

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

In the Matter of
Inquiry Concerning Deployment of Advanced
Telecommunications Capability to All Americans
in a Reasonable and Timely Fashion
GN Docket No. 19-285

2020 BROADBAND DEPLOYMENT REPORT

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By the Commission: Commissioners O’Rielly and Carr issuing separate statements; Commissioners
Rosenworcel and Starks dissenting, and issuing separate statements.

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I. INTRODUCTION

1. The Federal Communications is charged with “encourag[ing] the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans . . . by removing barriers to infrastructure investment and by promoting competition in the telecommunications market.”¹ For the past three years, the Commission’s top priority has been closing the digital divide, in recognition that high-speed broadband and the digital opportunity it brings can be essential to innovation, economic opportunity, healthcare, and civic engagement in today’s modern society. We remain committed to ensuring that all Americans, including those in rural areas, Tribal lands, and disaster-affected areas, enjoy the benefits of a high-speed broadband connection.

2. Available evidence demonstrates that the digital divide continues to narrow as more Americans than ever before have access to high-speed broadband. The number of Americans lacking access to fixed terrestrial broadband service at 25/3 Mbps continues to decline, going down by more than 14% in 2018 and more than 30% between 2016 and 2018.² The number of Americans without access to 4G Long Term Evolution (LTE) mobile broadband with a median speed of 10/3 Mbps fell approximately 54% between 2017 and 2018.³ The vast majority of Americans—surpassing 85%—now have access to fixed terrestrial broadband service at 250/25 Mbps, a 47% increase since 2017.⁴ Over the same period, the number of Americans living in rural areas with access to such service increased by 85%.⁵ This progress has been fueled in part by an approximately \$80 billion investment in network infrastructure in 2018, the highest annual amount in at least the last decade.⁶ In 2019 alone, fiber broadband networks became available to roughly 6.5 million additional unique homes, the largest one-year increase ever, with smaller providers accounting for 25% of these new fiber connections.⁷ AT&T, Sprint, T-Mobile, and Verizon are also rapidly expanding their 5G capability, with 5G networks in aggregate now covering the majority of the country’s population, especially in urban areas, and more live launches planned for 2020.⁸

¹ 47 U.S.C. § 1302(a).

² See *infra* Fig. 1. When we provide broadband speed figures, we present both the download and upload speeds. In the case of 25/3 Mbps, for example, we refer to broadband service that has a download speed of 25 Mbps and an upload speed of 3 Mbps.

³ See *infra* Fig. 2b. Consistent with our conclusion in the *2019 Report*, we consider both fixed and mobile services as capable of meeting the definition of “advanced telecommunications capability.” *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, GN Docket No. 19-285, 2019 Broadband Deployment Report, 34 FCC Rcd 3857, 3860-61, para. 10 (2019) (*2019 Report*). We will continue to evaluate mobile deployment at speeds of 5/1 Mbps and 10/3 Mbps in this Report.

⁴ See *infra* Fig. 4.

⁵ *Id.*

⁶ See generally Patrick Brogan, Vice President for Industry Analysis, USTelecom, U.S. Broadband Investment Continued Upswing in 2018, at 1 (2019), <https://www.ustelecom.org/wp-content/uploads/2019/07/USTelecom-Research-Brief-Capex-2018-7-31-19.pdf>

⁷ Letter from Lisa R. Youngers, President and CEO, Fiber Broadband Association, to Marlene H. Dortch, Secretary, Federal Communications Commission, at 1 n.1, 2 n.5 (Dec. 16, 2019) (Fiber Broadband Association Dec. 16, 2019 *Ex Parte* Letter).

⁸ See AT&T, AT&T 5G Now Live for Consumers in 10 Markets (Dec. 13, 2019), https://about.att.com/story/2019/5g_launch.html (announcing live launch of AT&T 5G to consumers and businesses in the Birmingham, AL; Indianapolis; Los Angeles; Milwaukee; Pittsburgh; Providence, RI; Rochester, NY; San Diego, San Francisco, and San Jose, CA market areas, and plans to expand service availability to other markets

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3. With this Report, the Commission fulfills the Congressional directive to report each year on the progress made in deploying advanced telecommunications capability to all Americans.⁹ Given the compelling evidence before us, we find for the third consecutive year that advanced telecommunications capability is being deployed on a reasonable and timely basis. Despite this finding, our work to close the digital divide is not complete. The Commission will continue its efforts to ensure that all Americans have the ability to access broadband.

II. BACKGROUND

4. Section 706(b) of the Telecommunications Act of 1996 requires the Commission to annually “initiate a notice of inquiry concerning the availability of advanced telecommunications capability to all Americans (including, in particular, elementary and secondary schools and classrooms)”¹⁰ In conducting this inquiry, the Commission must “determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion.”¹¹ If that determination is negative, the Commission “shall take immediate action to accelerate deployment of such capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market.”¹²

5. On May 29, 2019, the Commission released the *2019 Broadband Deployment Report (2019 Report)* in which we concluded that advanced telecommunications capability was being deployed to all Americans in a reasonable and timely fashion.¹³ Consistent with the statute, the Commission focused its analysis in the *2019 Report* on the progress made in the deployment of fixed and mobile services.¹⁴ Since the *2019 Report*, the Commission has continued to aggressively promote deployment of advanced telecommunications capability by taking a number of actions to improve the regulatory environment and advance broadband deployment.¹⁵

6. On October 23, 2019, the Commission released the *Fifteenth Broadband Deployment Report Notice of Inquiry (Notice)*, seeking comment on how a range of factors may affect the deployment

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soon, as it works toward offering nationwide coverage in the first half of 2020); Sprint, Sprint 5g Overview (Nov. 1, 2019), <https://newsroom.sprint.com/sprint-5g-overview-1-2.htm> (touting Sprint 5G availability in parts of 9 cities—Atlanta, Chicago, Dallas-Ft. Worth, Houston, Kansas City, Los Angeles, New York City, Phoenix, and Washington, DC—as well as Sprint partnerships with multiple U.S. cities on Smart City applications leveraging Sprint’s 5G and IoT offerings); T-Mobile, T-Mobile 5G: It’s On! (Dec. 2, 2019), <https://investor.t-mobile.com/news-and-events/t-mobile-us-press-releases/press-release-details/2019/T-Mobile-5G-Its-On/default.aspx>; Verizon, When Will Verizon Have 5G? (Dec. 5, 2019), <https://www.verizon.com/about/our-company/5g/when-will-verizon-have-5g> (discussing current availability of Verizon’s 5G ultra-wideband service in parts of select cities, and plans for further rollouts in 2020).

⁹ 47 U.S.C. § 1302(b).

¹⁰ *Id.*

¹¹ *Id.* We note that the annual inquiry and determination continues to be required by section 706(b) despite Congress’s enactment of the RAY BAUM’S Act of 2018, which requires an assessment on the state of deployment of communications capability, including advanced telecommunications capability, as that term is used in section 706(b), in the biennial Communications Marketplace Report now required by section 13 of the Communications Act of 1934, as amended (Communications Act). See Consolidated Appropriations Act, 2018, Pub. L. No. 115-141, Div. P—RAY BAUM’S Act of 2018, §§ 401-402, 132 Stat. 348, 1087-90 (2018) (RAY BAUM’S Act of 2018); 47 U.S.C. § 163(b)(2) (added 2018); see also *Communications Marketplace Report et al.*, GN Docket No. 18-231 et al., Report, 33 FCC Rcd 12558, 12683-702, paras. 236-64 (Dec. 26, 2018) (*2018 Communications Marketplace Report*).

¹² 47 U.S.C. § 1302(b).

¹³ *2019 Report*, 34 FCC Rcd at 3858, 3896-97, paras. 4, 76.

¹⁴ *Id.* at 3859-60, paras. 8-9.

¹⁵ See *infra* Section V.

and availability of advanced telecommunications capability, and on whether and how to incorporate those factors into our section 706(b) analysis for both fixed and mobile services.¹⁶

III. EVALUATING DEPLOYMENT OF ADVANCED TELECOMMUNICATIONS CAPABILITY TO ALL AMERICANS IN A REASONABLE AND TIMELY FASHION

7. Consistent with past *Broadband Deployment Reports* and our proposal in the *Notice*, we holistically evaluate progress in the deployment of advanced telecommunications capability and whether that progress is occurring in a reasonable and timely fashion.¹⁷ Specifically, this Report will continue to evaluate deployment of fixed and mobile services over a five-year time period (2014-2018) using the same four categories presented in the *2018* and *2019 Reports*: (1) those with access to fixed services; (2) those with access to mobile LTE services; (3) those with access to both fixed *and* mobile LTE services; and (4) those with access to at least one of either fixed *or* mobile LTE services.¹⁸

8. We find substantial support in the record for continuing our use of a progress-based approach.¹⁹ As the Commission has previously found:

[A]nalyzing progress to determine whether deployment is occurring in a reasonable and timely fashion is the approach that is most consistent with the language of section 706, as the analysis of such progress enables the Commission to determine whether advanced telecommunications capability “is being deployed” in the manner that section 706 requires. The use of the present progressive tense—“is being deployed”—as well as the language requiring an evaluation of whether that deployment is “reasonable and timely” indicates that Congress intended that the Commission evaluate the current state of deployment to all Americans, not a rigid requirement that each and every American be served *at this moment*.²⁰

Examining the progress of deployment therefore best effectuates Congress’ charge to the Commission in section 706.

