Inquiry a number of factors indicating that mobile and fixed broadband appear to be different services in a number of respects under current technological and economic conditions, and that each currently appears best suited to serve different consumer needs. Finally, we propose to retain the speed benchmark of 25 Mbps download/3 Mbps upload (25 Mbps/3 Mbps) applied to fixed terrestrial services in the *2015 Broadband Progress Report*,⁹ and we seek comment on applying this speed benchmark to fixed satellite services. We also seek comment on a lower speed benchmark for mobile broadband service, particularly in the event the Commission elects to find that “advanced telecommunications capability” should be deemed to include access to both fixed and mobile broadband service.

II. DEFINING ADVANCED TELECOMMUNICATIONS CAPABILITY

4. In this section, we seek comment on the technical criteria that we should use to define advanced telecommunications capability. First, we discuss the roles of fixed and mobile services in the provision of advanced telecommunications capability. Next, we seek comment on the basic criteria we should use in defining advanced telecommunications capability, including speed, latency, and service consistency. We seek comment on whether these are the right criteria to consider and whether additional factors should be addressed in this context. Then, we discuss the development of specific benchmarks to judge whether the criteria have been met.

A. Advanced Telecommunications Capability: Role of Fixed and Mobile Services

5. *Overview.* In the past, the Commission has relied solely on data for fixed terrestrial broadband service¹⁰ in determining whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion.¹¹ We excluded mobile and satellite broadband service due to concerns about the quality and reliability of the data for these services as well as concerns about the limitations of the services themselves as they were then provided.¹² The Commission anticipates that the newly available Form 477 data, however, potentially in combination with other data sources, will allow fuller consideration of these services, especially mobile, and the role that their availability plays in making the determination required under section 706(b). Thus, in future section 706 reports, the Commission will have the option of considering the relationship between fixed and mobile broadband services for purposes of determining whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion.

6. Building on the discussions in the *2015 Broadband Progress Report*, we seek comment on whether consumers must have access to both fixed and mobile broadband service in order for advanced telecommunications capability to be deemed available. In that Report, the Commission excluded mobile and satellite service in making its statutory determination due to, among other things,

⁸ *Id.* at 1444, para. 120.

⁹ *Id.* at 1377, 1393-1408, paras. 3, 26-56.

¹⁰ Fixed broadband service includes both fixed terrestrial broadband (primarily wireline, but including some fixed wireless service) and satellite service. Due to the very different service characteristics, we often discuss fixed terrestrial and satellite services separately.

¹¹ *2015 Broadband Progress Report*, 30 FCC Rcd at 1379-80, para. 9.

¹² *Id.*

“significant concerns about the quality and reliability of the mobile and satellite service data.”¹³ The Commission stated, however, that the reliability of the mobile and satellite data should improve substantially.¹⁴ The Commission also cautioned that including mobile as well as fixed services in future reports would require a careful assessment of the nature of these product offerings, since many households subscribe to both services and use them in different ways.¹⁵ Thus, the Commission noted:

As consumers depend more and more on smartphones and other portable devices, and many Americans rely on both fixed service and a mobile service for broadband access, the day may be fast approaching when we would consider ‘advanced communications capability’ to be fully deployed only in areas where consumers have access to both mobile and fixed high-speed broadband in light of the distinct characteristics of these services.¹⁶

7. *Discussion.* As indicated earlier, the Commission anticipates that the new Form 477 data on mobile and satellite broadband service, as well as information from other sources such as Measuring Mobile Broadband America, Ookla, Rootmetrics, and Google M-Lab, are likely to allow consideration of mobile services in making the determination concerning broadband deployment and availability required by section 706. Data sources such as these offer a rich set of information that will assist the Commission in considering appropriate performance benchmarks for mobile broadband service. With the inclusion of improved data concerning mobile services, the Commission will be in a position to consider whether consumers need access to both fixed and mobile broadband in order to have access to advanced telecommunications capability.

8. Today, consumers frequently use broadband both at home and on the move. Fixed terrestrial broadband service can have advantages for high capacity home use, including, for example, streaming HD video or working at home, due to factors such as higher bandwidth, lower variability in speeds, higher usage allowances, and lower prices when compared to mobile broadband.¹⁷ However, fixed broadband lacks mobility. Mobile broadband has become increasingly important for accessing websites, navigating during travel, connecting on social media, communicating with family and friends, receiving timely news updates, and obtaining entertainment while away from a fixed broadband connection. For example, an entire ecosystem of location-aware applications depends primarily, if not solely, on mobile broadband access. Thus, fixed and mobile broadband appear to meet different consumer needs. Accordingly, we seek comment on whether advanced telecommunications capability should be defined to include capabilities of mobile broadband such as mobility and whether advanced telecommunications capability should be deemed to be available in an area only when both fixed and mobile broadband meeting our benchmark standards are available. We propose to evaluate this issue

¹³ *Id.* The Commission also noted that even if these concerns were resolved, it would not alter the negative finding concerning the deployment of advanced telecommunications capability since satellite services “are likely not yet offering the 25 Mbps/3 Mbps speeds.” *Id.*

¹⁴ *Id.* at 1380, 1415, paras. 10, 75.

¹⁵ *Id.* at 1444, para. 120.

¹⁶ *Id.*

¹⁷ We note there can be substantial differences in the speed and latency characteristics of fixed broadband services depending on the underlying technology. In general, fiber to the premises and coaxial cable have higher speeds and lower latency than DSL and satellite service. Certain forms of DSL and satellite service, for example, are likely to have difficulty meeting the current speed benchmark. Geostationary satellite service also generally has high latency, making it unsuitable for real-time services that require low latency. *See, e.g.*, FCC, Office of Engineering and Technology and Consumer and Governmental Affairs Bureau, 2014 Measuring Broadband America Fixed Broadband Report: A Report on Consumer Fixed Broadband Performance in the U.S. (2014) (*2014 Fourth Measuring Broadband America Report*).

based on information concerning customer purchasing and usage patterns, and service capabilities, among other factors. We seek comment below concerning what benchmarks to use in considering the availability of advanced telecommunications capability.

9. The inclusion of access to mobile broadband service in the definition of advanced telecommunications capability may be warranted by the increasing importance of mobile broadband services. From August 2012 to September 2014, the smartphone share of mobile phones in the United States increased from 50 percent to 72 percent. In the same period, the smartphone share of new mobile phone purchases increased from 64 percent to 85 percent.¹⁸ This suggests that the number of Americans with mobile broadband is increasing and that the quantity of mobile data usage is increasing as well. Between 2010 and 2013 the average monthly data usage per subscriber with data capable units increased from 122 Mb to 849 Mb.¹⁹

10. There are a number of factors that appear to indicate that mobile and fixed broadband are different services that address different consumer telecommunications needs and different components of the definition of advanced telecommunications capability. We seek comment on these factors and others that could potentially justify the inclusion of both services in the definition of advanced telecommunications capabilities. Consumers typically use fixed terrestrial broadband for high capacity stationary uses such as entertainment, especially downloading or streaming full-length, higher-resolution shows or movies, or telecommuting. For example, Sandvine, in its well-recognized report on broadband usage, reports that entertainment is the largest traffic category for fixed broadband service, with Netflix representing 32.39 percent of aggregate peak period fixed access traffic in North America during the second quarter of 2014.²⁰ This difference is due, at least in part, to the higher download speeds currently available on fixed terrestrial broadband and the substantially higher data caps (or the complete lack of data caps) for such services, making such data intensive uses more affordable for consumers, as discussed in greater detail below.²¹ Mobile services, by contrast, currently may not meet consumers' needs for such entertainment or telecommuting purposes because of its typically lower data caps and other characteristics. Sandvine reports that Netflix traffic represents only 4.1 percent of aggregate peak period mobile access traffic during this period.²²

11. Consumers also rely on access to broadband services while away from home and on the move. The ability to access advanced telecommunications capabilities while on the move cannot be provided by fixed broadband service. For example, consumers increasingly rely on their mobile devices to access location-based services such as real-time maps, directions, and live traffic updates. Mobile broadband is also used extensively for social media, such as Facebook, Twitter, and Whatsapp, for entertainment and mobile video, online shopping, mobile payments, and keeping in touch with friends and family while away from home. Social media usage is the second-highest traffic category for mobile broadband service.²³ Sandvine reports that Facebook usage represents 19.43 percent of aggregate peak

¹⁸ *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. 13-135, Seventeenth Report, 29 FCC Rcd 15311, 15350, Chart III.C.3 (Wireless Tel. Bur. 2014) (*Seventeenth Mobile Wireless Report*).

¹⁹ *Id.* at 15348, Chart III.C.2.

²⁰ Global Internet Phenomena Report 2H2014, Sandvine Intelligent Broadband Networks at 6 (2014), <https://www.sandvine.com/trends/global-internet-phenomena/> (2014 Sandvine Report).

²¹ *See infra* paras. 13-18.

²² 2014 Sandvine Report at 8. In this context, we note that a significant portion of traffic originated from mobile devices, presumably including the most data-intensive uses, is off-loaded through the use of WiFi to the fixed broadband network. *See 2015 Broadband Progress Report*, 30 FCC Rcd at 1399-1400, para. 37.

²³ 2014 Sandvine Report at 8.

period mobile access traffic in North America during the second quarter of 2014, while it represents only 2.94 percent of aggregate peak period traffic for fixed access during this period.²⁴ In contrast, as discussed earlier, video streaming from sources such as Netflix represents the highest traffic category for fixed broadband.²⁵

12. Purchasing patterns also support the view that consumers currently use fixed terrestrial and mobile broadband to meet different communications needs. In particular, several data sources, such as the Pew survey and the American Community Survey, indicate that a large portion of U.S. households have both fixed terrestrial broadband service and mobile broadband service. The Pew Home Broadband Study indicates that 46 percent of Americans have both a home broadband connection and a smart phone.²⁶ The American Community Survey data also indicate that at least 28 percent of households report having both a fixed Internet access service and have at least one person in the household with a mobile data subscription.²⁷ In addition, a significant portion of Americans subscribe only to fixed broadband,²⁸ and a small portion of Americans subscribe only to mobile broadband.²⁹

13. The figures reported above support the view that consumers currently use fixed terrestrial and mobile broadband to meet different communications needs. There are a number of reasons why consumers use fixed and mobile broadband differently. These factors include speed, pricing, data allowances, and device size and capability. Fixed broadband service often offers higher speeds than mobile broadband at present. Higher speeds are better suited to data intensive uses such as downloading or streaming full-length, higher-resolution movies or shows, for example. Approximately 83 percent of Americans live in areas served by 25 Mbps/3Mbps or faster fixed broadband service.³⁰ While deployment of HSPA+ and LTE mobile technologies have increased available mobile broadband speeds substantially, a 2014 U.S. Department of Commerce study found that “at speeds of 25 Mbps or greater, mobile service was nearly non-existent.”³¹ While the maximum theoretical speeds possible with new mobile technology

²⁴ *Id.* at 6, 8.

²⁵ *See supra* para. 10 & n.20.

²⁶ Pew Research Center, Home Broadband 2013, Trends and Demographic Difference in Home Broadband Adoption at 4 (Aug. 26, 2013), http://www.pewinternet.org/files/old-media/Files/Reports/2013/PIP_Broadband%202013_082613.pdf (Pew, Home Broadband 2013). This Pew Report also states that only 33% of individuals say that they connect to the Internet at home via some form of wireless service (including satellite, fixed wireless and mobile broadband service). *Id.* at 10. Households with only mobile service tend to have lower incomes. Pew Research Center, U.S. Smartphone Use in 2015 at 17-18 (April 1, 2015), http://www.pewinternet.org/files/2015/03/PI_Smartphones_0401151.pdf (Pew, U.S. Smartphone Use in 2015).

²⁷ 2013 American Community Survey 1 Year Estimates. These data can be found at United States Census Bureau, *American FactFinder*, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_13_1YR_B28002&prodType=table (last visited July 16, 2015).

²⁸ The Pew Home Broadband Study indicates that 24% of households have only fixed broadband Internet service, while the American Community Survey indicates that at least 40% of households have only fixed broadband Internet. Pew, Home Broadband 2013 at 4; 2013 American Community Survey 1 Year Estimates. We note that the American Community Survey reports an additional 4% of households have broadband Internet service with an unreported technology. 2013 American Community Survey 1 Year Estimates.

²⁹ Pew indicates that 10% of Americans own a smart phone, but do not have home broadband, and the American Community Survey indicates that 5% of households have only mobile broadband service. Pew, Home Broadband 2013 at 4; Pew, U.S. Smartphone Use in 2015 at 2; 2013 American Community Survey 1 Year Estimates.

³⁰ *2015 Broadband Progress Report*, 30 FCC Rcd at 1406, para. 51.

³¹ U.S. Department of Commerce, Economics and Statistics Administration, Competition Among U.S. Broadband Service Providers at 5 (2014). While the *2015 Broadband Progress Report* establishes a speed standard for advanced telecommunications capability of 25 Mbps/3 Mbps for fixed terrestrial service in light of the need to

(continued...)

may be much higher than this, the speeds actually experienced by customers of commercial mobile networks generally are significantly less than theoretical speeds.³² Fundamentally, commercial mobile network providers need to make various tradeoffs as they engineer their networks, so as to ensure that the costs of providing certain speeds, coverage, capacity, and quality of service are covered by what consumers are willing to pay. We note as well that speeds in individual locations are affected by various factors, including position relative to the base station, the availability and type of broadband spectrum, environmental conditions, network configuration, type of backhaul, and network congestion.³³

14. Mobile broadband service pricing and data allowances can also make mobile broadband service much more expensive than fixed terrestrial broadband service for high volume usage. In general, usage allowances are more prevalent for mobile broadband service plans than for fixed terrestrial broadband services. Mobile broadband data allowances are typically much lower than those for fixed terrestrial broadband with substantially higher overage charges. For instance, while all four nationwide mobile broadband providers offer a variety of service plans, the currently offered plans of three of the four providers, AT&T, Verizon, and Sprint, include only limited, as opposed to unlimited, data allowances and significant amounts of data are relatively expensive. For example, in one of its high-use plans, Verizon offers 60 GB of data per month at a cost of \$410, and, similarly, AT&T offers 50 GB of data per month for \$375.³⁴ Most mobile broadband plans are for LTE data service, which is usually advertised at 5 – 12 Mbps average download speed.³⁵ Additionally, all providers except T-Mobile impose overage charges for additional data usage beyond a plan's allowance.³⁶ Compared to these mobile

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support multiple simultaneous users, we recognize that a lower speed standard might be appropriate for mobile broadband service. See *infra* paras. 27-30.