9. We agree with commenters that we must continue our efforts to close the digital divide and extend the reach of broadband deployment to all Americans.²¹ Section 706(a) mandates that we

¹⁶ See generally *Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, Fifteenth Broadband Deployment Report Notice of Inquiry, GN Docket No. 19-285, 34 FCC Rcd 10092 (2019) (*Notice*).

¹⁷ *2019 Report*, 33 FCC Rcd at 3859-60, para. 8; *Notice*, 34 FCC Rcd at 10094, para. 6; *Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, GN Docket No. 17-199, 2018 Broadband Deployment Report, 33 FCC Rcd 1660, 1663-64, paras. 10-13 (*2018 Report*).

¹⁸ *2019 Report*, 34 FCC Rcd at 3859, para. 8. See *infra* Section IV (discussing broadband deployment estimates and data sources for fixed and mobile services).

¹⁹ See, e.g., ACA Connects – America’s Communications Association (ACA) Comments at 3; ADTRAN, Inc. (ADTRAN) Comments at ii; CTIA Comments at 6; Fiber Broadband Association (Fiber Broadband Association) Comments at 1; Free State Foundation Comments at 3; ITTA Comments at 10; NCTA – The Internet and Television Association (NCTA) Comments at 1; USTelecom Comments at 12; Wireless Internet Service Providers Association (WISPA) Comments at 6; ADTRAN Reply at 2; Utilities Technology Council Reply at 4-5.

²⁰ *2018 Report*, 33 FCC Rcd at 1663, para. 11; see also *2019 Report*, 34 FCC Rcd at 3859-60, para. 8 (finding that use of a progress-based approach enables the Commission to conduct the section 706 inquiry in the manner the statute requires).

²¹ ACA Comments at 6-7; ADTRAN Comments at 14-15; Colville Confederated Tribes Comments at 13; Free State Foundation Comments at 10-11; Internet Innovation Alliance Comments at 7-8; INCOMPAS Comments at 9-10; ITTA Comments at 1-2; Next Century Cities Comments at 2; NCTA Comments at 7-8; National Digital Inclusion Alliance Comments at 4; USTelecom Comments at 16-17; Viasat, Inc. (Viasat) Comments at 3-4; American Library Association Reply at 3-5; Public Knowledge, Common Cause, and Next Century Cities (Public Knowledge et al.) Reply at 12-13.

continue to promote deployment of advanced telecommunications capability to all Americans,²² and even though “remarkable progress has been made[.]” it remains the case that “many people, particularly rural and Tribal areas, do not enjoy the fastest possible broadband speeds or even access to advanced telecommunications services.”²³ We therefore remain committed to closing the digital divide and ensuring that all Americans can share in the benefits of access to advanced telecommunications capability, and we will continue to monitor progress toward that goal. We agree with ACA that the Commission “refin[ing] and improv[ing] its universal service programs that subsidize buildout in hard-to-serve areas” is helping fuel the growth in broadband investment.²⁴ We also agree with commenters that urge the Commission to continue its work to expand access to spectrum to facilitate broadband deployment and 5G services in the future.²⁵ And we agree with ADTRAN that continuing to work with “state and local governments through the [Broadband Deployment Advisory Committee (BDAC)] process to help accelerate broadband deployment” is vital to increase broadband investment and adoption across America.²⁶

A. Defining Advanced Telecommunications Capability

10. Consistent with our conclusion in the *2019 Report*, we continue to consider both fixed and mobile services as capable of meeting the definition of “advanced telecommunications capability” under section 706.²⁷ This finding is consistent with the language of the statute, which defines advanced telecommunications capability “without regard to any transmission media or technology.”²⁸

11. The Commission concluded at the time of both the *2018 Report* and the *2019 Report* that mobile services were not full substitutes for fixed service, but that both services still independently met the statutory definition of advanced telecommunications capability.²⁹ The record before us provides some evidence that consumers increasingly rely on mobile broadband for accessing and sharing information, and they can substitute fixed and mobile broadband when accessing certain services and applications (such as e-mail or social media, for example).³⁰ Moreover, mobile wireless providers continue to improve their networks, notably through the deployment of 5G technology, which may have performance characteristics similar to fixed services in certain environments.³¹ Mobile wireless providers also continue to offer new retail data plans that make mobile service an increasingly-attractive alternative to fixed services.³²

²² 47 U.S.C. § 1302(a).

²³ Internet Innovation Alliance Comments at 7.

²⁴ ACA Comments at 5.

²⁵ See Colville Confederated Tribes Comments at 13; Free State Foundation Comments at 10-11; Public Knowledge et al. Comments at 35-37; WISPA Comments at 7-8; Consumer Technology Association (CTA) Reply at 7.

²⁶ ADTRAN Comments at 14-15.

²⁷ *2019 Report*, 34 FCC Rcd at 3860-61, para. 10.

²⁸ 47 U.S.C. § 1302(d)(1).

²⁹ *2019 Report*, 34 FCC Rcd at 3861-62, para. 11; *2018 Report*, 33 FCC Rcd at 1666-67, para. 18.

³⁰ CTIA Comments at 12-13 (citing Pew Research Center, Mobile Factsheet (June 12, 2019), <https://www.pewresearch.org/internet/fact-sheet/mobile/>), 19-20 (discussing the smartphone only trend)).

³¹ ADTRAN Comments at 6-7; Free State Foundation Comments at 8, 10; Internet Innovation Alliance Comments at 3-4. *But see* Public Knowledge et al. Comments at 19-21 (arguing 5G is still years away from being a fully realized commercial service).

³² See, e.g., Verizon Wireless, Single Connected Home Plans, <https://www.verizonwireless.com/plans/single-device-plan/> (last visited Mar. 26, 2020). AT&T has a mobile service that it optimizes for HD video streaming and offers 30GB mobile hotspot to connect other devices. AT&T Unlimited Elite, <https://www.att.com/plans/unlimited-data-plans/> (last visited Mar. 26, 2020); see also, Xfinity Mobile Plan Details,

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12. The record also provides substantial evidence, however, that fixed and mobile services often continue to be used in distinct ways, and that users tend to subscribe to both services concurrently and treat them as complements.³³ For example, a fixed broadband service subscriber cannot use this service while traveling. Similarly, in-home connected devices, such as smart lights, Internet-connected security devices, or smart thermostats, often include features that allow for their use outside of the home, and consumers are unlikely to be able to take full advantage of these remote monitoring capabilities without the benefit of a mobile broadband connection (in addition to their fixed broadband service).³⁴ Mobile broadband subscribers, meanwhile, may not be able to use their mobile devices as in-home hotspots to stream large quantities of high-definition video content (due to either plan restrictions or data limits).³⁵ While users may substitute between mobile and fixed broadband when accessing certain services and applications, the record indicates that they are not yet functional substitutes for all uses and customer groups.³⁶ Based on the record before us, we again find that fixed broadband and mobile wireless broadband services are not functional substitutes in all cases.³⁷ We also continue to conclude that both fixed and mobile services provide capabilities that satisfy the statutory definition of advanced telecommunications capability, and we will continue to examine the deployment of fixed and mobile wireless services, both individually and in conjunction with one another, for the purposes of this Report.

13. *Performance Benchmarks for Fixed Service.* We find that the current speed benchmark of 25/3 Mbps remains an appropriate measure by which to assess whether a fixed service is providing advanced telecommunications capability. We conclude that fixed services with speeds of 25/3 Mbps continue to meet the statutory definition of advanced telecommunications capability; that is, such services “enable[] users to originate and receive high-quality voice, data, graphics, and video telecommunications.”³⁸ This finding follows the proposal in the *Notice*, and the record reflects significant support for maintaining the current fixed 25/3 Mbps speed benchmark.³⁹ ITTA, for example, explains

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<https://www.xfinity.com/mobile/plan/details> (last accessed Mar. 26, 2020) (offering Xfinity Mobile customers up to five lines for phones, watches, or tablets, mix and match data options, and the ability to access LTE networks and any of Xfinity’s WiFi hotspots).

³³ New America Open Technology Institute and Access Now (Open Technology Institute & Access Now) Comments at 2-8; NTCA Comments at 2-8; Public Knowledge et al. Comments at 16-18; WISPA Comments at 2; see also Pew Research Center, *Mobile Technology and Home Broadband 2019* at 21 (*available at* <https://www.pewresearch.org/internet/2019/06/13/mobile-technology-and-home-broadband-2019/>) (27% of respondents that do not subscribe to broadband at home state that a smartphone is not sufficient to do everything online that they need to do.).

³⁴ See, e.g., Krissy Rushing, *11 Smart Apps for Your Home*, <https://www.hgtv.com/design/remodel/mechanical-systems/voice-control-in-the-home> (last visited Mar. 26, 2020).

³⁵ See New America & Access Now Comments at 7-8; NCC Comments at 3-5; Public Knowledge et al. at 16-17; CWA Reply at 5-6; see also NTCA Comments at 2-5.

³⁶ Benton Foundation Comments at 9-10; Colville Confederated Tribes Comments at 3; INCOMPAS Comments at 5, 8-9; Next Century Cities Comments at 3-4; Open Technology Institute & Access Now Comments at 2-8; NTCA Comments at 1-3, 6; Public Knowledge et al. Comments at 18-21; WISPA Comments at 2; American Library Association Reply at 6; CWA Reply at 6-11; Public Knowledge et al. Reply at 8-9; USTelecom Reply at 8; Utilities Technology Council Reply at 5; WISPA Reply at 3-5; see also ITTA Comments at 7-8, 12 (asserting that Commission should continue to evaluate deployment of fixed and mobile services both individually and in conjunction with each other).

³⁷ *2019 Report*, 34 FCC Rcd at 3861-62, para. 11.

³⁸ 47 U.S.C. § 1302(d)(1); see also NCTA Reply at 2 (explaining that “the statutory definition of advanced telecommunications capability is a functional one”).

³⁹ See ACA Comments at 2; ADTRAN Comments at 7-8; Free State Foundation Comments at 3; Internet Innovation Alliance Comments at 6; ITTA Comments at 3-6; NCTA Comments at 2; USTelecom Comments at 10; WISPA Comments at 4-5; ADTRAN Reply at 3-4; NCTA Reply at 1; USTelecom Reply at 6; WISPA Reply at 6-7.

that “[b]y any reasonable account, the features, functions, and applications enabled by 25/3 Mbps broadband still qualify as ‘advanced’ and ‘high-quality.’”⁴⁰ We agree with WISPA that since the 2015 adoption of the 25/3 Mbps benchmark, “the speed required for the applications that most broadband consumers use has not changed substantially . . . and actual subscriptions have not yet consistently surpassed the benchmark level.”⁴¹

14. We are cognizant of current market trends and the demand for robust networks, including 4K streaming, online gaming, and high definition (HD) video streaming. Some commenters submit that such factors should result in us increasing the speed benchmark.⁴² Although we agree that there is an “increased appetite”⁴³ for a number of new devices and applications and “trends in the United States show that the average speeds are increasing every year,”⁴⁴ the definition of advanced telecommunications capability in section 706 does not suggest that “advanced” necessarily means the highest quality service possible.⁴⁵ Furthermore, we agree with NCTA that “the current demand for multiple 4K video streams in a household is minimal because the use of 4K is still nascent and the majority of households consist of only one or two people” and as such does not provide a sufficient rationale to change the current fixed speed benchmark.⁴⁶ We also agree with NCTA that “adopting a ‘forward-looking’ or ‘aspirational’ definition, as some recommend, distorts the purpose of the analysis Congress has required the Commission to perform and may prove to be counter-productive in terms of new investment.”⁴⁷ Therefore, we will not determine our fixed speed benchmark based on the maximum speeds available to consumers, such as gigabit service, as some commenters suggest.⁴⁸ The Commission’s data shows that in the areas where gigabit service is available, only 4% of Americans living in those areas are in fact subscribing to it.⁴⁹

⁴⁰ ITTA Comments at 4-5; *see also* Internet Innovation Alliance Comments at 6 (“[W]hat Congress sought to measure – the deployment of advanced telecommunications services in a reasonable and timely fashion – is captured by the current measure.”).

⁴¹ WISPA Comments at 4-5; *see also* USTelecom Comments at 10 (stating that even with new technologies, “current usage patterns do not require more bandwidth than 25/3 Mbps”).

⁴² Benton Foundation Comments at 10; Fiber Broadband Association Comments at 4-5; INCOMPAS Comments at 4; Next Century Cities Comments at 4-5; Open Technology Institute and Access Now Comments at 3-4; Public Knowledge et al. Comments at 1-4; CWA Reply at 4-5; Public Knowledge et al. Reply at 1-2; Utilities Technology Council Reply at 3-4; Letter from Lindsay Stern, Public Knowledge, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 19-285, at 1-2 (filed Jan. 21, 2020) (Public Knowledge et al. Jan. 21, 2020 *Ex Parte* Letter); Letter from Lindsay Stern, Public Knowledge, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 19-285, at 1-3 (filed Jan. 30, 2020); New Networks Institute, Statement and Refreshing the Record, GN Docket No. 19-285, at 3 (filed Feb. 20, 2020) (New Networks February 20, 2020 Statement).

⁴³ Next Century Cities Comments at 5.

⁴⁴ Open Technology Institute and Access Now Comments at 3-4.

⁴⁵ 47 U.S.C. § 1302(d)(1).

⁴⁶ NCTA Reply at 3-4; *see also* ADTRAN Comments at 7-8 (“While 4K TV purchases have been growing, they still do not comprise a majority of the new television set purchases and 4K TV content is still limited.”).

⁴⁷ NCTA Reply at 3; *see also* WISPA Comments at 6 (“[T]he availability of advanced services is an incremental process that must be measured empirically based on year-over-year advancement rather than by setting artificial a priori goals that may be more aspirational than realistic.”); ADTRAN Reply at 5 (explaining that the benchmark “is not intended as an aspirational goal”); NCTA Reply at 3 (“While Congress has in the past asked the Commission to develop a forward-looking broadband plan, that is not the purpose of this report.”); USTelecom Reply at 6 (“There is no basis upon which the Commission could reasonably conclude that the time is ripe for a precipitous increase in the Section 706 speed benchmark.”).

⁴⁸ *See, e.g.*, INCOMPAS Comments at 4, 6-7; Fiber Broadband Association Comments at 4 n.6.

⁴⁹ *See* FCC, Fixed Broadband Deployment Data from FCC Form 477, Data as of December 31, 2018.

15. Notably, while 25/3 Mbps remains our fixed speed benchmark for purposes of conducting our inquiry under section 706, we continue our practice of showing progress of fixed services at multiple speed thresholds, including three speeds above the benchmark (50/5 Mbps, 100/10 Mbps, and 250/25 Mbps), to enable the Commission and the public to monitor consumer usage trends and marketplace developments. We agree with Free State Foundation and NCTA that we should assess a wider range of speed tiers,⁵⁰ but we continue to find, consistent with the *2019 Report* and longstanding Commission precedent, that a “single fixed speed benchmark provides a useful and administrable way of conducting our inquiry.”⁵¹ Furthermore, we maintain that a single fixed benchmark allows us to more easily understand consumer usage trends and marketplace developments and to track progress over time. We evaluate progress using a variety of speed tier metrics and categories across technologies.⁵²

16. *Performance Benchmarks for Mobile Service.* We again evaluate deployment of advanced telecommunications capability for mobile services using multiple metrics instead of relying on a single benchmark.⁵³ A single benchmark is unreliable in the mobile wireless context due to the inherent variability in the performance characteristics of mobile service both geographically and temporally, as we have noted in previous reports.⁵⁴ Accordingly, we first analyze provider-reported 4G LTE coverage based on the Commission’s Form 477 data, where service providers claim a minimum advertised speed of 5/1

⁵⁰ Free State Foundation Comments at 3; NCTA Comments at 2.

⁵¹ See *2019 Report*, 34 FCC Rcd at 3863, para. 15; *2018 Report*, 33 FCC Rcd at 1669, para. 25; 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. 15-191, 2016 Broadband Deployment Report, 31 FCC Rcd 699, 707, para. 19 (*2016 Report*); *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, 1391, para. 23 (2015) (*2015 Report*).

⁵² While some commenters urge the Commission to adopt a benchmark based on an alternative metric from speed, the proffered approaches fail to provide a methodology or reliable data sources to implement their suggestions. See Benton Foundation Comments at 10 (urging the Commission “to set a new benchmark that better represents marketplace realities”); CTIA Comments at 17 (suggesting that “rigid speed benchmarks are an inadequate way to measure whether deployment is reasonable and timely” and instead, “the Commission should consider a range of data that better reflect the innovative and growing mobile economy, and the diversity of use cases consumers increasingly adopt”); Fiber Broadband Association Comments at 4-5 (suggesting the Commission “increase its current speed benchmark from 25/3 Mbps to at least 100/10 Mbps, and preferably higher, to reflect current and near-term use”); INCOMPAS Comments at 4 (suggesting the Commission “adopt 1 Gbps as the fixed broadband benchmark”); Next Century Cities Comments at 5 (“A standard of at least 50/10 Mbps will help ensure that households are not limited by inadequate connections.”); Open Technology Institute and Access Now Comments at 3-4 (“The Commission should increase the benchmark for advanced telecommunications capability to ensure that the definition adequately matches the average speed consumed by Americans.”); Public Knowledge et al. Comments at 2 (“Technological innovation and consumer demand for faster broadband warrant the FCC to update its benchmark speed from 25 Mbps to 100 Mbps downstream.”); CWA Reply at 5-6 (“The Commission should raise its broadband benchmark to 100/10 Mbps to encourage high-speed broadband deployment that will ensure the United States leads the world in Internet speeds and deployment instead of simply struggling to keep up with global speeds.”). *But see* ADTRAN Reply at 3-4 (arguing that “in order to justify a higher benchmark, [Next Century Cities] relies on increased average monthly usage, while [Open Technology Institute] relies on increased average speeds . . . [and] [t]he statutory definition does not include any reference to average speeds that consumers use or purchase”).