³² 4G.co.uk, *How Fast is 4G?*, <http://www.4g.co.uk/how-fast-is-4g/> (last visited July 15, 2015).

³³ Reply to Opposition to Petition to Deny of Public Knowledge, MB Docket No. 14-57, Attach., The State of the Art and Evolution of Cable Television and Broadband Technology at 15 (filed Dec. 22, 2014) (“Typical 4G technologies have theoretical maximum download speeds from 42 Mbps to 100 Mbps and upload speeds from 11.5 Mbps to 50 Mbps. The speeds users actually experience, however, may be significantly lower due to environmental factors or a large number of devices sharing a tower. . . . Likewise, the technology used to connect the wireless antenna to the rest of the network, whether copper, or fiber optic cable, can influence the actual data speeds available to users. Recent testing has shown that typical 4G speeds are usually 4 Mbps to 13 Mbps download and 2 Mbps to 6 Mbps upload.”).

³⁴ Verizon, The More Everything Plan, <http://www.verizonwireless.com/landingpages/more-everything/#how-it-works> (last visited July 2, 2015) (data only pricing); AT&T Mobile Share Value Plans, <http://www.att.com/shop/wireless/data-plans.html> (last visited June 15, 2015). For Sprint's customers, 30 GB of data costs \$110, while T-Mobile offers unlimited data at \$80 for the first line. The largest regional mobile provider, US Cellular, offers 50 GB of data for \$375. Sprint, Plans/Choose Data, https://shop.sprint.com/mysprint/shop/plan/plan_wall.jsp?tabId=pt_data_plans_tab#! (last visited July 7, 2015); T-Mobile, Simple Choice Plan, <http://www.t-mobile.com/cell-phone-plans/individual.html> (last visited July 7, 2015); US Cellular, Shared Connect Plans, <http://www.uscellular.com/uscellular/plans/showPlans.jsp?plan-selector-type=shared&type=plans> (last visited July 7, 2015).

³⁵ See, e.g., Verizon Wireless, 4G LTE Speeds vs. Your Home Network, <http://www.verizonwireless.com/mobile-living/network-and-plans/4g-lte-speeds-compared-to-home-network/> (last visited July 2, 2015).

³⁶ For instance, overage charges for Verizon Wireless plans are \$10 per 75 MB for the 75 MB plan and \$10 per 1 GB for all other plans. Verizon Wireless, About Data Packages, <http://www.verizonwireless.com/b2c/includes/plans/dataInfoOverlay.jsp> (last visited July 15, 2015). Overage charges for AT&T plans are \$20 per 300 MB for a 300 MB plan, \$20 per 500 MB for a 1 GB plan, and \$15 per 1 GB on a plan with greater than 1 GB of monthly data. AT&T Wireless, Mobile Share Value Plans, <http://www.att.com/shop/wireless/data-plans.html> (last visited July 16, 2015).

broadband plans, Comcast and Verizon FiOS currently offer unlimited fixed high speed broadband at download speeds of 25 Mbps.³⁷

15. In the case of fixed terrestrial broadband, usage-based pricing is less prevalent, and any data caps are typically much higher with lower prices for additional usage. In a recent study, the Government Accountability Office (GAO) reviewed the pricing policies of thirteen fixed, terrestrial Internet providers. While seven of the thirteen providers offered a plan with an element of usage-based pricing, usage-based pricing appears to be a major feature for only three of these providers, with a fourth provider experimenting with usage based pricing in select markets.³⁸ GAO stated that three of the fixed internet providers they interviewed “use data allowances (ranging from 150 GB to 4,000 GB) [with] higher allowances . . . generally tied to faster connection speeds and higher overall prices . . .”³⁹ These providers “impose fees on customers who exceed their allowance (generally starting at \$10 for an extra 50 GB).”⁴⁰ GAO stated that a fourth provider was testing usage-based pricing approaches in 14 markets, including plans with data allowances and overage fees.⁴¹ GAO noted that “[a]llowances are generally 300 GB regardless of the plan’s connection speeds . . . and overages are generally \$10 for 50 GB of additional data.”⁴²

16. The potential impact of data allowances and overage charges in mobile broadband plans if customers tried to switch from fixed terrestrial broadband to mobile broadband service could be substantial.⁴³ This is particularly significant since Sandvine states that median aggregate monthly usage for fixed access in North American in the second quarter of 2014 was 22.5 GB, well above many mobile broadband data allowances.⁴⁴ Currently, even unlimited mobile broadband plans typically offer

³⁷ Comcast Internet, <http://www.xfinity.com/internet-service.html> (last visited June 29, 2015); Verizon FiOS, <http://www.verizon.com/home/fios-fastest-internet/> (last visited June 29, 2015). Comcast is experimenting with data usage plans. Comcast Xfinity, Questions & Answers about Our Data Usage Plan Trials, <http://customer.xfinity.com/help-and-support/internet/data-usage-trials/> (last visited July 15, 2015).

³⁸ GAO, Broadband Internet, GAO-15-108 at 10 (Nov. 2014). For example, GAO states that two of these providers “have data allowances, but do not impose fees or normally take other action when customers exceed their data allowance.” *Id.* GAO states that most providers interviewed for the study have use policies that permit them to take action against customers for excessive data use, although they rarely take such action. *Id.* at n.20. Another provider offers “a low-data allowance option . . . at a discounted rate.” *Id.* at 10.

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ *Id.* This provider also offers a low-data plan at a discounted rate. *Id.*

⁴² *Id.*

⁴³ See, e.g., Kate Cox, Comcast Says that Mobile Data is Competitive but it Costs \$2k to Stream ‘Breaking Bad’ Over LTE, Consumerist (Aug. 18, 2014), <http://consumerist.com/2014/08/18/comcast-says-mobile-data-is-competitive-but-it-costs-2k-to-stream-breaking-bad-over-lte/>.

⁴⁴ See also Reply of Future of Music Coalition and Writers Guild of America, West, Inc., MB Docket No. 14-57, at 27 (filed Dec. 23, 2014) (“Verizon estimates that an hour of streaming HD video on a tablet requires 1 GB and an hour of streaming video on a smartphone requires 250 MB for a 3G phone and 350 MB for a 4G phone. AT&T estimates that an hour of HD streaming, on a tablet or smartphone, requires 306 MB. Based on this information, to replace an average month of television consumption would require Verizon customers to purchase 50 GB of data for a smartphone at \$420 per month or 100 GB for a tablet, which would cost \$710 per month, plus data overages and device charges. We estimate that an AT&T subscriber would need 46 GB of data to replace an average month of television consumption. Substituting a home broadband connection with an AT&T smartphone plan would cost about \$225 a month plus device charges. In comparison, TWC offers a 15 Mbps (upgraded to 50 Mbps in some service areas) connection for \$34.99 a month, with unlimited data consumption.”).

substantially lower speeds than comparably- or lower-priced unlimited fixed terrestrial broadband services.⁴⁵

17. We also note that many mobile broadband consumers are using devices that not only provide mobile service but also are able to obtain access to fixed broadband networks via Wi-Fi technology while at home or away from home. Some consumer products will prioritize use of the Wi-Fi network and then use the mobile network only if Wi-Fi is unavailable.⁴⁶ While connecting through Wi-Fi does not itself provide true mobility, it can provide access to broadband service outside the home by use of a fixed broadband network. Indeed, a consumer without a mobile service can access broadband through a fixed network using Wi-Fi and any Wi-Fi-enabled device.

18. We seek comment on how the Commission's understanding of "advanced telecommunications capability" should address consumer needs and features associated with mobile service, such as mobility. In particular, we seek comment on whether to treat access to both fixed and mobile broadband as necessary components of advanced telecommunications capability, and on our discussion concerning this issue. Among other things, we invite interested parties to address the apparent increasing importance of mobile broadband and the extent to which fixed and mobile broadband service meet different consumer needs at this time. We also seek comment on how the availability of Wi-Fi should factor into our consideration of the availability of advanced telecommunication capability, if at all. We also invite proposals and comments on alternative standards for determining the availability of advanced telecommunications capabilities. Interested parties advocating alternative approaches should provide information supporting their position and addressing the role of fixed and mobile broadband in satisfying the statutory definition of advanced telecommunications capability.

B. Criteria and Benchmarks for Assessing Consumer Broadband

19. *Background.* Section 706 provides that advanced telecommunications capability "enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology."⁴⁷ Historically, the Commission has focused on upload and download speed benchmarks to evaluate broadband services pursuant to section 706.⁴⁸ However, past broadband progress

⁴⁵ For example, Sprint charges \$60 per month for unlimited data plans that have speeds of 3-6 Mbps. *See* Sprint, Data Plans, http://www.sprint.com/landings/datashare/index_c.html?INTNAV=ATG:HE:UnlimitedPlan&view=unlimitedtalk (last visited July 16, 2015); Sprint, How much faster is 4G (WiMax)?, http://shop2.sprint.com/en/shop/why_sprint/4g/evo_plan_details.html (visited July 16, 2015). Comcast offers 105 Mbps in markets such as Boston, Philadelphia and Washington, D.C. for \$59.99 a month, and TWC offers 30 Mbps for \$54.99 markets like Charlotte, Cleveland, Dallas, New York City and Los Angeles. *See* Comcast, High Speed Internet Service from XFINITY, <http://www.comcast.com/internet-service.html> (last visited Feb. 2, 2015) (requires a residential address for local pricing); Time Warner Cable, Cable, Internet and Home Phone Packages, <http://www.timewarnercable.com/en/plans-packages/cable-internet.html#internet> (last visited Feb. 2 2015) (requires a residential address for local pricing). Comcast's 25 Mbps offering usually ranges from \$29.99 to 44.99 per month, all better values than comparable mobile offerings. *See* Comcast, High Speed Internet Service from XFINITY, <http://www.comcast.com/internet-service.html> (last visited Feb. 2, 2015). T-Mobile charges \$80 per month for unlimited data at 11 Mbps. *See* T-Mobile, Cell Phone Plans, <http://www.t-mobile.com/cell-phone-plans/individual.html> (last visited Feb. 2, 2015). TWC offers 300 Mbps in Los Angeles and New York City, 100 Mbps in Dallas and 50 Mbps in Cleveland and Charlotte for \$64.99, which is \$15 less than T-Mobile's charge. *See* Time Warner Cable, Cable, Internet and Home Phone Packages, <http://www.timewarnercable.com/en/plans-packages/cable-internet.html#internet> (last visited Feb. 2 2015).

⁴⁶ Lynn La & Andrew Hoyle, What You Need to Know about Wi-Fi Calling, CNET (Apr. 21, 2015), <http://www.cnet.com/news/what-you-need-to-know-about-wifi-calling/>; Republic Wireless, FAQs, <https://republicwireless.com/faqs/> (last visited July 15, 2015).

⁴⁷ 47 U.S.C. § 1302(d)(1).

⁴⁸ 2015 Broadband Progress Report, 30 FCC Rcd at 1392, para. 24; *see also Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible* (continued...)

reports also have made clear that additional factors, such as latency, consistency, price, data allowances, and security may be equally relevant to the determination of what constitutes advanced telecommunications capability.⁴⁹ In particular, the *2015 Broadband Progress Report* stated that the Commission intended to look “more robustly at other factors, such as . . . latency, whether service at the relevant speed is available on a consistent and reliable basis, and whether the network is secure, which can be as important as speed in determining whether service is available.”⁵⁰

20. *Discussion.* Building on this groundwork, we propose to continue using speed as one of the criteria to assess advanced telecommunications capability. We also seek comment on adding additional criteria to the definition of advanced telecommunications capability in the next report, such as latency and the consistency of service. We discuss data allowances and pricing, as well as privacy and security, elsewhere in this *Notice* because we believe that they are better considered in more general terms rather than through a specific benchmark for purposes of this latest Inquiry.⁵¹ Are the criteria we have identified appropriate? Should additional criteria be considered, and if so, which ones and why?

C. Benchmarks for Assessing Consumer Broadband

21. In this section, we seek comment on benchmarks to define advanced telecommunications capability. We make several specific proposals involving speed benchmarks, and seek comment on other speed related issues. We also seek comment on whether the Commission should develop benchmarks related to quality of service, including latency and consistency.

1. Speed

22. In this section, we seek comment on the appropriate speed benchmarks for use in making our statutory determination. We propose to retain the newly adopted speed benchmark for fixed terrestrial broadband service and we seek comment on applying this speed benchmark to fixed satellite service as well. We also seek comment on the development of a lower speed benchmark for mobile service in the event that the Commission finds that consumers require access to both fixed and mobile broadband in order to have access to advanced telecommunications capability. We seek comment on these issues and invite interested parties to present additional options for speed benchmarks.

a. Fixed Broadband Service

23. *Background.* In the *2015 Broadband Progress Report*, the Commission increased the existing 4 Mbps/1 Mbps benchmark for actual download/upload speeds for services with advanced telecommunications capabilities which had been in place since 2010, to 25 Mbps/3 Mbps.⁵² In doing so,

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Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act, GN Docket No. 14-126, Tenth Broadband Progress Notice of Inquiry, 29 FCC Rcd 9747, 9749-50, para. 5 (2014) (*Tenth Broadband Progress Notice of Inquiry*).

⁴⁹ See *2015 Broadband Progress Report*, 30 FCC Rcd at 1392, para. 24; *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*, GN Docket No. 12-228, Ninth Broadband Progress Notice of Inquiry, 27 FCC Rcd 10523, 10528-33, paras. 7-21 (2012) (*Ninth Broadband Progress Notice of Inquiry*); *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*, GN Docket No. 11-121, Eighth Broadband Progress Report, 27 FCC Rcd 10342, 10348-49, para. 7 (2012) (*Eighth Broadband Progress Report*).

⁵⁰ *2015 Broadband Progress Report*, 30 FCC Rcd at 1392-93, para. 25.

⁵¹ See *infra* para. 52 (discussing privacy and security) and paras. 73-76 (discussing pricing and data allowances).

⁵² *2015 Broadband Progress Report*, 30 FCC Rcd at 1393, 1403-08, paras. 26, 45-55.

the Commission acknowledged a variety of shifts that had reshaped the broadband landscape warranting a higher speed benchmark.⁵³

(i) Fixed Terrestrial Broadband Service

24. *Discussion.* We first propose to retain the 25 Mbps/3 Mbps speed benchmark for fixed terrestrial broadband services.⁵⁴ We seek comment on this proposal, and invite interested parties to address whether there are any considerations that would warrant a change in this speed benchmark. For example, consumers may increasingly use broadband applications and services that require greater upload capability than traditional web browsing or video streaming services.⁵⁵ Do these trends warrant consideration of changes in our upload speed benchmark?

25. We also seek comment on whether additional speed benchmarks might improve our ability to measure the deployment and availability of advanced telecommunications capability. In particular, we seek comment on whether the Commission should adopt a forward-looking benchmark. Is a forward-looking benchmark reasonable under section 706(b)? If we adopt a forward-looking benchmark, how should we determine whether broadband “is being deployed” in a reasonable and timely manner? For example, should we adopt a forward-looking benchmark of 100 Mbps/10 Mbps in addition to a 25 Mbps/3 Mbps speed benchmark?

(ii) Fixed Satellite Broadband Service

26. *Discussion.* We next seek comment on using the fixed terrestrial broadband speed benchmark for assessing fixed satellite broadband service, rather than creating a separate benchmark specifically for satellite. In the *2015 Broadband Progress Report*, the Commission excluded fixed satellite broadband from the 706(b) finding, citing a number of reasons, including lack of fixed satellite service offerings at or above the 25 Mbps/3 Mbps speed threshold, as well as insufficient data, but stated that “satellite broadband deployment data may improve when we collect data from Form 477, and we expect it to be a topic for closer examination in future reports.”⁵⁶ We also note that current satellite broadband offerings are fixed services, and likely to be used as a household broadband solution, as is true of fixed terrestrial broadband service.⁵⁷ Actual usage patterns for satellite service, however, are likely to differ from those for terrestrial broadband due to significant differences in available speeds, pricing, data allowances and latency. We also seek comment on whether there are factors that justify setting a different speed benchmark for fixed satellite broadband service. How would such an approach comport with the definition of advanced communications capability as encompassing particular functionalities without regard to the transmission media or technology?⁵⁸ In the alternative, we seek comment on whether to exclude satellite from the section 706(b) finding and any quantitative and qualitative data illustrating changes in this area that may enable the Commission to reach a determination on this point.

⁵³ *Id.* at 1403-04, paras. 46-48 (noting that “[h]ousehold use clearly has changed significantly” since 2010).

⁵⁴ As we noted in the *2015 Broadband Progress Report*, this benchmark was intended in part to accommodate near-term growth in consumer broadband services. *Id.* at 1404, para. 48.

⁵⁵ *Tenth Broadband Notice of Inquiry*, 29 FCC Rcd at 9756-57, para. 17.

⁵⁶ *2015 Broadband Progress Report*, 30 FCC Rcd at 1446-48, paras. 125-26.

⁵⁷ Although there is some mobile ground equipment that operates using Fixed Satellite Service satellites, due to size and cost, such equipment is currently generally not suitable for widespread consumer offerings comparable to those for terrestrial mobile services.

⁵⁸ 47 USC § 1302(d)(1).

b. Mobile Broadband Service

27. *Background.* While the *2015 Broadband Progress Report* included discussion of the deployment and availability of mobile broadband in America,⁵⁹ mobile broadband was excluded from our statutory determination due to a lack of reliable deployment and speed data.⁶⁰ As indicated in the *2015 Broadband Progress Report*, the Commission anticipated that the transition to revised Form 477 deployment data, currently underway, would produce more reliable information, which could allow consideration of mobile broadband service in our statutory finding on broadband deployment for the first time.⁶¹ The *2015 Broadband Progress Report* suggested that once the Commission has sufficiently reliable mobile service data, we might assess mobile availability using a speed benchmark that differs from the speed benchmark for fixed services.⁶²

28. *Discussion.* In this section, we seek comment on the adoption of a speed benchmark for mobile service that is lower than the standard for fixed services, and the specific speed benchmark that should be adopted in the event that the Commission concludes that access to advanced telecommunications service requires consumer access to both fixed and mobile broadband service meeting applicable benchmark standards. We seek comment on this approach given that mobile broadband appears to address different consumer telecommunications needs and provide different capabilities than fixed terrestrial broadband for purposes of making our statutory determination under section 706.⁶³ We seek comment on the view that this would comport with the section 706 instruction to define advanced telecommunications capability “without regard to any transmission media or technology,”⁶⁴ since the critical difference between fixed and mobile product offerings is mobility, not any transmission media or technology.

29. We seek comment on these issues and invite interested parties to present alternative approaches. We also seek comment and information concerning differences in fixed terrestrial and mobile broadband usage patterns as they relate to the question of setting a speed benchmark for mobile broadband service. For example, does the fact that mobile service appears to be used predominantly in conjunction with different devices than fixed services significantly affect usage patterns, or are other factors more determinative? We also seek comment on the incidence and trends in use of mobile broadband networks to support simultaneous Internet access for multiple devices.⁶⁵

30. We next seek comment on the specific mobile speed benchmark that should be adopted if the Commission finds that advanced telecommunications capability requires access to both fixed and mobile broadband meeting applicable benchmark standards. For example, would a mobile speed

⁵⁹ *2015 Broadband Progress Report*, 30 FCC Rcd at 1414-1415, 1439-1444, paras. 72-75, 107-119.

⁶⁰ Historically, the Commission has relied on a combination of National Broadband Map data (commonly called SBI Data) and data provided by Mosaik Solutions (Mosaik Data), to analyze broadband deployment for our annual Reports pursuant to section 706. *See id.* at 1382, 1414, paras. 14, 72. While the Commission has used these data sets to estimate the level of mobile broadband deployment in prior reports, concerns that they overstated mobile deployment have led the Commission to exclude mobile broadband from its finding on broadband deployment. *Id.* at 1414-15, para. 72-75 (“The SBI Data and Mosaik Data on mobile deployment, while useful for measuring developments in mobile broadband deployment, have certain limitations that likely overstate the extent of deployment of 4G and LTE mobile broadband services and deployment of 10 Mbps/768 kbps speeds or higher.”).

⁶¹ *Id.* at 1414-1415, para. 72-75; *see also id.* at 1445, para. 121 (“[W]e anticipate examining whether to adopt a separate, complementary mobile [speed] benchmark in a future report.”).

⁶² *Id.* at 1414, para. 72.

⁶³ *See supra* paras. 10-18.

⁶⁴ 47 USC § 1302(d)(1).

⁶⁵ For example, simultaneous usage of multiple devices over a single mobile broadband connection using the tethering feature on a smartphone, or a mobile hotspot device.

benchmark of 10 Mbps/1 Mbps be appropriate? Should the 10 Mbps download speed be paired with an upload speed higher than 1 Mbps? Is this speed benchmark desirable given current customer usage patterns for mobile broadband? Or, would a lower benchmark be more reflective of current consumer experiences with mobile broadband service? What data should guide the Commission's analysis of these questions? In the *2015 Broadband Progress Report*, the Commission stated that the 25 Mbps/3 Mbps speed benchmark was to be compared with actual speeds experienced by consumers in making the statutory determination under section 706, thereby acknowledging the importance of actual speed measurements to our analysis.⁶⁶ The *Report* also mentioned that data "on advertised speed may not accurately represent consumers' actual broadband speed."⁶⁷ This distinction may be of even greater importance for mobile broadband performance than for fixed broadband. Therefore, we also seek comment on how we should set the appropriate speed benchmark for mobile broadband. We also seek comment on alternative approaches to setting the speed benchmark for mobile broadband services.

2. Latency

31. *Overview.* In this section, we seek comment on whether we should develop a benchmark for latency as part of our definition of advanced telecommunications capability. Building on prior Commission decisions, we seek comment on the adoption of a latency benchmark for fixed terrestrial, mobile, and/or satellite broadband services.

32. *Background.* Latency is a measurement of the time it takes a packet of data to travel from one point in the network to another, and is typically measured by round-trip time in milliseconds (ms).⁶⁸ As a measurement of advanced telecommunications capability, latency can be important because it "affects a consumer's ability to use real-time applications, including interactive voice or video communication."⁶⁹

33. The *2015 Broadband Progress Report* recognized the importance of latency to many of the applications and services that are part of the statutory definition of advanced telecommunications capability.⁷⁰ Indeed, the Commission has long identified latency as a "core component[]" of broadband, and has indicated its intent to "adopt[] specific minimum service standards" for broadband latency.⁷¹ Accordingly, while the *2015 Broadband Progress Report* declined to set a benchmark for fixed

⁶⁶ *2015 Broadband Progress Report*, 30 FCC Rcd at 1393, para. 26 & n.137.

⁶⁷ *Id.* at para. 26 n.137.

⁶⁸ *Eighth Broadband Progress Report*, 27 FCC Rcd at 10362, para. 23.

⁶⁹ *Id.* Latency is therefore important for a variety of applications, including VoIP, video calling, distance learning, and online gaming. These kinds of interactive services may be effectively unusable over high latency connections, regardless of the download/upload speeds being offered. *See, e.g., 2015 Broadband Progress Report*, 30 FCC Rcd at 1446-48, para. 125 n.438.

⁷⁰ *2015 Broadband Progress Report*, 30 FCC Rcd at 1392-93, paras. 24-25, *see also Ninth Broadband Progress Notice of Inquiry*, 27 FCC Rcd at 10531-32, paras. 14-17. The Commission has recognized that "for some applications," particularly those that enable real-time interactivity, "latency is more important than bandwidth." *Ninth Broadband Progress Notice of Inquiry*, 27 FCC Rcd at 10531, para. 15. Latency can also "limit the maximum actual speed achievable for a broadband service," an effect which becomes more pronounced at higher speeds. *2014 Fourth Measuring Broadband America Report* at 20.

⁷¹ *Eighth Broadband Progress Report*, 27 FCC Rcd at 10362-63, para. 25; *see also Connect America Fund; A National Broadband Plan for Our Future; Establishing Just and Reasonable Rates for Local Exchange Carriers; High-Cost Universal Service Support; Developing an Unified Intercarrier Compensation Regime; Federal-State Joint Board on Universal Service; Lifeline and Link-Up; Universal Service Reform—Mobility Fund*, WC Docket Nos. 10-90, 07-135, 05-337, 03-109, GN Docket No. 09-51, CC Docket Nos. 01-92, 96-45, WT Docket No. 10-208, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663, 17698, para. 96 (2011) (*USF/ICC Transformation Order*).

broadband latency due to limited data,⁷² it stated that collecting reliable data on latency should be a priority in the next Inquiry.⁷³

a. Fixed Broadband

34. *Discussion.* We seek comment on whether we should adopt a latency standard for fixed broadband service, including satellite broadband service, and on the specific standard, if any, that the Commission should adopt. We also seek input on possible sources of latency data and ways to measure latency for both fixed terrestrial and satellite services.

(i) Fixed Terrestrial Broadband Service

35. We seek comment on whether the Commission should adopt a latency benchmark for fixed terrestrial broadband service, and on the specific latency standard, if any, that should be applied to these services, including the network points between which latency should be measured. Over what part of the network should latency be measured?⁷⁴ The Wireline Competition Bureau, acting on delegated authority, has applied a 100 ms benchmark for the service obligations of price cap carriers that accept Connect America Phase II funding via the state-level commitment process – to ensure that consumers are able to use interactive services, including VoIP and video conferencing over their broadband service in applicable rural areas.⁷⁵ Would the use of such a 100 ms standard be appropriate nationwide for fixed terrestrial services in the context of this Inquiry? In seeking to address this issue, we note that the Commission anticipates that most, if not all, fixed terrestrial broadband service is likely to achieve latency standards of 100 ms or less between the points measured in the Connect America funding context.⁷⁶ Nevertheless, are there reasons why the Commission should consider adopting a different latency benchmark for fixed terrestrial broadband service? The Commission has previously indicated that network latencies somewhat higher than 100 ms may still be consistent with “acceptable voice quality”

⁷² 2015 *Broadband Progress Report*, 30 FCC Rcd at 1392-93, para. 25 (referencing “limited data on latency for fixed broadband”); see also *id.* at 1443, para. 117 (noting that the Commission had received “few comments” on what threshold would be appropriate for establishing a mobile broadband latency benchmark).

⁷³ *Id.* at 1415, para. 75 (“[C]ollecting reliable data on other characteristics, including, but not limited to, latencies, usage limits, and affordability will be a priority in the next Inquiry and we will continue to explore how best to collect information on these issues further.”).

⁷⁴ See *Connect America Fund Phase II Service Obligations Order*, 28 FCC Rcd at 15068-70, paras. 19-22 (discussing latency measurement generally).

⁷⁵ See *Connect America Fund*, WC Docket No. 10-90, Report and Order, 28 FCC Rcd 15060, 15061, 15068-70, paras. 2, 19-20 (Wireline Comp. Bur. 2013) (*Connect America Fund Phase II Service Obligations Order*); see also *Tenth Broadband Progress Notice of Inquiry*, 29 FCC Rcd at 9760-61, paras. 25-26. Although latency can be calculated in a variety of ways, in the *Connect America Fund Phase II Service Obligations Order*, the Commission’s 100 ms latency standard referred to a round-trip measurement of delay on the provider’s network, from the input device to the Internet core. *Connect America Fund Phase II Service Obligations Order*, 28 FCC Rcd at 15068-70, paras. 19-22. See *Connect America Fund Phase II Service Obligations Order*, 28 FCC Rcd 15060-62, paras. 1-5. The 100 ms threshold was based largely on customer satisfaction with VoIP call quality. *Id.* at 15068-15070, paras. 19-22. The Commission has previously sought comment on whether to apply this latency standard in defining advanced telecommunications capability. See, e.g., *Ninth Broadband Progress Notice of Inquiry*, 27 FCC Rcd at 10531-32, para. 16.