⁵³ *2019 Report*, 34 FCC Rcd at 3863-64, paras. 16-17; *2018 Report*, 33 FCC Rcd at 1672-74, paras. 30-34.

⁵⁴ *2019 Report*, 34 FCC Rcd at 3863, para. 16; *2018 Report*, 33 FCC Rcd at 1672, para. 30.

Mbps.⁵⁵ We do not assert that 5/1 Mbps is a mobile advanced telecommunications capability benchmark; rather, we use the 5/1 Mbps minimum advertised speed as a check to ensure that the 4G LTE deployed to an area has sufficient backhaul and other capabilities to offer LTE in a manner consistent with being an advanced telecommunications capability.⁵⁶ Second, in areas where providers claim to provide 4G LTE with a minimum 5/1 Mbps advertised speed, we supplement provider-reported data with Ookla speed-test data, which identify areas showing median speed tests of at least 10/3 Mbps. This supplemental approach attempts to address certain limitations of the current Form 477 mobile data, while helping the Commission understand the extent to which American consumers today are receiving speeds higher than 5/1 Mbps.⁵⁷ By continuing our prior approach, we also can more readily assess progress over time.⁵⁸

17. We find, therefore, that retaining the current approach of using multiple metrics is appropriate for this Report at this time.⁵⁹ We agree with CTIA that this Report should continue to focus on the ongoing nature of advanced telecommunications service deployment.⁶⁰ We also agree that mobile wireless service capability should be assessed holistically, given the inherent variability of wireless service. Finally, we will also begin collecting 5G New Radio (NR) deployment data this year, to ensure that both the Commission and consumers have an accurate account of 5G deployment.⁶¹

⁵⁵ The Form 477 Instructions require each provider to indicate their minimum advertised speeds and where users should expect to receive those advertised speeds. For convenience, we refer to minimum advertised speeds throughout this Report. Form 477 Instructions at 25, available at <https://us-fcc.app.box.com/v/Form477Instructions>. The Commission has recognized certain limitations associated with its Form 477 data collection and recently amended that collection to require, among other things, that mobile providers report 5G technology deployments and submit broadband and subscriber data at the census-tract level. *Establishing the Digital Opportunity Data Collection; Modernizing the FCC Form 477 Data Program*, WC Docket Nos. 19-195, 11-10, Report and Order and Second Further Notice of Proposed Rulemaking, 34 FCC Rcd 7505, 7524, para. 44, 7530, para. 58 (2019) (*Digital Opportunity Data Collection Order*). The Commission also sought comment on steps to obtain more accurate and reliable mobile broadband deployment data, including the collection of crowdsourced and other on-the-ground data. *Id.* at 7549-59, paras. 112-34.

⁵⁶ *2019 Report*, 34 FCC Rcd at 3863, para. 16; *see also* 47 U.S.C. § 1302(d) (defining advanced telecommunications capability as capable of enabling “users to originate and receive high-quality voice, data, graphics, and video telecommunications”). In previous reports, the Commission has concluded that LTE at 5/1 Mbps is a starting point for the analysis that enables consumer use consistent with the requirements of 47 U.S.C. § 1302, and speeds of 5/1 Mbps or higher “are accepted by industry as consistent with an LTE network.” *2019 Report*, 34 FCC Rcd at 3863, para. 16; *2018 Report*, 33 FCC Rcd at 1672-73, paras. 31-32.

⁵⁷ *2019 Report*, 34 FCC Rcd at 3864, para. 16; *2018 Report*, 33 FCC Rcd at 1672-73, paras. 31-32; *see also Digital Opportunity Data Collection Order*, 34 FCC Rcd at 7549-59, paras. 112-34 (seeking comment regarding how to obtain and verify more accurate mobile coverage data).

⁵⁸ *2019 Report*, 34 FCC Rcd at 3864, para. 16 (“Overall, retaining this methodology allows consistent metrics by which we can evaluate whether mobile advanced telecommunications capability is improving for American consumers.”); CTIA Comments at 5; Free State Foundation Comments at 1-2.

⁵⁹ 47 U.S.C. § 1302(d)(1); *2019 Report*, 34 FCC Rcd at 3863-64, paras. 16-17. The record does not justify altering the Commission’s approach of analyzing both Form 477 data and Ookla data at speeds of 5/1 Mbps and 10/3 Mbps, respectively. *See* Free State Foundation Comments at 1-3, 6, 8 (agreeing with the 5/1 Mbps, 10/3 Mbps approach although also advocating for a wider range of speed tiers to be analyzed if available); CTIA Comments at 17-24 (arguing that the Commission should adopt a more “holistic approach” that assesses factors related to consumers wireless experience beyond speeds and coverage data); *see also 2019 Report*, 34 FCC Rcd at 3864, para. 17 (rejecting CTIA’s alternative methodology proposal for assessing the mobile experience).

⁶⁰ *See* CTIA Comments at 5-6.

⁶¹ *Digital Opportunity Data Collection Order*, 34 FCC Rcd at 7524, para. 44; *cf.* ADTRAN Comments at 6-7 (advising the Commission to collect “any information it can on 5G deployments” to accurately reflect 5G deployment in future assessments). *But see* INCOMPAS Comments at 3 (arguing that now is the time to reassess

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18. *Other Benchmarks.* We decline suggestions of some commenters to adopt additional benchmarks. While several commenters suggest adoption of a latency benchmark,⁶² they do not offer a reliable and sufficiently comprehensive data source for such analysis.⁶³ As we concluded in last year's Report, we decline to incorporate latency into our section 706 analysis.⁶⁴ We therefore disagree with FBA's assertion that the Commission should use "a broadband experience metric [based on reliability, bandwidth, and latency, which] would better reflect how consumers are increasingly examining broadband service."⁶⁵

19. Additionally, we decline the requests of some commenters to consider data allowances and affordability.⁶⁶ For purposes of this Report, such metrics fall outside the scope of our section 706 inquiry.⁶⁷ We reiterate our finding in the *2019 Report* that "[w]hile factors such as data allowances or pricing may affect consumers' use of advanced telecommunications capabilities or influence decisions concerning the purchase of these services in the first instance, such considerations do not affect the underlying determination of whether advanced telecommunications capability has been deployed and made available to customers in a given area."⁶⁸ Notably, commenters in support of including non-

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performance benchmarks due to carriers' beginning deployment of 5G-capable networks); NCC Comments at 5-6 (advocating switching from LTE to a 5G standard for this report).

⁶² American Library Association Reply at 3; Benton Foundation Comments at 6; Public Knowledge et al. Comments at 12-13; *see also* Fiber Broadband Association Comments at 2-3 (advocating adoption of a "broadband experience metric" based on reliability, bandwidth, and latency).

⁶³ We also reached this conclusion based on the records in the two most recent reports, as well. *See 2019 Report*, 34 FCC Rcd at 3865, para. 19; *2018 Report*, 33 FCC Rcd at 1674-75, para. 36.

⁶⁴ *2019 Report*, 34 FCC Rcd at 3865, para. 19 (finding that "[a]pplying a latency benchmark for all broadband services, whether fixed terrestrial, satellite, or mobile broadband, that would exclude from our section 706 analysis any consideration of broadband services that, on their face, would appear to provide consumers with the relevant capabilities articulated in section 706(d)(1), would prevent a reliable or complete assessment of the deployment of advanced telecommunications capability"); *see also* WISPA Reply at 7 ("And while latency may have some minor impacts on the user experience for such activities as gaming and video conferencing, it does not render broadband capability 'unavailable' as a general matter even for users interested in these discrete capabilities.").

⁶⁵ Fiber Broadband Association Comments at 2-3.

⁶⁶ *See* Benton Foundation Comments at 4; National Digital Inclusion Alliance Comments at 1-2; Open Technology Institute & Access Now Comments at 3; Next Century Cities Comments at 1-2; CWA Reply at 3; Letter from Access Now, Benton Institute for Broadband & Society, Common Cause, MediaJustice, National Hispanic Media Coalition, New America's Open Technology Institute, and Public Knowledge, to Marlene H. Dortch, Secretary, Federal Communications Commission at 3 (Dec. 19, 2019); Letter from the Leadership Conference on Civil and Human Rights, American Civil Liberties Union, Asian Americans Advancing Justice, Common Cause, Communications Workers of America, National Consumer Law Center, on behalf of its low-income clients, National Hispanic Media Coalition, United Church of Christ, and OC Inc. to Marlene H. Dortch, Secretary, Federal Communications Commission (Feb. 4, 2020); Public Knowledge et al. Jan. 21, 2020 *Ex Parte* Letter at 5. *But see* WISPA Reply at 8-9 ("Like variations in latency, price differentials for broadband service in the real world are incremental not vast and therefore do not suggest that service is unobtainable at a reasonable cost in areas where it is available for purchase.").

⁶⁷ ADTRAN Reply at 5 (explaining that the benchmark "is not intended as an aspirational goal"); NCTA Reply at 3 ("[A]dopting a 'forward-looking' or 'aspirational' definition, as some recommend, distorts the purpose of the analysis Congress has required the Commission to perform and may prove to be counter-productive in terms of new investment."); WISPA Reply at 8-9 (explaining that latency and pricing information "falls outside the scope of data subject to [s]ection 706 analysis").

⁶⁸ *2019 Report*, 34 FCC Rcd at 3866, para. 19.

performance metrics fail to cite reliable, comprehensive data sources that we could use, or offer sound methodologies for incorporating these metrics into the section 706 inquiry.⁶⁹

B. Demographic Information

20. Section 706(c) directs the Commission to compile a list of geographical areas that are not served by any provider of advanced telecommunications capability and, to the extent that data from the Census Bureau are available, to determine, for each unserved area, the population, the population density, and the average per capita income.⁷⁰ We include a demographic data analysis below in Section IV.C.⁷¹ and show the availability of advanced telecommunications capability on a county-by-county basis with demographic information in Appendix 4.⁷²

C. Schools and Classrooms

21. Section 706(b) also specifies that our annual inquiry concerning the availability of advanced telecommunications capability to all Americans must include “elementary and secondary schools and classrooms.”⁷³ As in the *2019 Report*, we continue to assess the current state of deployment in elementary and secondary schools in Section IV.F. below, using a short-term and long-term goal for broadband connectivity to schools of 100 Mbps per 1,000 students and staff, and 1 Gbps per 1,000 students and staff, respectively.⁷⁴

D. Tribal Lands

22. We find that Tribal lands continue to face significant obstacles to broadband deployment. As reflected in both the *2018 Report* and *2019 Report*, deployment of advanced telecommunications capability on certain Tribal lands, particularly rural Tribal lands, lags behind deployment in other, non-Tribal areas.⁷⁵ Accordingly, the *Notice* sought comment on whether deployment on Tribal lands still falls behind other areas and on additional considerations, such as difficulties involving rights-of-way, that could be preventing deployment that would otherwise occur.⁷⁶ We recognize the need to promote and encourage the availability of broadband on Tribal lands as many of these lands are located disproportionately in rural areas, which tend to be less densely populated than rural non-Tribal areas. Further, the remote, isolated nature of these areas combined with challenging terrain and lower incomes

⁶⁹ See, e.g., Benton Foundation Comments at 4; National Digital Inclusion Alliance Comments at 1-2; Open Technology Institute & Access Now Comments at 3; Next Century Cities Comments at 1-2; CWA Reply at 3. *But see* NCTA Reply at 2 (“None of the parties seeking to change the threshold offers any evidence that 25/3 Mbps services no longer meet the statutory definition of advanced telecommunications capability or that such connections are incapable of handling the important functions they identify, such as finding employment or conducting research for homework.”); USTelecom Reply at 6-7 (submitting that while quality of service and affordability “are important issues that the Commission addresses in other proceedings, they are not related to whether a consumer has access to broadband, the focus of this inquiry”); WISPA Reply at 7-9 (explaining that the record does not support including additional metrics that are not directly relevant to the section 706 inquiry). We similarly decline to evaluate provider conformance with state-level deployment commitments. See *New Networks* February 20, 2020 Statement at 7-9.

⁷⁰ 47 U.S.C. § 1302(c).

⁷¹ See *infra* Section IV.C.

⁷² See *infra* Appx. 4; see also Benton Foundation Comments at 7 (supporting use of demographic information).

⁷³ 47 U.S.C. § 1302(b).

⁷⁴ See *infra* Section IV.F; see also ADTRAN Comments at 8-9 (supporting use of the short and long term goals); Colville Confederated Tribes Comments at 5 (supporting use of “1 Gbps per 1,000 students and staff”).

⁷⁵ *2019 Report*, 34 FCC Rcd at 3866, para. 22, 3883-85, paras. 44-46, Figs. 10 and 11; *2018 Report*, 33 FCC Rcd at 1681-86, paras. 50-57.

⁷⁶ *Notice*, 34 FCC Rcd at 10097, para. 15.

increase the cost of network deployment and entry, thereby reducing the profitability of providing service.⁷⁷ Although the record here is limited, it confirms that broadband deployment on Tribal lands continues to lag behind compared to other rural areas.⁷⁸ The Benton Foundation explains that “[t]he challenge of deploying broadband to tribal lands is exacerbated by poverty and low population density as well as tough terrain that increases construction and operating costs;” and “on Navajo lands in the Southwest, many people live in buildings, like converted tool sheds and traditional Navajo hogans, that the federal government does not recognize as dwelling units.”⁷⁹ Colville Confederated Tribes contends that “[t]he digital divide has only grown larger over the last decade as other rural areas have seen significant increases in broadband access availability while Rural Native communities lack access.”⁸⁰

23. Because of challenges in accounting for all types of Tribal homes and Tribal lands and obstacles to infrastructure investment, we agree with commenters that more work is needed to spur broadband deployment in these areas.⁸¹ We therefore find it critical to continue our efforts to collect, monitor, and analyze any relevant data on Tribal lands. Below, in Section IV.D., we present our measurement of deployment data on Tribal lands, acknowledging the challenges to increasing broadband services in these areas.

IV. BROADBAND DEPLOYMENT AND AVAILABILITY

A. Data Sources and Methodologies

24. We continue to rely primarily on the Commission’s Form 477 deployment data to evaluate consumers’ broadband options for fixed terrestrial and mobile services.⁸² We agree with commenters that the Form 477 data “remains the most comprehensive data” available to complete our section 706 inquiry.⁸³ The Form 477 deployment data is also available to the public, which increases the transparency of our analysis and permits the public to independently assess our broadband service deployment data.⁸⁴ The Commission has been collecting Form 477 deployment data for several years,

⁷⁷ *Id.* at 10096-97, paras. 14-15; *see also* FCC, *Report on Broadband Deployment in Indian Country, Pursuant to the Repack Airwaves Yielding Better Access for Users of Modern Services Act of 2018*, at 2, 19, submitted to the Senate Committee on Commerce, Science, and Transportation; House of Representatives Committee on Energy and Commerce (May 1, 2019): <https://docs.fcc.gov/public/attachments/DOC-357269A1.pdf>; *Rural Digital Opportunity Fund; Connect America Fund*, WC Docket Nos. 10-90, 19-126, Report and Order, 35 FCC Rcd 686 (2020) (*Rural Digital Opportunity Fund Order*) (creating a Rural Digital Opportunity Fund to target support to areas that lack access to 25/3 Mbps broadband service, including prioritizing bids to serve Tribal lands).

⁷⁸ Benton Foundation Comments at 12-13; Colville Confederated Tribes Comments at 6; Public Knowledge et al. Reply at 13.

⁷⁹ Benton Foundation Comments at 13-14.

⁸⁰ Colville Confederated Tribes Comments at 6.

⁸¹ Public Knowledge et al. Reply at 13; Colville Confederated Tribes Comments at 13.

⁸² Some estimates for years prior to 2018 may differ from last year’s *Report* because some filers have revised their Form 477 data since the *2019 Report*. For this year’s *Report*, we also exclude deployment data for one service provider due to ongoing concerns about the reliability of this filer’s data.

⁸³ *See, e.g.*, ADTRAN Comments at 9; NCTA Comments at 4; USTelecom Comments at 12-13; USTelecom Reply at 7; WISPA Reply at 9-10; *see also 2019 Report*, 34 FCC Rcd at 3868, para. 25; *2018 Report*, 33 FCC Rcd at 1677, para. 43 (concluding the Form 477 data remains the most thorough and accurate data available to the Commission for the section 706 analysis).

⁸⁴ FCC, Form 477 Resources, <https://www.fcc.gov/economics-analytics/industry-analysis-division/form-477-resources>. All Form 477 data used in this Report has been certified as accurate by the filers. We note that the Report’s analysis may understate or overstate consumers’ options for services to the extent that broadband providers fail to report data or misreport data. *See* FCC, *Explanation of Broadband Deployment Data* (Nov. 20, 2017), <https://www.fcc.gov/general/explanation-broadband-deployment-data> (describing quality and consistency checks performed on providers’ submitted data and explaining any adjustments made to the Form 477 data as filed).

and so it provides a consistent yardstick against which to measure year-over-year progress of broadband deployment.