⁷⁶ See *Ninth Broadband Progress Notice of Inquiry*, 27 FCC Rcd at 10531-32, para. 16. The 2014 *Fourth Measuring Broadband America Report* found that latency for all “terrestrial” technologies during peak periods averaged 34.9 ms. *2014 Fourth Measuring Broadband America Report* at 16. However, we note that this figure includes all mobile services, as well as other non-satellite based services. *2015 Broadband Progress Report*, 30 FCC Rcd at 1437, para. 103 n.364. For fixed terrestrial broadband services, latency for FTTH averaged 24 ms, while cable-based services averaged 30 ms, and DSL-based services averaged 48 ms. *2014 Fourth Measuring Broadband America Report* at 35.

for VoIP consumers.⁷⁷ Would a somewhat higher standard still be consistent with fixed broadband consumers having the ability to “originate and receive high-quality voice, data, graphics, and video telecommunications,” as provided in the definition of advanced telecommunications service in section 706?⁷⁸ Alternatively, are there reasons the Commission should decline to adopt a latency benchmark for fixed terrestrial broadband?

36. We also invite comment on whether the Commission should rely on latency findings for fixed terrestrial broadband generated in the *Measuring Broadband America Report* for the purposes of the next 706 Report. In doing so, we note that the Commission currently lacks the kind of small-scale geographic data for latency that it has for speed, and that this data limitation exists for all categories of broadband, including satellite and mobile as well as fixed terrestrial broadband. How, if at all, should this impact consideration of latency benchmarks for broadband services? Are there data sources in addition to the *Measuring Broadband America Report* that the Commission should consider?

(ii) Fixed Satellite Broadband Service

37. *Discussion.* We also seek comment on whether we should adopt a latency benchmark for fixed satellite broadband services, and if so, what the standard should be. Are there any factors that would support the use of a different latency benchmark for satellite services than the benchmark we could establish for fixed terrestrial services? Would a consumer with access to low-latency, high-speed mobile broadband service have less of a need for low-latency fixed service? We note that satellite broadband involves transmission of data across great distances, and that for most satellite services currently in operation, this makes achieving latencies on par with those of fixed terrestrial services impossible.⁷⁹ However, we recognize that satellite service has improved significantly in terms of speed, price, usage allowances, and latency in recent years,⁸⁰ and that “satellites continue to have a role to play in the provision of broadband services, especially in areas not well served by other means.”⁸¹ We also note that the *2015 Broadband Progress Report* discussed the possibility that lower orbit satellites might offer service “comparable to terrestrial fiber” with latencies in the 120-150 ms range.⁸² We therefore seek comment on the state of satellite technology, and the ability of current or future satellite services to achieve latencies suitable for interactive communications services such as VoIP.

38. We also seek comment on how satellite latency should be measured. Should the Commission make use of data collected in the *Measuring Broadband America Report* for the purposes of

⁷⁷ See *Tenth Broadband Progress Notice of Inquiry*, 29 FCC Rcd 9760, para. 26 n.62; International Telecommunication Union, *Telecommunication Standardization Sector, Series G: Transmission Systems and Media, Digital Systems and Networks, G.114 3*, <http://www.itu.int/rec/T-REC-G.114-200305-I> (last visited July 16, 2015).

⁷⁸ See 47 U.S.C. § 1302(d)(1).

⁷⁹ *2014 Fourth Measuring Broadband America Report* at 18 (“[L]atency has been an order of magnitude greater [for satellite] than with terrestrial broadband technologies. Communicating with a geosynchronous satellite orbiting the earth at a distance of approximately 36,000 km above the equator results in a round trip latency of about 500 ms. The necessary signaling between the set-top box and the satellite controller, to request assignment of a communication channel, can double this to over 1000 ms, which would preclude use of many latency-sensitive services.”); see also *2015 Broadband Progress Report*, 30 FCC Rcd 1446-47, para. 125 & 125 n.438-439. The *Fourth Measuring Broadband America Report* found satellite to have the highest latency of all measured fixed broadband technologies, with an overall latency of 671 ms. *2014 Fourth Measuring Broadband America Report* at 35. Satellite latency was 19 times greater than the terrestrial average, and more than 10 times greater than the highest latency recorded for a single ISP using terrestrial technology. See *id.* at 16, 35.

⁸⁰ *2015 Broadband Progress Report*, 30 FCC Rcd at 1445-46, para. 122-23.

⁸¹ *Id.* at 1448, para. 126.

⁸² *Id.* at 1445-46, para. 122.

analyzing satellite latencies? Are there other sources of information on satellite broadband latency that the Commission should use?

b. Mobile Broadband Service

39. *Discussion.* Finally, we seek comment on whether we should develop a latency benchmark for mobile broadband services. Is a latency benchmark an appropriate tool to ensure that mobile customers are able to use advanced telecommunications services over their mobile broadband connection? We also seek comment on the specific latency standard, if any, that the Commission should adopt. How might the effect of latency on the consumer experience using mobile LTE services be different from the effect of latency on fixed services? Could this justify a different latency standard, especially if the Commission elects to find that “advanced telecommunications capability” should be deemed to include consumer access to both fixed and mobile broadband service? Are there factors that would argue in favor of a different latency standard for mobile services than for fixed broadband services given the apparent differences between the two services?

40. In the *2015 Broadband Progress Report* the Commission noted it would continue to consider improvements to the mobile Measuring Broadband America latency data.⁸³ In seeking comment on this issue, we note that the *Seventeenth Mobile Wireless Report* indicates that mobile broadband services generally experience somewhat greater latencies than fixed services.⁸⁴ We also note that mobile latency can vary significantly based on technology, with LTE generally experiencing lower latency. Should the Commission rely on the findings from data sets such as the Mobile Measuring Broadband America program, Ookla, Rootmetrics, or Google M-Lab to assess mobile broadband latency? What other sources of information on mobile broadband latency should the Commission consider?⁸⁵ Should these data be used to determine latency requirements for mobile services?

3. Consistency

41. *Overview.* In this section, we seek comment on whether to incorporate measurements of service consistency into our definition of advanced telecommunications capability. Consistency of service will necessarily reflect the other benchmarks discussed above. Such a standard could include consideration of variation in the speeds consumers actually experience when using their service. We could also consider variations in latency (*i.e.*, jitter) experienced by consumers over time in this context. In addition, we could consider the effect of weather conditions and physical obstacles on service quality.

42. *Background.* As the Commission explained in the *2015 Broadband Progress Report*, “consumers want access to a high-speed service that is reliable . . . and of consistent quality.”⁸⁶ Although the Commission did not establish a service consistency benchmark for advanced telecommunications capability, it noted that the *2014 Measuring Broadband America Report* based on fixed broadband measurements had “considered for the first time, not only whether consumers are receiving the speeds advertised, but whether those speeds are reached consistently.”⁸⁷ Service consistency is likely to be of particular importance for users of certain advanced services, such as VoIP, distance learning, or

⁸³ *Id.* at 1392-93, para. 25.

⁸⁴ *See e.g.*, *Seventeenth Mobile Wireless Report*, 29 FCC Rcd at 15412, para. 206. The Commission also noted that, “the FCC test selects the server with the fastest latency, chosen from an initial set of possible test servers, which may bias subsequent tests towards higher performance. It is possible that consecutive tests in the same place, on the same provider, and at about the same time may test to different servers.” *Id.*

⁸⁵ In addition to the Commission’s Measuring Mobile Broadband America data, the *Seventeenth Mobile Wireless Report* also mentions Ookla Data and CalSPEED Data but does not report latency estimates for these data sources. *Seventeenth Mobile Wireless Report*, 29 FCC Rcd at 15412, paras. 205, 207.

⁸⁶ *2015 Broadband Progress Report*, 30 FCC Rcd at 1380, para. 11.

⁸⁷ *Id.* at 1392, para. 24; *see also 2014 Fourth Measuring Broadband America Report* at 11.

telemedicine, typically provided over fixed broadband facilities.⁸⁸ Consequently, in addition to speed and latency, the *2015 Broadband Progress Report* discussed “whether service at the relevant speed is available on a consistent and reliable basis” as a factor relevant to the definition of advanced telecommunications capability.⁸⁹

a. Fixed Broadband Service

(i) Fixed Terrestrial Broadband Service

43. *Discussion.* We first seek comment on whether a standard for service consistency should be included in our definition of advanced telecommunications capability as applied to fixed terrestrial broadband, and, if so, which factors should be considered? Should we analyze variability in speed? In the *Tenth Broadband Progress Notice of Inquiry*, the Commission sought comment on variations in latency or jitter as a potential characteristic to consider in establishing a broadband benchmark.⁹⁰ Would measurement of jitter be helpful in assessing fixed terrestrial broadband service quality? What other factors, if any, might be relevant?⁹¹ How should the Commission analyze consistency of service for fixed terrestrial broadband? The *2014 Measuring Broadband America Report* presented data on broadband speed consistency by tracking the minimum actual speeds experienced by consumers, relative to their advertised speeds, at a given frequency. For example, using an 80/80 specification (80 percent of consumers, 80 percent of the time) the *2014 Measuring Broadband America Report* found that “80 percent of Cablevision and Verizon Fiber customers receive over 100 percent of advertised download speeds 80 percent of the time.”⁹² Should the Commission set a speed consistency benchmark using this type of methodology? If so, what standard would be appropriate? Should a consistency benchmark be set for latency using a similar approach? If so, what benchmark should the Commission adopt? As with latency, we note that the Commission does not currently have granular, geographic data on broadband service consistency, an issue that exists for satellite and mobile broadband in addition to fixed terrestrial broadband. How, if at all, should this affect our treatment of service consistency as a potential benchmark for defining advanced telecommunications capability? Should the Commission rely on data collected for the *Measuring Broadband America Report* insofar as it addresses service consistency issues? Are there other data sources or analytical approaches that the Commission should consider in measuring consistency of service for fixed broadband services?

(ii) Fixed Satellite Broadband Service

44. *Discussion.* We also seek comment on whether the Commission should apply consistency of service standards for satellite broadband service, and, if so, whether those standards should differ from those for fixed terrestrial service. As the Commission has noted in the *2015 Broadband Progress Report*, satellite “may be affected by weather, topographical features, or network congestion.”⁹³ Are there characteristics of satellite broadband service that may warrant application of a consistency of service standard that differs from that for fixed terrestrial broadband service? Are there other issues

⁸⁸ See *2015 Broadband Progress Report*, 30 FCC Rcd at 1392, 1436, paras. 24, 102.

⁸⁹ *Id.* at 1392-93, paras. 24-25 (stating that “consistency could affect whether a service should be considered advanced telecommunications capability”); see also *Tenth Broadband Progress Notice of Inquiry*, para. 30 (seeking comment on “other technical issues that we should consider when establishing a benchmark [for advanced telecommunications capability], such as jitter, or consistency (i.e., reliability) of service”).

⁹⁰ *Tenth Broadband Progress Notice of Inquiry*, 29 FCC Rcd at 9762, para. 30.

⁹¹ See e.g., *Rural Health Care Support Mechanism*, WC Docket No. 02-60, Report and Order, 27 FCC Rcd 16678, 16732, para. 116 (2012) (seeking comment on “the minimum quality of service standards necessary to meet health IT needs, and whether the broadband services program should include a minimum quality of service requirement (including metrics such as reliability, bit delay, jitter, packet dropping probability, and/or bit error rate)”).

⁹² *2014 Fourth Measuring Broadband America Report* at 25.

⁹³ *2015 Broadband Progress Report*, 30 FCC Rcd at 1392, para. 24.

unique to satellite that the Commission should be aware of in evaluating consistency of satellite broadband service? Are there particular sources of satellite performance data that the Commission should consider in evaluating satellite broadband service consistency?

b. Mobile Broadband Service

45. Finally, we seek comment on whether to establish a consistency of service benchmark for mobile broadband, and if so, what the standards should be. In this regard, we seek comment on whether there are characteristics of mobile service that could make consistency of service standards less meaningful for consumers than in the context of fixed broadband service? In considering this issue, we also note that because mobile broadband travels with the user, service quality may vary at different locations due to a variety of factors, including the particular network technology deployed in a given area, network congestion, or physical interference.⁹⁴ We seek comment on whether and how each of these issues should factor into our analysis of mobile broadband consistency of service.

46. We seek comment on how the Commission should set standards for consistency of service for mobile broadband. As the Commission indicated in the *2015 Broadband Progress Report*, the Measuring Broadband America mobile program currently gathers and analyzes data on mobile broadband performance.⁹⁵ There are other data sets available from Ookla, Rootmetrics, or Google M-Lab as well. Are there other data sources on broadband service consistency that the Commission should consider? To the extent that relevant mobile data are available, should the Commission use any of this data to analyze mobile broadband consistency of service? Are there other data sources on broadband service consistency that the Commission should consider?

D. Criteria and Standards for School and Library Broadband Access

47. *Background.* Section 706 directs the Commission to focus particularly on the deployment and availability of advanced communications capability to “elementary and secondary schools and classrooms.”⁹⁶ However, as the Commission explained in the *2015 Broadband Progress Report*, “the broadband needs of schools are likely to be significantly greater than the needs of most households,” therefore the Commission found it appropriate to use higher speeds in determining whether broadband is being deployed to elementary and secondary schools in a reasonable and timely fashion.⁹⁷ Accordingly, in the *2015 Broadband Progress Report*, the Commission applied a separate, two-prong standard for tracking the deployment of broadband in American schools. Building on assessments in the recently released *E-rate Modernization Order*, the Commission adopted a “shorter term benchmark of 100 Mbps per 1,000 students and staff and [a] long-term speed benchmark of 1 Gbps per 1,000 students and staff.”⁹⁸ The Commission found that this approach was well supported by the extensive record in the E-rate proceeding, and was consistent with our interpretation of section 706 in prior Reports.⁹⁹

48. *Discussion.* We propose to retain the standard laid out in the *2015 Broadband Progress Report*, and seek comment on such an approach. We also seek comment on whether these standards ought to be updated, and whether further proceedings are appropriate to revisit the standard for evaluating broadband deployment to American classrooms.

⁹⁴ *Id.* at 1442-44, para. 115-19.

⁹⁵ *Id.* at 1392, para. 25.

⁹⁶ 47 U.S.C. § 1302(b).

⁹⁷ *2015 Broadband Progress Report*, 30 FCC Rcd at 1410, para. 61.

⁹⁸ *Id.* at para 62.