25. We have acknowledged that the Form 477 data collection is imperfect—which is why the Commission established the new Digital Opportunity Data Collection that will ultimately collect more precise fixed terrestrial, and has proposed to collect more precise mobile wireless, data than the Form 477 broadband deployment data.⁸⁵ While many commenters offer criticism of the Form 477 data,⁸⁶ as well as recommendations for how to improve the Commission’s data,⁸⁷ this Report is not the appropriate vehicle for the Commission to make changes to the data collection.⁸⁸

26. Form 477 deployment data report service at the census block level.⁸⁹ For purposes of this Report, a census block is classified as served if the Form 477 data indicate that service is available anywhere in the census block, which has been the case since the Commission began collecting broadband deployment data in 2014.⁹⁰ Therefore, it is not necessarily the case that every household, housing unit, or person will have coverage from a given service in a census block that this Report indicates is served. Therefore, as the Commission has previously explained, this analysis likely overstates the coverage experienced by some consumers, especially in large or irregularly-shaped census blocks.⁹¹ We therefore acknowledge that this analysis may overstate the deployment of fixed and mobile services. Nonetheless, we continue to find that using a consistent unit of measurement (the census block), as well as our threshold for considering service to be deployed in a census block, is an effective tool for measuring progress over time. We report an analysis of deployment for fixed and mobile LTE services using 2010

⁸⁵ See generally *Digital Opportunity Data Collection Order*. In the *Digital Opportunity Data Collection Order*, the Commission also took the important immediate step of requiring facilities-based mobile-broadband and voice providers to submit their subscriber data by census tract rather than by state. *Digital Opportunity Data Collection Order*, 34 FCC Rcd at 7529-33, paras. 57-65.

⁸⁶ See, e.g., American Library Association Reply at 2; Benton Foundation Comments at 3, 8; Colville Confederated Tribes Comments at 8, Public Knowledge et al. Comments at 8-10; Open Technology Institute & Access Now Comments at 3; CWA Reply at 11-12; Public Knowledge et al. Reply at 4.

⁸⁷ See, e.g., CWA Reply at 11; Public Knowledge et al. Reply at 5-7; Letter from Cat Blake, Senior Program Manager, Next Century Cities, to Marlene H. Dortch, Secretary, FCC, at 2 (Nov. 27, 2019).

⁸⁸ *Notice*, 34 FCC Rcd at 10099, para. 20.

⁸⁹ The Commission’s instructions for completing Form 477 state the following in this regard: “For purposes of this form, fixed broadband connections are available in a census block if the provider does, or could, within a service interval that is typical for that type of connection—that is, without an extraordinary commitment of resources—provision two-way data transmission to and from the Internet with advertised speeds exceeding 200 kbps in at least one direction to end-user premises in the census block.” FCC, FCC Form 477 Local Telephone Competition and Broadband Report Instructions at 17 (2016) (pertinent to the data on which this Report is based), <https://us-fcc.box.com/v/Form477InstThruJune19> (2018 Form 477 Instructions); FCC, FCC Form 477 Local Telephone Competition and Broadband Report Instructions at 18 (2019) (2019 Form 477 Instructions) (current version), <https://transition.fcc.gov/form477/477inst.pdf>.

⁹⁰ For the purposes of Form 477, fixed broadband connections are “available” in a census block “if the provider, does, or could, within a service interval that is typical for that type of connection—that is, without an extraordinary commitment of resources—provision two-way data transmission . . . in at least one direction to end-user premises in the census block.” See Glossary of Terms Used in FCC Form 477 (for filings through June 30, 2019), <https://us-fcc.app.box.com/v/Form477GlossaryThruJune19>. We reject Utilities Technology Council’s argument that our methodology should evaluate individual technologies at the census block level. Utilities Technology Council Reply at 2, 6. It is unclear how this would better inform our analysis of the deployment of services to residents in a specific census block.

⁹¹ See *2019 Report*, 34 FCC Rcd at 3869, para. 25 n.92; *2018 Report*, 33 FCC Rcd at 1677, para. 43.

census block population data that the Commission staff has updated to account for population growth and economic development.⁹²

27. We note that the Commission recently released the Form 477 data for June 2019.⁹³ This Report maintains our practice of analyzing the most recent year-end data, which in this case is for 2018. We note that the June 2019 data demonstrate continuing progress in deployment.⁹⁴

28. *U.S. Territories.* We believe the Form 477 deployment data, as of December 31, 2018, provide the most reliable and comprehensive available data that is currently available regarding the current deployment of broadband services in the U.S. Territories. Neither the *2018 Report* nor the *2019 Report* included data from the U.S. Territories in overall national deployment figures for the United States, including in the figures showing the five-year progression of deployment, because of anomalies in the historical deployment data for Puerto Rico and the U.S. Virgin Islands.⁹⁵ Puerto Rico and the U.S. Virgin Islands account for over 92% of the total combined population of the U.S. Territories; therefore, presenting historical data for the U.S. Territories would likely misrepresent the progress in deployment that has occurred in these areas from 2014 to 2018. Thus, figures that present deployment data from 2014-2018 do not include U.S. Territories data. Nevertheless, we do include data from the U.S. Territories in the national deployment figures wherever possible,⁹⁶ including in Figure 3e, where we present the overall state of fixed and mobile deployment data for the full United States.⁹⁷

⁹² Commission staff developed population estimates for 2011-18 by updating the 2010 census block population estimates. These estimates are based upon annual U.S. Census mid-year county (or county-equivalent) level population and housing unit estimates for the fifty states, the District of Columbia, and Puerto Rico. These data are used in conjunction with U.S. Census Bureau TIGER data to indicate new roads, that is, new housing development, to distribute population amongst the census blocks comprising each county (or county-equivalent). Federal Communications Commission, Staff Block Estimates, <https://www.fcc.gov/reports-research/data/staff-block-estimates>. Next Century Cities argues that overstatement may be over 100% in rural counties based upon a landmass analysis. Next Century Cities Comments at 6. We measure deployment by population rather than land area because providers of fixed services likely build their networks where people live not where there is land. For example, there are 3.5 million square miles of land area encompassed in the 11.1 million census blocks in the United States but only 7.4 million of the census blocks are populated and these census blocks only account for 2.4 million of the 3.5 million square miles of land area in the United States.

⁹³ *FCC Releases Form 477 Data on Broadband Deployment as of June 30, 2019*, WC Docket No. 11-10, Public Notice, DA 20-262 (Mar. 12, 2020).

⁹⁴ Form 477 Data as of June 30, 2019 is available at <https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477>.

⁹⁵ See *2019 Report*, 34 FCC Rcd at 23, para. 3867; *2018 Report*, 33 FCC Rcd at 1678, para. 44. The historical data suggests a 20.9 percentage point reduction in the deployment in the U.S. Territories between 2014 and 2015, and a 21.7 percentage point increase in deployment between 2015 and 2016. *2019 Report*, 34 FCC Rcd at 3878, para. 39, Fig. 5. In addition, the year-end 2017 deployment data most likely significantly overstates deployment in Puerto Rico and the U.S. Virgin Islands at that time, because the data do not reflect infrastructure damage caused by Hurricanes Maria and Irma, even though these data postdate the hurricanes and should reflect such damage. See *2019 Report*, 34 FCC Rcd at 3869, para. 26 and 3877-78, para. 39. We agree with Colville Confederate Tribes that we should include “all data from every state and territory.” Colville Confederated Tribes Comments at 13. While the *2018 Report* and *2019 Report* did not include data from the U.S. Territories in the overall deployment figures for the United States, data from the U.S. Territories was reported separately. See *2019 Report*, 34 FCC Rcd at 3878, para. 39, Fig. 5; *2018 Report*, 33 FCC Rcd at 1688-89, para. 59, Tbl. 6.

⁹⁶ Ookla data is unavailable for the U.S. Territories, and thus figures and appendices presenting 10/3 Mbps mobile figures based on Ookla data will not include the U.S. Territories, even for 2018.

⁹⁷ We also include data for Puerto Rico in our presentation of demographic data. See Figs. 5, 6, 7, 8. Further, Appendices 1-6 include data for the U.S. Territories.

29. *Fixed Terrestrial Services.* We find that our Form 477 deployment data for fixed terrestrial services remain the most reliable and comprehensive data to assess the availability of fixed terrestrial services to American consumers. We evaluate the deployment of fixed terrestrial services with minimum advertised speeds of 10/1 Mbps, 25/3 Mbps, 50/5 Mbps, 100/10 Mbps, and 250/25 Mbps. We use Form 477 subscribership data to calculate adoption rates for fixed terrestrial services.

30. *Satellite Services.* We find that Form 477 deployment data for satellite broadband service may overstate the extent to which satellite broadband is available. The Form 477 deployment data for satellite broadband indicate that satellite service offering 25/3 Mbps speeds is available to nearly all of the population.⁹⁸ However, other Form 477 data indicate that satellite services have a relatively low subscription rate despite their apparent widespread availability.⁹⁹ In Appendix 8, we provide deployment estimates for all fixed services, including satellite, from 2014 to 2018.¹⁰⁰ Unless stated otherwise, our analysis is based on all fixed terrestrial services, which do not include satellite.

31. *Fixed Wireless Services.* We note that the Form 477 data for fixed wireless services appear to show that these services are widely available. However, these services have a sufficiently low subscription rate¹⁰¹ to potentially support a conclusion that the Form 477 deployment data may overstate the extent to which fixed wireless services are available. In Appendix 9, we provide deployment estimates for fixed wired services, that is, fixed services excluding fixed wireless and satellite services, for 2014 to 2018.¹⁰²

32. *Mobile Services.* We continue to conclude that the best way to evaluate mobile broadband deployment and availability is to rely on available coverage data supplemented with Ookla's speed test data. These data sets serve as a proxy for the likely consumer experience in a given area while providing objective data to assess deployment progress. While acknowledging certain limitations of the Form 477 data, we nonetheless elect to employ the Form 477 LTE technology coverage data in this Report because they are the most comprehensive data that we currently have on a nationwide basis over time to assess the availability of mobile LTE to American consumers.¹⁰³ We use the Form 477 LTE deployment shapefiles with a minimum advertised speed of 5/1 Mbps.¹⁰⁴ As the Commission has done in

⁹⁸ More specifically, the data indicate that satellite service offering 25/3 Mbps speeds is available to 326.979 million of the 327.167 million Americans, or approximately 100% of the U.S. population. FCC Form 477 Data as of December 31, 2018.

⁹⁹ Form 477 data shows that 1.7 million households currently subscribe to satellite services of at least 10/1 Mbps. FCC Form 477 Data as of December 31, 2018. While satellite signal coverage may enable operators to offer services to wide swaths of the country, overall satellite capacity may limit the number of consumers that can actually subscribe to satellite service at any one time. *Notice*, 34 FCC Rcd at 10099, para. 19; *2019 Report*, 34 FCC Rcd at 3870, para. 28 n.98; *2018 Report*, 33 FCC Rcd at 1681, para. 51 n.148. For this reason, we will continue to report satellite broadband deployment data separately.

¹⁰⁰ See *infra* Appx. 8 (Deployment (Millions) of Fixed Services (Including Satellite) at Different Speed Tiers).

¹⁰¹ For example, as of December 31, 2018, the adoption rate for fixed wireless services of at least 10/1 Mbps is 1%. FCC Form 477 Data as of December 31, 2018. This contrasts with the 57% adoption rate for cable and the 30% adoption rate for fiber-based services at the same speeds where these services are available in the United States. *Id.*

¹⁰² See *infra* Appx. 9 (Deployment (Millions) of Fixed Wired Services at Different Speed Tiers).

¹⁰³ We continue to explore ways of improving data on mobile coverage. *Digital Opportunity Data Collection Order*, 34 FCC Rcd at 7549-59, paras. 112-34 (seeking comment about how to obtain and verify more accurate mobile coverage data).

¹⁰⁴ For fixed services, the Commission has been able to rely upon Form 477 reported maximum advertised speeds to track actual speeds. However, we note that the relationship between actual speeds and the advertised speed reported in the Form 477 for mobile services is more complex, because minimum advertised speed is reported by the mobile providers, and different mobile providers estimate their minimum advertised speed based on various points of their

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previous *Reports*, we employ the centroid methodology in evaluating the Form 477 deployment data for LTE.¹⁰⁵ We apply the same methodology as we use for fixed services, and consider a census block to be covered by LTE services if there is at least one service provider serving that census block that reports 5/1 Mbps as the minimum advertised speed, based on their Form 477 submission.¹⁰⁶

33. We recognize, however, that actual speeds tend to be much faster than the minimum advertised speed. Therefore, we also present estimates based on Ookla speed test data to evaluate the availability of LTE with a median actual speed of 10/3 Mbps or higher.¹⁰⁷ We rely on the Ookla data¹⁰⁸ to supplement our Form 477 analysis primarily because they allow us to evaluate the extent to which the typical consumer receives speeds of 10/3 Mbps or higher, and they provide us with the greatest number of observations of actual speeds that customers receive.¹⁰⁹ As the Commission has done previously, our analysis of the availability of mobile LTE services with a median speed of 10/3 Mbps includes actual speed test data in counties¹¹⁰ with at least 300 test observations in each time frame.¹¹¹ The more densely

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actual speed distribution. *2019 Report*, 34 FCC Rcd at 3870, para. 29 & n.100. By contrast, the Ookla data provide us with the actual speeds that consumers experience.

¹⁰⁵ See, e.g., *2019 Report*, 34 FCC Rcd at 3870, para. 29.

¹⁰⁶ We note that questions have arisen in various contexts regarding the bases for certain filings. For example, in the context of the Mobility Fund Phase II (MF-II) proceeding, the Commission determined that a separate, one-time data collection was necessary to ensure that all mobile LTE providers were using the same standard when generating coverage maps of their 5 Mbps downstream 4G LTE deployment. *Connect America Fund, Universal Service Reform—Mobility Fund*, Order on Reconsideration and Second Report and Order, 32 FCC Rcd 6282, 6286, para. 7, 6287, para. 10, 6298, para. 34 (2017) (*Mobility Fund Phase II Challenge Process Order*). However, a 2019 staff report investigating potential violations of the MF-II mapping rules concluded, among other things, that the MF-II coverage maps submitted by several providers are not a sufficiently reliable or accurate basis upon which to complete the MF-II challenge process (used to determine areas eligible for funding) as it was designed. FCC, Mobility Fund Phase II Coverage Maps Investigation, GN Docket No. 19-367, Staff Report (Dec. 4, 2019), <https://docs.fcc.gov/public/attachments/DOC-361165A1.pdf>. We note the Commission has begun to implement improvements in our data collection process and has sought comment on other steps to obtain more accurate and reliable mobile deployment data. *Digital Opportunity Data Collection Order*, 34 FCC Rcd at 7549-7559, paras. 112-34; FCC, Changes to Form 477 in 2019 and 2020 at 2 (Jan. 8, 2020), <https://us-fcc.app.box.com/v/ChangesFor2019and2020>.

¹⁰⁷ The data collected by the Ookla Speedtest mobile app include test results for download speed, upload speed, and latency, as well as other information, such as the location of the test and operating system of the handset. See *2019 Report*, 34 FCC Rcd at 3871, para. 20 n.105; see also <https://www.speedtest.net/about>.

¹⁰⁸ The Ookla results presented in this Report are based on tests that were executed in the second half of the year for 2014, 2015, 2016, 2017, and 2018 on the smartphone's cellular connection, and using LTE technology. Test data were excluded if they had missing GPS location data or if the reported download or upload speed was less than zero or greater than 100 Mbps. Multiple tests by a single phone in the same locality and in the same day were averaged (using the median). All Ookla speed tests are user-initiated.

¹⁰⁹ We note that, in general, crowd-sourced data can offer the advantage of generating a large volume of data at a very low cost and of measuring actual consumer experience on a network in a wide variety of locations, indoor and outdoor. Crowd-sourced data, however, often are not collected pursuant to statistical sampling techniques, and may require adjustments to construct a representative sample from the raw data. For instance, crowd-sourced mobile data come from a self-selected group of users, and there often is little control for most tests regarding such parameters as when people implement the test, whether the test is performed indoors or outdoors, the geographic location of the tester, and the vintage of the consumer's device. *2019 Report*, 34 FCC Rcd at 3871, para. 30 n.104.

¹¹⁰ Wireless mobile speeds vary over even small local areas. Therefore, ascribing the median county Ookla speed to an entire county will sometimes overestimate or underestimate realized local speeds. See Colville Confederated Tribes Comments at 4. Use of Ookla data alone would overestimate coverage as counties with only partial coverage would be represented as having 100% coverage. Use of Form 477 data alone would necessitate reliance on the 5/1 Mbps reporting standard.

populated counties have a higher likelihood of being included in this analysis because there generally are more observations in those geographical areas with a higher population density. Although we do not have reliable on-the-ground speed data for every county in the United States, the Ookla data cover approximately 93% of the population of the United States, excluding the U.S. Territories, for which we do not have data.¹¹² Using the existing Form 477 data combined with on-the-ground speed testing data provides the most reliable and comprehensive available data that is currently available on the extent of mobile coverage,¹¹³ and its continued use allows for a consistent measure of progress over time.

34. *Schools.* For purposes of this Report, we assess deployment in elementary and secondary schools based upon the best publicly available data, specifically that analyzed in EducationSuperHighway's *2019 State of the States Report*.¹¹⁴ The *2019 State of the States Report* tracks public schools' progress toward the Commission's goals for K-12 connectivity using the Commission's Form 471 data and additional outreach efforts to E-Rate applicants for clarifications on their broadband purchases.¹¹⁵ The *2019 State of the States Report* provides an analysis of schools meeting the connectivity goals using fiber and other scalable broadband connections, using a sample of public school districts in each state.