⁹⁹ *Id.*

III. OTHER FACTORS AFFECTING DEPLOYMENT AND AVAILABILITY

49. *Background.* In the *2015 Broadband Progress Report*, we “affirmed the Commission’s prior findings that, for purposes of our analysis, the terms broadband ‘deployment’ and ‘availability’ are broader than [the] mere physical presence of broadband networks.”¹⁰⁰ The Commission found that it should evaluate a variety of factors affecting access to broadband, including service quality and adoption by consumers, as well as physical network deployment, when determining whether broadband is being deployed to all Americans in a reasonable and timely fashion.¹⁰¹ In the *2015 Broadband Progress Report* the Commission discussed each of these factors as well as privacy and security concerns.¹⁰²

50. *Discussion.* We continue to believe that consideration of factors beyond mere physical network deployment is appropriate in reaching our ultimate section 706 determination of whether broadband is being deployed to all Americans on a reasonable and timely basis. Indeed above we seek comment on whether to develop a number of service quality standards that would be part of the definition of advanced telecommunications capability along with the speed benchmark. These include service quality standards for latency and consideration of whether service is available on a consistent basis. In addition to those factors, we propose to continue to consider pricing, data allowances and adoption as additional factors relevant to our determination of whether advanced telecommunications capability is actually available to consumers under section 706. We emphasize that this consideration of pricing and data allowances is consistent with our examination of these issues in prior section 706 inquiries and intended solely for use as an input in making the determination under section 706 concerning the availability of advanced telecommunications capability.

51. We seek comment on our proposal to continue considering factors beyond physical deployment in determining whether broadband is being deployed to all Americans in a reasonable and timely fashion. We also request comment on the additional factors that we should consider. Are the factors previously considered by the Commission appropriate? Should any of these factors be dropped from consideration, and, if so, why? Should the Commission consider additional factors in this regard? In particular, we seek comment on whether the Commission should consider the extent to which consumers have access to multiple service providers in this context.

52. In our *2015 Broadband Progress Report* we concluded that “promoting consumer trust in digital technology is of critical importance to consumers and businesses alike” because “there are indications that there is a correlation between [security and privacy] concerns and non-adoption of broadband.”¹⁰³ We seek comment on how security concerns should be factored into our assessment of whether reliable broadband service is available to all Americans.

IV. BROADBAND DATA SOURCES AND ANALYSIS

53. *Overview.* In determining whether broadband is being made available to all Americans on a reasonable and timely basis, the Commission considers the physical presence of broadband networks meeting our speed benchmarks. In addition, the Commission historically also has considered other factors, including price and consumer broadband adoption, in making its determination.¹⁰⁴ In this section, we describe and seek comment on the data sources that address these issues. In particular, we emphasize changes in the data sources that are likely to affect our future analysis and seek comment on how best to assess the availability of broadband using these data sources, whether other data sources are available, and whether additional studies and/or reports should be included in our assessment.

¹⁰⁰ *Id.* at 1410-11, para 64.

¹⁰¹ *Id.* at 1411, para 65.

¹⁰² *Id.* at 1428-39, paras. 90-106, 1442-44, paras. 114-119.

¹⁰³ *2015 Broadband Progress Report*, 30 FCC Rcd at 1438, para. 104.

¹⁰⁴ *Id.* at 1410-11, paras. 64-65.

A. Physical Deployment Data and Related Issues – Transition to Form 477

54. *Background.* In the last several Broadband Progress Reports, the Commission relied on State Broadband Information (SBI) data to determine the deployment footprint associated with advertised speeds for fixed terrestrial broadband.¹⁰⁵ The SBI program ended with the collection of broadband data as of June, 2014.¹⁰⁶ In preparation for the conclusion of the SBI data collection program, the Commission revised Form 477 in 2013 to collect broadband deployment data to replace and to improve upon the SBI Data, beginning with an overlapping collection of data as of June 2014.¹⁰⁷

55. While the FCC's collection of broadband deployment data is quite similar to the prior SBI collection,¹⁰⁸ there are a number of important differences. First, the revised Form 477 data collection is mandatory, and filing parties must certify the accuracy of their filings.¹⁰⁹ Second, the revised Form 477 data collection uses a uniform nationwide collection methodology and thereby reduces the likelihood of inconsistencies or inaccuracies in the reported broadband coverage arising from SBI awardees using different reporting methods.¹¹⁰ Third, the new procedures collect deployment data only from facilities-based providers, and require these filers to submit information separately for business customers and residential customers using a uniform method to designate an area as being served.¹¹¹

56. In addition, the revised Form 477 collection moves away from collecting broadband speeds in predetermined speed tiers as the SBI collection did.¹¹² Instead, providers of fixed broadband services report the maximum advertised speed for each technology used to offer service in each census block.¹¹³ This collection methodology should result in data that better reflect each provider's service capabilities and improve the accuracy of the reported speeds experienced by consumers (e.g., by

¹⁰⁵ *Id.* at 1393, para. 26 n.137.

¹⁰⁶ Press Release, Anne Neville, Director State Broadband Initiatives, NTIA, National Broadband Map has Helped Chart Broadband Evolution (Mar. 23, 2015), <http://www.ntia.doc.gov/blog/2015/national-broadband-map-has-helped-chart-broadband-evolution>.

¹⁰⁷ *Modernizing the FCC Form 477 Data Program*, WC Docket No. 11-10, Report and Order, 28 FCC Rcd 9887, 9888, paras. 2-3 (2013) (*Modernizing Form 477 Order*). See also *id.* at 9892-93, para. 14, which notes that we need to collect deployment data, in part, "to assess annually the state of broadband availability."

¹⁰⁸ In general, both sets collect deployment data for the same types of fixed technologies; however the revised Form 477 Data template specifies some additional fixed technologies including: ADSL2, ADSL2+, VDSL, and add an additional cable modem category. (Cable Modem DOCSIS 1, 1.1 or 2.0 is no longer captured in the Cable Modem Other category.) See *Wireline Competition Bureau Releases Data Specification for Form 477 Data Collection*, WC Docket No. 11-10, Public Notice, 28 FCC Rcd 12665, 12667 (Wireline Comp. Bur. 2013) (*Data Specifications for Form 477*). In addition, the revised Form 477 data will have much more detailed mobile wireless deployment data including shapefiles showing geographic coverage for each transmission technology deployed in each frequency band, including the minimum upload and download speeds that users should expect to receive. *Id.* at 12671-72.

¹⁰⁹ See Form 477 Filing Instructions (June 30, 2015), <https://transition.fcc.gov/form477/477inst.pdf>.

¹¹⁰ *Modernizing Form 477 Order*, 28 FCC Rcd at 9897, para. 23; see also *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*, GN Docket No. 10-159, Seventh Broadband Progress Report and Order on Reconsideration, 26 FCC Rcd 8008, 8013-14, para. 9 (2011) (*Seventh Broadband Progress Report*).

¹¹¹ See Form 477 Filing Instructions (June 30, 2015), <https://transition.fcc.gov/form477/477inst.pdf>.

¹¹² SBI Data collect the following speed tiers: (1) 200 kbps; (2) 768 kbps; (3) 1.5 Mbps (4) 3.0 Mbps; (5) 6.0 Mbps; (6) 10.0 Mbps; (7) 25.0 Mbps; (8) 50 Mbps; (9) 100 Mbps; and (10) 1 Gbps. State Broadband Data and Development Grant Program, Notice of Funds Availability, 74 Fed. Reg. 32545, 32557, App. A. (July 8, 2009) (NTIA State Mapping NOFA).

¹¹³ *Data Specifications for Form 477*, 28 FCC Rcd at 12669-70.

specifying that a download speed is 12 Mbps rather than specifying that it is at least 10 Mbps but less than 25 Mbps).

57. Moreover, the revised Form 477 changes the way the Commission collects mobile deployment data.¹¹⁴ First, where the SBI program collected download and upload speeds but not technology, and Mosaik data captured technology but not speed, the FCC's new Form 477 collection requires providers to submit shapefiles containing information about both speed and mobile broadband network technology (e.g., EV-DO, WCDMA, HSPA+, LTE, WiMAX).¹¹⁵ In addition, the Commission shifted away from collecting maximum advertised speed, as NTIA had done with the SBI data, to collecting minimum advertised speed for mobile broadband. Similar to fixed broadband, mobile broadband speed data are not collected in predetermined tiers.

58. *Discussion.* We seek comment on a number of issues that are raised by these changes in broadband deployment data sources. Pending completion of checks of the quality of data submitted, we expect that maximum advertised speeds as reported on Form 477 for fixed broadband (both terrestrial and satellite) are likely to be a reasonably good proxy for actual speeds.¹¹⁶ We expect to be able to rely on the speeds and footprints reported on Form 477 for our analysis of fixed terrestrial broadband. Further, we expect to rely on Measuring Broadband America data to confirm the relationship between advertised and actual speeds for fixed broadband, though we also may, in the future, need to revisit whether advertised speeds remain a good proxy for actual speeds.¹¹⁷ We seek comment on this approach and any alternatives.

59. We also seek comment on how to determine the deployment footprint of qualifying mobile broadband providers. Specifically, we seek comment on the use of service footprints collected by Form 477, combined with data from the Mobile Measuring Broadband America program, Ookla, Rootmetrics, or Google M-Lab.¹¹⁸ We also seek comment on whether use of minimum advertised speeds would tend to understate the actual speeds experienced by consumers. Are there alternative approaches to measuring mobile broadband speed or data sources for actual speeds that can be tied to geographic areas

¹¹⁴ 2015 *Broadband Progress Report*, 30 FCC Rcd at 1380, para. 10; *see also id.* at 1385, para. 17 (“We expect that the revised data collection will improve our ability to identify unserved areas and, in particular, may improve our mobile and satellite deployment estimates in the future.”).

¹¹⁵ *See Modernizing Form 477 Order*, 28 FCC Rcd at 9888, para. 3; *Data Specifications for Form 477*, 28 FCC Rcd at 12671-72. Shapefiles also contain information about the spectrum band associated with each shape.

¹¹⁶ In the 2014 *Measuring Broadband America Report*, the Commission compared participating consumers' advertised download speeds for their fixed broadband service (both terrestrial and satellite) with the actual speeds experienced by these consumers. The Commission found that speeds of the fixed services provided to these consumers generally met or exceeded speeds advertised to these consumers. *See 2014 Measuring Broadband America Report* at 14-15 (finding that the ISPs surveyed in the Report provided on average 101 percent of advertised speeds). For fixed terrestrial broadband services, the advertised speed for a particular service package is typically presented as a single speed, rather than as a range of speeds. Accordingly, these advertised speeds generally equate to the maximum advertised speed for the service package. *See, e.g., Comcast, Xfinity Internet*, <http://www.xfinity.com/internet-service.html> (last visited on Aug. 3, 2015) (advertising speeds “up to 3 Mbps” for its Economy Plus package, and “up to 25 Mbps” for its Internet Plus plan; AT&T, *U-Verse Offer Details*, <https://www.att.com/shop/u-verse/offer-Details.html?offerId=prod8020232> (last visited Aug. 3, 2015) (advertising speeds “up to 6 Mbps”); Google Fiber, *Austin Residential Plans*, <https://fiber.google.com/cities/austin/> (last visited Aug. 3, 2015) (advertising speeds “[u]p to 1,000 Mbps”).

¹¹⁷ *See supra* para. 42-43. Advertised speeds for a particular service offered by a particular provider are not useful as a proxy for actual speeds provided in conjunction with different service offerings or by different providers. For example, we may revisit this proxy to ensure that advertised gigabit speeds are not being used as a proxy for actual speeds associated with non-gigabit service offerings.

¹¹⁸ *See supra* paras. 40, 58-59.

that will allow us to evaluate where mobile broadband meeting a particular speed benchmark is and is not being deployed?

60. In addition, we seek comment on how best to report broadband speeds given the shift away from pre-determined speed tiers in the data collection. Should the Commission report deployment estimates for the same tiers used previously (e.g., 768 kbps/200 kbps, 10 Mbps/768 kbps and 25 Mbps/3 Mbps)? Since 768 kbps was a proxy for 1 Mbps, should we now substitute 1 Mbps for 768 kbps in reporting speeds?¹¹⁹ In the alternative, should we no longer report on speed tiers below the new fixed threshold? We also seek comment on the use of this approach for mobile broadband services. In addition, should we include, in the next broadband report, deployment estimates for fixed terrestrial broadband speeds above those used to define advanced communications services, possibly including thresholds such as 50 Mbps/5 Mbps or 100 Mbps without a required upload speed?

61. The new data from Form 477, as well as other currently available data sources mentioned in this section,¹²⁰ should allow the Commission to identify and analyze disparities in the availability of “advanced telecommunications capability” in urban, rural, and Tribal areas. We addressed this issue with regard to fixed terrestrial and mobile broadband service in the *2015 Broadband Progress Report*,¹²¹ and the new data on fixed terrestrial and mobile broadband deployment should allow us to continue to perform this type of analysis. We seek comment on this discussion, and on the availability of additional analyses and data sources that could shed further light on these issues.

B. Deployment to Elementary and Secondary Schools and Classrooms

62. *Background.* In the *2015 Broadband Progress Report*, we relied on the data developed in the *E-rate Modernization Order* proceeding to evaluate whether broadband deployment to schools and classrooms met the Commission Internet access benchmark of 100 Mbps per 1,000 users in the short-term and the 1 Gbps per 1,000 users benchmark in the longer-term.¹²² The Commission and USAC now collect, on a recurring basis, the type of information used in the *E-Rate Modernization Order*.¹²³ We seek

¹¹⁹ Previously, the Commission has relied on 3 Mbps/768 kbps as a proxy for the 4 Mbps/1 Mbps benchmark. See *2012 Eighth Broadband Progress Report*, 27 FCC Rcd at 10364, para. 29. The Commission no longer requires providers to submit data in predetermined speed tiers, so the proxy is no longer needed. See *Modernizing Form 477 Order*, 28 FCC Rcd at 9898-99, para. 25.

¹²⁰ See, e.g., *supra* paras. 58-59.

¹²¹ *2015 Broadband Progress Report*, 30 FCC Rcd at 1417-21, 1441-43, 1452-53, paras. 79-82, 113-115, 134-136, Tbls. 4, 5, 6, 15.

¹²² *Wireline Competition Bureau & Office of Strategic Planning and Policy Staff Report*, WC Docket No. 13-184, Staff Report, 29 FCC Rcd 9646, 9655, para. 18 (Wireline Comp. Bur. 2014) (*August 2014 E-Rate Staff Report*) (stating that the data provides “direct, ‘actual’ data on the connectivity status of about half of all U.S. public schools”); *Wireline Competition Bureau & Office of Strategic Planning and Policy Staff Report*, WC Docket No. 13-184, Staff Report (Wireline Comp. Bur. rel. Nov. 17, 2014) (*November 2014 E-Rate Staff Report*).

¹²³ The Commission created the new Form 471 to collect information from schools and libraries that apply for Universal Service funding for broadband connections. This form includes information about connectivity to the applicant, including the speed of service sought, the price of the services for which the applicant is seeking E-rate funding. The new Form 471 also identifies schools and libraries as located in rural or urban areas, based upon census definitions. Beginning with funding year 2015, schools and libraries located in areas that are not located in urban areas, as defined by the most recent decennial Census, will be considered rural for the purposes of the E-rate program. *Modernizing the E-rate Program for Schools and Libraries*, WC Docket No. 13-184, Report and Order and Further Notice of Proposed Rulemaking, 29 FCC Rcd 8870, 8957, paras. 222-24 (2014) (*E-rate Modernization Order*). The new Form 471 data are available to the public on the USAC website, and we expect that this information will be useful in identifying what services are available to schools and libraries and the extent to which progress is being made. See Universal Service Administrative Company (USAC), Schools and Libraries (E-Rate), Download Form 471 Information, <https://slweb.universalservice.org/form471publicdatatool/app/#/> (last visited July 16, 2015).

comment on whether we should consider this data in the process of making the determination required by section 706 of the Act. The Commission created a revised FCC Form 471 (Form 471) for Funding Year 2015 (July 1, 2015 to June 30, 2016) to collect information from schools and libraries that apply for E-rate support for broadband connections. The Form 471 includes information about connectivity to the applicant, including the speed of service sought, the price of the services for which the applicant is seeking E-rate funding, and also identifies whether schools and libraries as located in rural or urban areas based upon census definitions.¹²⁴ The new Form 471 data are available to the public on the USAC website,¹²⁵ and we expect that this information will be useful in identifying what services are available to schools and libraries and the extent to which progress is being made.

63. *Discussion.* The Commission has begun to review these data, but has not reached any conclusions concerning the adequacy of broadband deployment to schools and libraries. However, the Commission has taken a number of steps designed to facilitate access to broadband services by schools and libraries. For example, the Commission is funding all requests for support for Funding Year 2015.¹²⁶ Recent reforms to permit support for self-provision of broadband facilities will also become effective for Funding Year 2016.¹²⁷ In addition, the Commission has taken steps to release substantially more information concerning E-rate support than it has in the past.¹²⁸ We seek comment on the Form 471 data concerning schools and libraries and invite interested parties to submit their analyses of the trends indicated by this new information.¹²⁹

C. Broadband Performance Data

1. Fixed Broadband Performance

64. *Background.* This section addresses data on broadband service quality, including whether actual speeds meet or exceed advertised speeds, latency and service consistency in terms of speed and latency (*i.e.*, jitter). Our analysis of broadband availability presented in the *2015 Broadband Progress Report* considers factors beyond physical deployment, including indicators of broadband service quality or performance.¹³⁰ In the *2015 Broadband Progress Report* we summarized the findings of the

¹²⁴ Beginning with funding year 2015, schools and libraries located in areas that are not located in urban areas, as defined by the most recent decennial Census, will be considered rural for the purposes of the E-rate program. For the 2010 Census, the Census Bureau defined urban areas as the densely settled core of census tracts or blocks that met minimum population density requirements (50,000 people or more), along with adjacent territories of at least 2,5000 people that link to the densely settled core. “Rural” encompasses all population, housing, and territory not included within an urban area. *E-rate Modernization Order*, 29 FCC Rcd at 8958, para. 223.

¹²⁵ See Universal Service Administrative Company (USAC), Schools and Libraries (E-Rate), *Download Form 471 Information*, <https://slweb.universalservice.org/form471publicdatatool/app/#/> (last visited July 16, 2015).

¹²⁶ *Wireline Competition Bureau Announces Carry-Forward of Unused E-rate funds for Funding Year 2015*, CC Docket No. 02-6, Public Notice, DA 15-599 (Wireline Comp. Bur. rel. May 8, 2015).

¹²⁷ *Modernizing the E-rate Program for Schools and Libraries Connect America Fund*, WC Docket Nos. 13-184, 10-90, Second Report and Order on Reconsideration, 29 FCC Rcd 15538, 15555, para. 43 (2014).

¹²⁸ *E-rate Modernization Order*, 29 FCC Rcd at 8935-37, paras. 158-60.

¹²⁹ The form requires the applicant to answer whether the request is for specific internet access speeds. There may be differences in applicants’ reporting of these figures depending upon their interpretation of the question, for example, how does school system respond to the question about internet speed if it is phasing in upgrades to its system over time.

¹³⁰ *2015 Broadband Progress Report*, 30 FCC Rcd at 1435, para. 100. As indicated above, we are proposing to adopt service quality standards for some of these factors as part of our definition of “advanced communications service.” See *supra* paras. 31-46.

2014 *Fourth Measuring Broadband America Report*.¹³¹ In that Report, the Commission, for the first time, presented results on “service consistency” for ISPs serving residential consumers. This data included information on ISPs that cover 80 to 85 percent of non-rural consumers.¹³² Wireline providers were evaluated according to thirteen separate measurements, with a focus on speed of service and latency.¹³³

65. *Discussion.* The Commission continues to monitor the performance of fixed terrestrial services and has made the data available to the public as part of its open data policy.¹³⁴ We seek comment and analysis of the data. We also invite comment on whether there are other analyses of performance measurements that we should consider and, if so, what these analyses show.

2. Mobile Broadband Performance

66. *Background.* The performance of mobile broadband services can be affected by a number of factors, including the mobile wireless technology deployed in a particular area, the backhaul technology used, as well as the end user’s signal strength, the level of network congestion, and interference. These latter factors can be influenced by the distance between the user and the cell tower, the number of customers using their service within the cell tower coverage area, terrain and obstructions.¹³⁵

67. Some of the available data sources that could be used to assess mobile broadband performance include, Ookla’s Speedtest mobile app, CalSPEED drive-test data collected by the California Public Utility Commission,¹³⁶ and the Commission’s Measuring Mobile Broadband America project which was expanded to include mobile broadband by the release of two speed test apps.¹³⁷ These data sources use different methodologies to assess mobile broadband performance.

¹³¹ This report is based upon data collected for the entire month of September. *2014 Fourth Measuring Broadband America Report* at 14-18.

¹³² *2015 Broadband Progress Report*, 30 FCC Rcd at 1436-38, para. 103.

¹³³ Latency is a key factor in broadband performance. High round-trip latency may compromise the quality of voice services and may interfere with playing interactive games. It also affects the rate of information transmission for the transmission control protocol (TCP) which is used to support Internet applications and can limit the maximum actual speed achievable for the broadband service. *2014 Fourth Measuring Broadband America Report* at 20-21.

¹³⁴ To access validated data used in the *2014 Measuring Broadband America Report*, and to access raw bulk data from the September 2013 testing period, see FCC, Measuring Broadband America 2014, *Tabular Test Results*, <https://www.fcc.gov/measuring-broadband-america/2014/tabular-test-results-fixed-2014> (last visited May 6, 2015).

¹³⁵ See *Seventeenth Mobile Wireless Report*, 29 FCC Rcd at 15405, para. 190; *Seventh Broadband Progress Report*, 26 FCC Rcd at 8083-84, Appx. F, para. 17.

¹³⁶ As part of a grant from NTIA, the California Public Service Commission created and implemented CalSPEED, a program to measure mobile broadband speeds and service quality using an Android mobile crowdsourcing application. The program also performs semi-annual field testing of mobile broadband service quality throughout California. The California PUC argues that the CalSPEED is more accurate representation of quality of service, in part, because it does not filter out any of its results, *i.e.*, if the webpage fails to load, the result is a valid representation of the user’s experience. Comments of the California Public Utilities Commission, GN Docket No. 14-126, at 5-6 (filed Sept. 4, 2014) (*2015 Broadband Progress Report CA PUC Comments*). One component of the CalSPEED program is that, at each location, tests were done using the latest Android phone and USB network device on a Windows based netbook for each of the four major carriers. *Id.* at Appx., p. 3. See also *id.* at Appx., pp. 6-7, 25-26, 30-31.

¹³⁷ The Commission released a speed test app for Android phones in November of 2013 and a speed test app for iPhones in early 2014. The Commission’s speed apps use smartphone-based technology to collect anonymized broadband performance data from volunteers participating in a crowdsourcing initiative. The app for Android phones can be set up to run manually or to run periodically in the background. In contrast, the app for iPhones can only execute the speed test manually because iPhone devices do not have automated testing capability. The total amount of data used by the application is configured by default not to exceed 100 MB per month. The tests are
(continued...)

68. The data collected using the FCC's speed test app as part of the Measuring Mobile Broadband America measures mobile broadband performance in at least four categories, including but not limited to, download speed, upload speed, latency, and packet loss. In addition, several passive metrics are recorded, including, signal strength of the connection, and the device manufacturer and model. The *Seventeenth Mobile Wireless Report* presents performance results based upon the FCC Measuring Mobile Broadband program, California's CalSPEED program¹³⁸ and other data sources.¹³⁹

69. *Discussion.* We seek comment on data sources reported in the December 2014 *Seventeenth Mobile Wireless Report* and other data sources we can use to assess the performance of mobile broadband services. We seek comment on how we might appropriately incorporate these data into our consideration of the availability of mobile broadband services. We also request information on whether other states or entities are testing the reliability and performance of mobile broadband networks, and if so, what these analyses have found.¹⁴⁰

D. Other Sources of Performance Data

70. In addition to the data sources discussed above, we seek comment on new and alternative sources of publicly or commercially available broadband performance data. We note that broadband networks automatically generate information on network performance, which is critical to efficient network management.¹⁴¹ We seek comment on whether such data is publicly or commercially available, and, if so, whether the Commission can, or should, make broader use of it in our analysis of broadband performance. We note that in seeking comment on passively generated network data we are looking toward commercially or publicly available sources and are not seeking comment on broadband providers or edge providers submitting their own data for our use in our analysis.

71. We also note that third parties regularly publish reports on diverse aspects of Internet performance based on information collected as part of their management or operation of Internet networks. The Commission currently utilizes these reports in producing its annual broadband progress

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engineered not to interfere with a user's broadband Internet use and the application can be configured to not perform any automated background testing. However, manual testing can lead to biased results when performed only at specific times or places, and may provide a less accurate picture of overall broadband performance. Automatic background tests contribute more-valuable, high-quality data that help inform our reports and provide the most accurate data about mobile broadband performance. FCC, Measuring Broadband America Mobile Broadband Services (Sept. 29, 2014), <https://www.fcc.gov/measuring-broadband-america/mobile>.

¹³⁸ The California PUC asserts its CalSPEED application yields more reliable performance data than the methodologies used by the FCC. *2015 Broadband Progress Report* CA PUC Comments at 6.

¹³⁹ *Seventeenth Mobile Wireless Report*, 29 FCC Rcd at 15406-08, paras. 193-197. For example, based upon Ookla data, the reported median download speed for 2014 is 2.90 Mbps (Sprint PCS), 9.79 Mbps (AT&T), 9.89 Mbps (T-Mobile) and 10.74 Mbps (Verizon Wireless). Based upon the FCC data, the reported median download speeds for November 2013 to July 2014 is 1.40 Mbps (Sprint PCS), 6.33 Mbps (AT&T), 9.41 Mbps (Verizon Wireless) and 9.93 Mbps (T-Mobile). *Id.* Table VI.C.1 and Table VI.C.2 Based on FCC Speed Test App data as of July, 2014, latency was 98 ms. (T-Mobile), 102 ms (Verizon Wireless), 124 ms (AT&T) and 135 ms (Sprint).

¹⁴⁰ We note that the California PUC is continuing its testing and that at least one other state may be initiating a similar program. Rob Osborn, *Spring 2015 Field Testing Has Begun, California Drive Testing – Mobile Broadband* (May 4, 2015), <http://calbroadbanddrivetest.blogspot.com/2015/05/spring-2015-field-testing-has-begun.html>; Rob Osborn, *CalSpeed goes to Virginia, California Drive Testing – Mobile Broadband* (Mar. 20, 2015), <http://calbroadbanddrivetest.blogspot.com/2015/03/calspeed-spawns-app-for-virginia.html> (reporting that Virginia Tech's Center for Geospatial Information Technology recently created its own mobile speed test app using the CalSPEED source code. DataCardinal will be used/marketed by the state to help citizens in Virginia determine and map the speed of their Internet connection).

¹⁴¹ See, e.g., Cisco, *Measuring IP Network Performance* (2003), http://www.cisco.com/web/about/ac123/ac147/archived_issues/ipj_6-1/measuring_ip.html.

report. However, these reports, including publications by Akamai, Sandvine, Cisco, and others, are often global or continental in scope.¹⁴² We seek comment on the extent to which more geographically disaggregated data, of the kind utilized in these reports, could aid the Commission's analysis of advanced telecommunications deployment and availability in the United States. Are there other publicly or commercially available data sources that make use of passively-generated network data, in addition to those discussed above, that the Commission might utilize in its inquiry under section 706?

72. Understanding that diverse hardware and software are employed in managing Internet networks, we recognize that performance data may not be easily collected and made available to third parties for analysis. Therefore, we also seek comment on any potential barriers that may prevent the Commission from analysing such passively generated network performance data.

E. Pricing Data and Usage Allowances

73. *Background.* In the *2015 Broadband Progress Report*, we indicated the Commission does not have a reliable source of information for actual prices paid by consumers for broadband services that we can use in the section 706 context for determining the availability of advanced telecommunications capability.¹⁴³ Nonetheless, sources of available data provide us with the ability to evaluate some consumer pricing. For example, the *Fourth International Broadband Data Report* reports that the average advertised price in the U.S. for a standalone fixed broadband plan with download speed greater than 15 Mbps and up to and including 25 Mbps increased from \$50.02 in 2012 to \$59.40 in 2013.¹⁴⁴ The report also indicates that the average price in the U.S. was \$1.65 per GB for standalone fixed broadband plans with usage caps and that the U.S. was the fourth lowest priced country.¹⁴⁵

74. Another source of information is the Commission's most recent Urban Rate survey, in which the Wireline Competition Bureau collected from providers prices for standalone fixed terrestrial broadband service offers in urban areas.¹⁴⁶ This survey suggested that the average monthly price for a 25 Mbps/3 Mbps service without a usage allowance was \$74.80 and that average monthly price for a 25 Mbps/3 Mbps service with a 250 GB usage cap was \$47.34.¹⁴⁷

75. The Commission has recently reported pricing data for mobile broadband services in the *Seventeenth Mobile Wireless Report*.¹⁴⁸ Data summarized in that report indicate that mobile high speed data services offered by the wireless providers are substantially more expensive than those offered by the

¹⁴² See, e.g., 2014 Sandvine Report; Cisco, *The Zettabyte Era: Trends and Analysis* (2014), http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-indexvni/VNI_Hyperconnectivity_WP.pdf; Akamai, *State of the Internet* (Q1 2015), <http://www.stateoftheinternet.com/resources-connectivity-2015-q1-state-of-the-internet-report.html>.

¹⁴³ *2015 Broadband Progress Report*, 30 FCC Rcd at 1435, para. 100.

¹⁴⁴ *Id.* at 1450, para. 130-32; *International Comparison Requirements Pursuant to the Broadband Data Improvement Act, International Broadband Data Report*, GN Docket No. 14-126, Fourth Report, DA 15-132, para. 34 (Int'l Bur. rel. Feb. 4, 2015) (*Fourth International Broadband Data Report*).

¹⁴⁵ *Fourth International Broadband Data Report*, para. 35.

¹⁴⁶ *Wireline Competition Bureau Announces Results of 2015 Urban Rate Survey For Fixed Voice and Broadband Services and Posting of Survey Data and Explanatory Notes*, WC Docket No. 10-90, 30 FCC Rcd 3687, 3688 (Wireline Comp. Bur. 2015) (*Results of 2015 Urban Rate Survey*) (describing survey sampling design).

¹⁴⁷ *Results of 2015 Urban Rate Survey*, 30 FCC Rcd at 3687-88 (Estimate of Average Monthly Rate (\$) = 13.8465 + 1.22028 D + 0.197281 U + 29.4602 UI + 11.5315 A, where D is the download speed in Mbps, U is the upload speed in Mbps, UI = 1 if usage allowance greater than or equal to 500 GB and 0 otherwise, A = 0 if usage allowance is greater than or equal to 500 GB and Log_{10} [usage allowance in GB] otherwise. For example, substituting 25/3 into the above formula yields $\$74.41 = 13.8465 + (1.22028 * 25) + .197281 * 3 + 29.4602$ (if unlimited) + 0 (if usage allowance is greater than or equal to 500 GB).

¹⁴⁸ *Seventeenth Mobile Wireless Report*, 29 FCC Rcd at 15391-92, para. 165.

fixed wireline providers.¹⁴⁹ Most of these plans are for LTE data service, which is usually advertised at 5 – 12 Mbps of average download speed.¹⁵⁰ For pre-paid mobile service, which tends to have more limited data plans and speed options, the *Seventeenth Mobile Wireless Report* reports an average price of \$50 – \$80 for only 2 – 5 GB of data.¹⁵¹ Also, as the *Report* states, “it is difficult to identify sources of information that track actual mobile wireless service prices in a comprehensive and consistent manner.”¹⁵²

76. *Discussion.* We seek comment on the usefulness of these price surveys for purposes of our analysis of the availability of advanced telecommunications capability. We also request comment on whether there are other data sources that could be helpful. We note that available sources for pricing data may not reflect actual prices paid by consumers. For example, such data may not reflect the impact of promotions, including bundle discounts, on the prices actually paid by consumers. In addition, prices offered at any given time may not reflect the prices paid by consumers who have not purchased recently (*i.e.*, consumers may be on legacy plans at higher or lower rates). Furthermore any examination of offered prices does not capture adoption patterns – the plans and prices consumers choose to subscribe to. Finally, offer prices do not capture the effect of any over-allowance charges that consumers pay. In particular, we seek comment on whether there are other data sources or approaches to capturing information on the prices consumers actually pay, including usage allowances. As in the past, we are seeking comment on broadband pricing and data allowances only as related to our section 706 analysis.

F. Adoption Data

77. *Background.* In the *2015 Broadband Progress Report*, the Commission presented overall broadband adoption rates as part of fulfilling our statutory obligation to determine whether broadband is available to all Americans.¹⁵³ We reported this information for the entire United States and for each state,¹⁵⁴ as well as for certain populations, including consumers residing in urban areas, rural areas and on Tribal lands.

78. *Discussion.* In evaluating and reporting broadband adoption rates, we propose to rely on the Form 477 as well as other data sources. The Commission’s revised Form 477 continues to collect broadband providers’ residential subscribership data, which are a major component of our adoption estimates. The revised Form 477 requires providers to report subscriber counts separately by residential and business customers, and to report the counts by the advertised maximum download and upload speed

¹⁴⁹ For instance, in one of its high-usage mobile plans, Verizon offers 60 GB of data per month at a cost of \$225, while AT&T offers 50 GB of data per month for \$375. *Seventeenth Mobile Wireless Report*, 29 FCC Rcd at 15391, Appx. V, Table V.A.v. For Sprint’s customers, 20 GB of data costs \$100, while T-Mobile offers unlimited data at \$80 for the first line. Sprint, *Data Plans*, http://www.sprint.com/landings/datashare/index_c.html?INTNAV=ATG:HE:UnlimitedPlan&view=unlimitedtalk (last visited July 6, 2015); T-Mobile, *Simple Choice Plan*, <http://www.t-mobile.com/cell-phone-plans/individual.html#tab-navigation> (last visited July 6, 2015). The largest regional mobile provider, US Cellular, offers 50 GB of data for \$375. U.S. Cellular, *Shared Connect Plans*, <http://www.uscellular.com/uscellular/plans/showPlans.jsp?plan-selector-type=shared&type=plans> (last visited July 6, 2015).

¹⁵⁰ See, e.g., Verizon Wireless, *4G LTE Speeds vs. Your Home Network*, <http://www.verizonwireless.com/mobile-living/network-and-plans/4g-lte-speeds-compared-to-home-network/> (last visited July 2, 2015).

¹⁵¹ *Seventeenth Mobile Wireless Report*, 29 FCC Rcd 15391-92, Appx. V, Table V.B.i – Table V.B.v.

¹⁵² *Id.* at para. 165; see also *id.* at 15328-29, para. 36.

¹⁵³ The adoption rate is the ratio of the number residential subscribers reported in the Form 477 data that purchase a service meeting a reported speed threshold divided by the number of households in which the reported speed threshold is available as determined by the SBI data.

¹⁵⁴ The adoption rates for certain states were withheld following confidentiality protocols used in the FCC’s Internet Access Reports.

combination.¹⁵⁵ For fixed broadband, providers report subscribership data at a relatively granular level (census tracts), and the Commission has calculated an adoption rate by speed by determining what fraction of homes where service is deployed have actually subscribed.

79. To report estimates of the adoption rate for households subscribing to a mobile broadband service, and estimates for households subscribing to both a fixed broadband and a mobile broadband service, we propose to rely on American Community Survey data. We have insufficient information to use the Form 477 data for these estimates because the subscription data on the Form 477 are collected from providers, who lack critical information needed for our analysis, such as the demographics of their customers or whether their customers choose to purchase services from multiple providers.

80. We also propose to rely upon Census Bureau data. In September 2014, the Census Bureau released the 2013 American Community Survey (ACS) 1 Year estimates for household Internet subscription by technology type, including mobile broadband subscription. We expect this data to be collected every year and the survey design is intended to yield estimates representative of the U.S. population. These data can be examined to evaluate adoption patterns for the United States as a whole, each state, urban areas, rural areas, and the largest 817 counties.¹⁵⁶

81. While ACS data does not include information on the speed of the Internet service households subscribe to, we note that it may be reasonable to assume that households reporting that they subscribe to a fiber service (5.1%), to a cable modem service (36.1%), or those that report having two or more fixed broadband services (8.8%) have 25Mbps /3Mbps service available to them.¹⁵⁷

82. We seek comment on these estimates as a means to assess adoption of fixed and mobile broadband services in this proceeding. ACS data, while not providing any information about the speed of subscriptions, provides a household-level view not available from Form 477 data (e.g., the fraction of homes with more than one fixed broadband subscription). Are there other sources or methods we should rely on to determine fixed broadband adoption rates? For mobile broadband, reliance on Form 477 introduces variables unique to the Form 477 collection of mobile data. First, mobile subscription data are collected only at the state level. Consequently, the data cannot be used to calculate adoption data at any level more granular than the state. Second, Form 477 data do not account for multiple mobile devices within single households. Household-level data from ACS are therefore more likely to be useful for reporting on adoption. We seek comment on whether there are other sources or methods we should rely on to determine mobile broadband adoption rates.

V. INTERNATIONAL COMPARISONS

83. *Background.* Section 706 requires the Commission to include an international comparison of broadband service capability and prices in its annual broadband progress report.¹⁵⁸ The

¹⁵⁵ See *Modernizing Form 477 Order*, 28 FCC Rcd at 9888, para. 3; *Data Specification for Form 477*, 28 FCC Rcd at 12675-77.

¹⁵⁶ These data can be found at United States Census Bureau, *American FactFinder*, http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_13_1YR_B28002&prodType=table (last visited June 30, 2015). Data for rural and urban areas are available in the summary file for the 2013 American Community Survey 1 Year estimates. These 817 counties collectively account for almost 84 percent of U.S. households.

¹⁵⁷ Because the data is aggregated we cannot determine what fixed broadband services these households use, but given the report of two or more fixed broadband services, we assume at least one of them is likely to be cable or fiber service.

¹⁵⁸ 47 U.S.C. § 1303(b). Specifically, the Commission must “include information comparing the extent of broadband service capability (including data transmission speeds and price for broadband service capability) in a total of 75 communities in at least 25 countries abroad for each of the data rate benchmarks for broadband service utilized by the Commission to reflect different speed tiers.” *Id.* § 1303(b)(1); *see also id.* § 1303(b)(2).

2015 Broadband Progress Report incorporated by reference the International Bureau's *Fourth International Broadband Data Report*,¹⁵⁹ which noted that "[t]he available international broadband data, though not fully comparable to data on the United States, continue to suggest that the United States may lag behind a number of other developed countries with regard to some broadband metrics, and leads in some other metrics."¹⁶⁰ The Commission added that broadband deployment is more likely to be reasonable and timely if deployment in United States communities compares favorably to that in other countries, and less likely to be reasonable and timely if U.S. communities compare unfavorably.¹⁶¹

84. *Discussion.* We seek comment on data we should consider as we prepare the next International Broadband Data Report (IBDR). We also seek comment on how we can best include the required international comparison in the next broadband progress report.¹⁶² Specifically, we seek comment on data comparing U.S. broadband deployment, capabilities and prices with those in other developed nations, and ask interested parties to address how these comparisons should affect our statutory finding.¹⁶³ In addition, we seek comment on how the Commission can further improve the data and analysis to be included in the next IBDR.¹⁶⁴ Commenters are invited to provide any relevant qualitative and quantitative data enabling international comparisons under the Act.

85. In the *Fourth International Broadband Data Report*, we presented data on both advertised and actual broadband speeds in different countries, by using the publicly available raw speed test data (for fixed broadband in 2012 and 2013) provided by Ookla, proprietor of speedtest.net, on their Net Index site.¹⁶⁵ Are there other data sources that the Commission should consider?

86. We also seek input on the sources of pricing data. In this regard, we propose to use Google's broadband price data supplemented by mobile (smartphone plans) broadband data collected via online research to the extent possible for the next *IBDR*.¹⁶⁶ We seek comment on this approach.

VI. SECTION 706 FINDING

87. *Background.* In the *2015 Broadband Progress Report*, the Commission found that "advanced telecommunications capability was not being deployed to all Americans in a reasonable and timely fashion."¹⁶⁷ The Commission "reached this conclusion for several distinct and independent reasons."¹⁶⁸ In explaining this conclusion, the Commission stated that approximately 55 million Americans or 17 percent "lack access to service that satisfies the definition of advanced communications

¹⁵⁹ *2015 Broadband Progress Report*, 30 FCC Rcd at 1450, para. 130.

¹⁶⁰ *See Fourth International Broadband Data Report*, at para. 1.

¹⁶¹ *2015 Broadband Progress Report*, 30 FCC Rcd at 1412, para. 66, citing *Eighth Broadband Progress Report*, 27 FCC Rcd at 10400-01, para 135 n. 347.

¹⁶² *See generally Fourth International Broadband Data Report*.

¹⁶³ *Id.*

¹⁶⁴ *Id.*

¹⁶⁵ *See id.* at para. 8.

¹⁶⁶ In the *Fourth International Broadband Data Report*, we noted that Google publishes open source broadband price data (which includes both fixed and mobile prices for 106 countries) and that Google has recommended the Commission use this data in connection with the preparation of its IBDRs. *See Fourth International Broadband Data Report*, at para. 4 n.8. Although the International Bureau declined to use Google's dataset, it noted in the *Fourth International Broadband Data Report* that in the future, it may consider using Google's dataset as a primary source if Google's dataset is updated on a cycle that corresponds with preparation for and release of the IBDR. *See id.* at para. 9 n.18.

¹⁶⁷ *2015 Broadband Progress Report*, 30 FCC Rcd at 1452, para. 133.

¹⁶⁸ *Id.*

capability.”¹⁶⁹ The Commission also found that “disparities in rural areas and on Tribal lands, relative to urban areas, and the slow rate of deployment to these areas, also necessitate a negative finding.”¹⁷⁰ In addition, the Commission found that “approximately 35 percent of schools are without access to fiber” and concluded that this “further independently justifies a finding that advanced telecommunications capability is not being deployed to elementary and secondary schools in a reasonable and timely fashion.”¹⁷¹

88. *Discussion.* We invite comment on whether advanced telecommunications capability is being deployed to all Americans on a reasonable and timely basis in light of the data and analysis in this proceeding. We invite interested parties to address each of the factors that led to the Commission’s negative finding in the *2015 Broadband Progress Report*, including our finding concerning urban/rural disparities in the availability of advanced telecommunications capability, in light of new information and any changes to our analytical framework that may be adopted in this proceeding, such as those discussed in this Notice of Inquiry. We seek comment on any new considerations or information that would warrant a change in our negative finding in the *2015 Broadband Progress Report*. In particular, we invite interested parties to address whether there have been changes in the availability of advanced telecommunications capability that impact urban/rural disparities, and how the Commission should account for any such changes in making its section 706 determination.

VII. PROCEDURAL MATTERS

A. Ex Parte Rules

89. This proceeding shall be treated as a “permit-but-disclose” proceeding in accordance with the Commission’s *ex parte* rules.¹⁷² Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter’s written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (*e.g.*, .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission’s *ex parte* rules.

B. Comment Filing Procedures

90. Pursuant to sections 1.415, 1.419, and 1.430 of the Commission’s rules, 47 C.F.R. §§ 1.415, 1.419, 1.430, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using the Commission’s Electronic

¹⁶⁹ *Id.*

¹⁷⁰ *Id.* at 1452-53, para. 134.

¹⁷¹ *Id.* at 1454, para. 138.

¹⁷² 47 C.F.R. § 1.1200 *et seq.*

Comment Filing System (ECFS). *See Electronic Filing of Documents in Rulemaking Proceedings*, 63 Fed. Reg. 24121 (1998).

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: <http://apps.fcc.gov/ecfs>.
- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.
 - All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of *before* entering the building.
 - Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.
 - U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

C. Accessible Formats

91. To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an email to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

VIII. ORDERING CLAUSE

92. Accordingly, IT IS ORDERED that, pursuant to section 706 of the Telecommunications Act of 1996, as amended, 47 U.S.C. § 1302, and section 103(b) of the Broadband Data Improvement Act, 47 U.S.C. § 1303(b), this Notice of Inquiry IS ADOPTED.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

**STATEMENT OF
CHAIRMAN TOM WHEELER**

Re: *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, GN Docket No. 15-191.*

The fundamental principle of broadband policy, as set forth by Congress, is that all Americans should have access to robust broadband services, no matter where they live. With this Notice of Inquiry (“NOI”), we set about to quantify the status of achieving that policy goal.

Earlier this year, the Commission defined broadband as connections with throughput speeds of at least 25 Mbps downstream and 3 Mbps upstream. This standard recognizes how consumers actually use broadband at home today, and is “table stakes” in 21st century communications.

But the discussion in the 2015 Broadband Progress Report of the new speed benchmark emphasized fixed terrestrial broadband services. Even though we were unable to incorporate mobile into the analysis, the 2015 Broadband Progress Report found that “the day may be fast approaching when we would consider ‘advanced telecommunications capability’ to be fully deployed only in areas where consumers have access to both mobile and fixed high-speed broadband in light of the distinct characteristics of these services.” Building on the direction laid out in the 2015 Broadband Progress Report, this NOI now takes the next step by asking whether “advanced telecommunications capability” should be considered fully deployed only in areas where consumers have access to both mobile and fixed broadband. Doing so would recognize the growing use of mobile broadband by consumers.

The NOI also seeks comment on the urban/rural disparity in the deployment of advanced telecommunications capability, asks about speed benchmarks for satellite broadband, and delves further into whether the Commission should adopt latency and consistency benchmarks as a part of the determination of what constitutes broadband.

I look forward to a robust record informing our analysis.

**STATEMENT OF
COMMISSIONER MIGNON L. CLYBURN**

Re: *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*, GN Docket No. 15-191.

Today, it is especially noteworthy that we are launching this annual Inquiry to determine “whether advanced telecommunications capability is being deployed to *all* Americans in a reasonable and timely fashion.”¹ The language in the statute is unequivocal when it comes to “all Americans” having access to these services. What is also crystal clear is that too many of our citizens, who are low-income or living in rural and on Tribal lands, remain on the wrong side of the connectivity divide.

The data from the *2015 Broadband Progress Report* shows that access to a fixed 25/3Mbps connection is unavailable to 53% of Americans in rural areas, and 63% of Americans on Tribal lands and in the U.S. Territories. There is much more work left to do, and we cannot afford to declare victory until we address and close these persistent opportunity gaps.

This Notice also triggers the FCC’s annual obligation to pause and evaluate this dynamic, rapidly-changing ecosystem, and determine what factors, such as speed, are appropriate for the “advanced telecommunications” capabilities of today. When the FCC first began to adopt these reports, the agency was criticized for using the outdated speed of 200 kbps until 2008. And perhaps some of you in the room can remember when this was increased to a lightning speed of 768 kbps until 2010. Particularly through today’s lenses, there would be few who argue that this criticism was not warranted because the FCC must be forward-looking, and recognize the realities of today and the demands of an evolving marketplace.

With this in mind, I am pleased that the Notice seeks comment on including access to mobile broadband services in the definition of “advanced telecommunications capability,” and asks whether this analysis should be on par with fixed broadband or based on a different standard. Mobile broadband usage is significant in the United States, and for many, especially those of limited financial means, their primary access to the Internet may be mobile-only. According to the Pew Research Center, approximately 10% of all smartphone users, and 13% of low-income users, have no other access to the Internet, outside of their mobile device. And since over 40% of all households and 56% of low-income households are wireless-only, excluding mobile services in our analysis of “advanced telecommunications capability” would not be keeping up with the letter or spirit of the statute when it comes to considering the communications experiences and needs of “all” Americans.

The next report will mark the first time that the FCC has the opportunity to review updated information from the revised Form 477 deployment data. It is my hope, that we evaluate mobile broadband service in our analysis to be more inclusive as we determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion.

Thank you.

¹ 47 U.S.C. § 1302. Section 706 of the Telecommunications Act of 1996, Pub. L. No. 104-104, § 706, 110 Stat. 56, 153 (1996), as amended by the Broadband Data Improvement Act, Pub. L. No. 110-385, 122 Stat. 4096 (2008), as codified in Title 47, Chapter 12 of the United States Code. See 47 U.S.C. § 1301 et seq. (emphasis added).

**STATEMENT OF
COMMISSIONER JESSICA ROSENWORCEL**

Re: *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, GN Docket No. 15-191.*

This inquiry kicks off our annual examination of the state of broadband. It's important to chart our progress—because broadband is more than a technology, it's a platform for opportunity. Extending its reach across this country is our new manifest destiny, because it is an essential part of modern civic and commercial life. No matter who you are or where you live, you need access to modern communications if you want a fair shot at prosperity in the 21st century.

With this in mind, we ask questions—lots and lots of questions. We ask about deployment, adoption, speed, and demand. We also inquire about challenges in rural areas and on Tribal lands, where too many residents for too long have been consigned to the wrong side of the digital divide. In addition, we seek comment on mobile broadband in light of new Form 477 data. And while we keep in place our current 25 Megabit standard for broadband, we also ask about faster speeds in the future. I appreciate that we are forward-looking, because when we set big goals we can make big things happen. I look forward to the record that develops.

**STATEMENT OF
COMMISSIONER AJIT PAI
APPROVING IN PART AND DISSENTING IN PART**

Re: *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*, GN Docket No. 15-191.

Congress has asked us to “annually initiate a notice of inquiry concerning the availability of advanced telecommunications capability to all Americans.”¹ I approve this *Notice* to the extent it meets that statutory requirement.

But I cannot support the kabuki theater that recent section 706 proceedings have been and that this one is sure to be. Here is the sad reality: It doesn’t matter what the public says or what the data show. When this proceeding ends, the FCC will issue a negative finding about the state of broadband deployment. And that’s because such a finding is necessary to maintain the limitless regulatory authority over Internet service providers, and perhaps other online entities, that the Commission thinks it has under the Telecommunications Act of 1996.

To its “credit,” the Commission makes abundantly clear how it will reach this preordained result. The *Notice* is filled with page after page of new conditions, novel tests, and nebulous qualifiers designed to give the agency plenty of ways to ensure a negative finding when the pen hits the paper.²

The *Notice*’s headline-inspired 25 Mbps benchmark for fixed broadband is a prime example of the arbitrariness of this proceeding.³ The FCC uses that benchmark only when convenient—namely, to claim that broadband deployment is insufficient. But then, why did it decide that 10 Mbps was good enough for rural Americans when it poured \$10.8 billion into the Connect America Fund last year?⁴ And why did it pat itself on the back for giving low-income Americans a 10 Mbps option when it approved the AT&T/DirecTV transaction just last week?⁵ If the FCC truly believes a 25 Mbps connection “has become ‘table stakes’ in 21st century communications,”⁶ it shouldn’t relegate certain Americans to a slow lane for broadband. It shouldn’t tolerate, much less deepen, the divide between the digital haves and the rural and low-income have-nots.

¹ Telecommunications Act § 706(b).

² See, e.g., *Notice* at para. 8 (new condition that an area is unserved unless it has “both fixed and mobile broadband”); *Notice* at paras. 41–46 (new test for broadband “consistency”); *Notice* at paras. 50–52 (qualifying objective test by listing “additional factors” the FCC will consider such as “access to multiple service providers”).

³ *Notice* at para. 24.

⁴ *Connect America Fund et al.*, WC Docket Nos. 10-90, 14-58, 14-192, Report and Order, 29 FCC Rcd 15644, 15649, para. 15 (2014).

⁵ *Applications of AT&T Inc. and DIRECTV For Consent to Assign or Transfer Control of Licenses and Authorizations*, MB Docket No. 14-90, Memorandum Opinion and Order, FCC 15-94, Appendix B at Condition VI.2.a–b (July 28, 2015).

⁶ *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*, GN Docket No. 14-126, 2015 Broadband Progress Report and Notice of Inquiry on Immediate Action to Accelerate Deployment, 30 FCC Rcd 1375, 1480 (2015) (Statement of Chairman Tom Wheeler), available at <http://go.usa.gov/3scbB>.

Similarly, the FCC has found the benchmark a useful crutch when claiming that the broadband market is not competitive. Artificially ratchet up the standard, and voila! Fewer competitors will be found. But the FCC didn't limit its net neutrality rules to 25 Mbps service—it applied them to everything faster than dial-up.⁷ And in another vote today, the FCC is bending over backwards to manipulate the market for special access services with speeds of 1.5 Mbps.⁸

In sum: A serious agency would evaluate the market using consistent, objective criteria. But the FCC simply chooses the preferred policy outcome of the moment and works its way backward. For these reasons, I dissent in part.

⁷ *Protecting and Promoting the Open Internet*, GN Docket No. 14-28, Report and Order on Remand, Declaratory Ruling, and Order, 30 FCC Rcd 5601, 5682, para. 187 (2015).

⁸ *Technology Transitions et al.*, GN Docket No. 13-5, RM-11358, WC Docket No. 05-25, RM-10593, Report and Order, Order on Reconsideration, and Further Notice of Proposed Rulemaking, FCC 15-97 (Aug. 6, 2015).

**STATEMENT OF
COMMISSIONER MICHAEL O'RIELLY
APPROVING IN PART AND CONCURRING IN PART**

Re: *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, GN Docket No. 15-191.*

I approve the initiation of this Notice of Inquiry to enable us to meet our obligation to report to Congress on whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion. I am troubled, however, that the NOI is not designed to provide an honest assessment of broadband deployment in the U.S.

As I expected, the Notice proposes to retain the current 25/3 benchmark. After all, there's no reason to increase a benchmark that was irrationally set just seven months ago. For instance, while I have no bias against and openly acknowledge the benefits of the adoption of 4K TV, the vast majority of consumers still haven't purchased such sets, which was a key driver in the Commission's rationale for selecting 25/3 in the first place.¹

But make no mistake: I suspect that the measuring stick will be adjusted again if necessary to ensure a negative finding. In the last Report, the Commission previewed that "the day may be fast approaching" when a positive finding will require the availability of both fixed and mobile broadband at their respective benchmarks. Given the emphasis on mobile broadband in this Notice, that day appears to be exactly 180 days from now.

I continue to be disturbed by the notion and actions to treat fixed and mobile broadband differently in this context. As I previously mentioned, the Commission went out of its way – wrongly, I believe – to declare them as the same for purposes of our misguided Net Neutrality Order. Yet here, we are doing the opposite, similarly wrong once again.

The general reason that fixed and mobile broadband are used for different purposes by consumers today is because of current speed limitations from mobile broadband technology. If the speeds of mobile broadband increase, and they will as we approach the potential adoption of a new 5G standard in 2020, the offerings will likely be substitutable, not complementary, services from consumers' perspective, while still having vastly different architectures and resource issues relevant to the Net Neutrality discussion. Therefore, the idea that we should tie our section 706 report finding to the belief that consumers must have both is flawed and strains credibility.

Moreover, the text of section 706 asks whether "advanced telecommunications capability is being deployed" and the term is defined "without regard to any transmission media or technology". That suggests to me that as long as consumers have access to such capability, regardless of how it is provided, then the test is met. Therefore, there is no statutory basis to break out mobile from fixed and require that both be available to reach a positive finding. Why not just admit the Commission is moving the goalposts once again based on a false dichotomy for the purpose of trying to preserve its fake section 706 "authority"?

¹ Joseph O'Halloran, RAPIDTVNews, Full-scale IP and 4KTV Adoption Considerably Slower Than Expected (June 23, 2015), <http://www.rapidtvnews.com/2015062338814/full-scale-ip-and-4ktv-adoption-considerably-slower-than-expected.html#axzz3hlArBdJp>.

Perhaps the most frustrating part of this annual charade is that the Commission contorts itself to reach a predetermined negative finding in order to justify the increased regulation of broadband providers, but does not do the hard work of advancing broadband to consumers in unserved areas. The last Report was accompanied by an NOI with a few half-hearted suggestions for promoting deployment. To supplement those meager offerings, I suggested several measures, such as completing a plan for the Remote Areas Fund to bring service to the hardest to reach consumers, as well as streamlining regulations, such as the Part 32 accounting rules, that cause carriers to spend resources on regulatory compliance rather than deployment. Six months later, the Commission has made no apparent progress on any of these ideas. When the relevant Committees in Congress can explore numerous ways to promote broadband deployment, why is it that the Commission cannot do so? Let's roll up our sleeves and remove the barriers to deployment. Instead, the Commission seems intent on actively discouraging deployment by heaping on new obligations, as we just discussed in the Tech Transitions or "Emerging Wireline" item.

I appreciate that some of my concerns were accommodated, including elimination of the notion that a positive finding would require that providers engage in cyber risk management practices, like the NIST Cybersecurity Framework, as part of our statutory determination. This line of questioning raises many problems, including the attempt to coerce providers toward a standard that is supposed to be voluntary. It is completely inappropriate to shoehorn a subject like cybersecurity into the inquiry when the statute contemplates no such thing.

Nonetheless, I have strong misgivings about where this latest proceeding is headed, and I must concur on the substance of the NOI.