(Continued from previous page) _____

¹¹¹ *2019 Report*, 34 FCC Rcd at 3871, para. 30. This sample size threshold applies to each county for each time frame (2H2014, 2H2015, 2H2016, 2H2017, and 2H2018). If a county does not have at least 300 observations during any of these time frames, it is not included in the actual speed analysis. The 300 observations threshold is a conservative threshold and is based on a general mean and median sample size analysis. We consider a county to have a sufficient sample size if there are at least 300 total observations in each of the five years after the cleaning and trimming rules have been applied. County geography is assigned using the latitude and longitude coordinates that are collected during each Ookla speed test, via the device's GPS. This allows us to evaluate actual median upload and download speeds at the county level, in each year of the five-year time period, for counties in which approximately 93% of the U.S. population live (not including the U.S. Territories). If a census block has LTE coverage of at least 5/1 Mbps based on the Form 477 minimum advertised speeds, it is assigned the median upload and download speeds that are calculated for the county in which it is located, which allows us to evaluate the mobile broadband speeds for each census block within the United States.

¹¹² The percentage of the population in our analysis is based on the total U.S. population, not including the U.S. Territories, for which we separately report our results. The Ookla speed data population in Figure 2b is a subset of the total U.S. population evaluated in Figure 2a and refers to the population in the counties for which we believe there are a statistically significant number of on-the-ground speed test observations. We do not have Ookla speed data for the U.S. Territories. In 2018, for example, the U.S. population, not including the U.S. Territories, was 325.167 million, whereas in Figure 2b, we use 304.288 million as the basis for our 2018 calculations. The population evaluated figure, 304.288 million, is the population for the U.S., excluding the U.S. Territories and the population in the counties without a sufficient number of reliable on-the-ground speed test data observations.

¹¹³ *2018 Report*, 33 FCC Rcd at 1672-74, paras. 31-34 (discussing use of Form 477 combined with Ookla data to account for limitations in both data sets). We note that no commenter has proposed alternative data sets for the specific analysis in this report.

¹¹⁴ See EducationSuperHighway, *2019 State of the States Report* (Oct. 2019) (*2019 State of the States Report*), <https://s3-us-west-1.amazonaws.com/esh-sots-pdfs/2019%20State%20of%20the%20States.pdf>. In the *2019 Report*, we also evaluated information provided by the Consortium for School Networking (CoSN), specifically the *CoSN's 2018-2019 Annual Infrastructure Report*, a report published in January 2019. See *2019 Report*, 34 FCC Rcd at 3887-88, para. 51. Because the *CoSN's 2018-2019 Annual Infrastructure Report* does not provide data for 2019 and no subsequent report has been issued, we do not rely on any COSN Annual Infrastructure Report in this Report.

¹¹⁵ See EducationSuperHighway, *2019 State of the States Report* at 21-22; see also EducationSuperHighway: *2019 State of the States FAQ* (Oct. 2019), <https://stateofthestates.educationsuperhighway.org/faq.html> (*2019 State of the States Report FAQ*). EducationSuperHighway uses a sample of public school districts receiving broadband services—including, but not limited to, fiber services—in funding year 2019 in its dataset. See *id.*

B. Broadband Deployment Estimates

35. In Figures 1 through 3 below, we present our measurement of deployment, evaluating progress by comparing deployment in the present year to deployment in the previous four years.¹¹⁶ Our released deployment data are periodically updated as filers revise their data. For purposes of this Report, we also report results for federally-recognized Tribal lands. We aggregate federally-recognized Tribal lands into four Tribal lands categories (the Lower 48 States,¹¹⁷ Tribal Statistical Areas,¹¹⁸ Alaskan Villages,¹¹⁹ and Hawaiian Homelands)¹²⁰ and report deployment for each of these four geographic categories separately, as well as together.¹²¹

1. Deployment of Fixed Advanced Telecommunications Capability

36. Figure 1 shows the deployment of fixed terrestrial broadband at speeds of 25/3 Mbps, the Commission's current benchmark for fixed advanced telecommunications capability.¹²² As of year-end 2018, 94.4% of the overall population had coverage of such services, up from 93.5% in 2017. Nonetheless, the gap in rural and Tribal America remains notable: 22.3% of Americans in rural areas and 27.7% of Americans in Tribal lands lack coverage from fixed terrestrial 25/3 Mbps broadband, as compared to only 1.5% of Americans in urban areas.¹²³ The data demonstrate, however, that the gap between urban and rural or Tribal areas has narrowed each year over the last five years. Indeed, while the gap between urban and rural areas was 30 percentage points as of year-end 2016, it was only 20.8 percentage points as of year-end 2018. In 2016, 25/3 Mbps satellite service was reported for the first time in the Form 477 data collection.¹²⁴ If we include satellite service in our estimate, the December 2018 data shows that fixed 25/3 Mbps service is deployed to nearly every American.¹²⁵

¹¹⁶ Unless otherwise noted, the deployment percentage estimate for fixed terrestrial services and/or mobile services is the population in the census blocks with coverage for the service divided by the total population in the area being considered (e.g., United States, all rural areas, all urban areas).

¹¹⁷ These areas include: (1) Joint Use Areas; (2) legal, federally-recognized American Indian area consisting of reservation and associated off-reservation trust land; (3) legal, federally-recognized American Indian area consisting of reservation only; and (4) legal, federally-recognized American Indian area consisting of off-reservation trust land only.

¹¹⁸ Tribal statistical areas are statistical American Indian areas. These are defined for a federally-recognized Tribe that does not have reservation or off-reservation trust land, specifically a Tribal designated statistical area (TDSA) or Oklahoma Tribal statistical area (OTSA).

¹¹⁹ Alaskan Native village statistical area.

¹²⁰ Hawaiian Home Lands established by the Hawaiian Homes Commission Act of 1921.

¹²¹ See *infra* Fig. 10.

¹²² In all instances in which we refer in this Report to data for the United States, unless stated otherwise, we refer to the fifty States and the District of Columbia, but not the U.S. Territories.

¹²³ For purposes of presenting estimates for rural and urban areas, we aggregate all similarly categorized areas. The designation of a census block as urban is based upon the 2010 Census. An urban census block encompasses all population, housing, and territory included within a census block categorized as in an urban area or urban cluster. A rural census block encompasses all population, housing, and territory not included within an urban census blocks.

¹²⁴ 2018 Report, 32 FCC Rcd at 1681, para. 51.

¹²⁵ See also *infra* Appx. 8 (Deployment (Millions) of Fixed Services (Including Satellite) at Different Speed Tiers in the United States). We also present estimates for fixed wired services, excluding satellite and fixed wireless services. See *infra* Appx. 9 (Deployment (Millions) of Fixed Wired Services (Including Satellite) at Different Speed Tiers in the United States).

Fig. 1
Deployment (Millions) of Fixed Terrestrial 25/3 Mbps Services

	2014		2015		2016		2017		2018	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%
United States	284.246	89.4%	287.853	89.9%	296.320	91.9%	304.473	93.5%	308.913	94.4%
Rural Areas	37.174	60.3%	38.271	61.5%	42.628	67.7%	46.982	73.7%	50.099	77.7%
Urban Areas	247.072	96.4%	249.582	96.7%	253.692	97.7%	257.491	98.3%	258.814	98.5%
Tribal Lands	2.245	57.1%	2.290	57.8%	2.520	63.1%	2.734	68.1%	2.921	72.3%
Pop. Evaluated	317.954	100.0%	320.289	100.0%	322.518	100.0%	325.716	100.0%	327.167	100.0%

2. Deployment of Mobile LTE

37. Figure 2a shows that approximately all of the American population lives in geographical areas covered by mobile LTE with a minimum advertised speed of at least 5/1 Mbps.¹²⁶ Further, from 2014 to 2018, the percentage of Americans living in rural areas with coverage of LTE at 5/1 Mbps increased from 96.5% to 99.4%. Figure 2b also shows significant improvement since 2017 in the deployment of mobile LTE services at median speeds of at least 10/3 Mbps for the United States, urban areas, and rural areas. Figure 2b shows that between 2017 and 2018, the percentage of Americans living in the United States with mobile LTE services coverage at median speeds of 10/3 Mbps increased from 89.0% to 94.9%. In addition, gains have been made in rural areas, where coverage increased from 69.3% to 83.3% between 2017 and 2018, after being relatively stagnant between 2014 and 2017.¹²⁷

¹²⁶ Questions have arisen in various contexts regarding the reliability of mobile coverage data. See, e.g., *Mobility Fund Phase II Challenge Process Order*, 32 FCC Rcd at 6286, para. 7, 6287, para. 10, 6298, para. 34. The Commission has begun to implement improvements in our data collection process and has sought comment on other steps to obtain more accurate and reliable mobile deployment data. *Digital Opportunity Data Collection Order*, 34 FCC Rcd at 7549-59, paras. 112-34. See *supra* n.106.

¹²⁷ We present additional deployment data for mobile LTE services for each state, the District of Columbia, U.S. Territory, and each category of Tribal land in the appendices. See *infra* Appxs. 1, 2, and 3 (reporting figures by state, the District of Columbia, and U.S. Territory), Appx. 4 (reporting figures by county and county equivalent), and Appx. 6 (reporting figures for Tribal lands and states).

Fig. 2a
Deployment (Millions) of Mobile LTE with a Minimum Advertised Speed of 5/1 Mbps

Area	2014		2015		2016		2017		2018	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%
United States	315.506	99.2%	318.923	99.6%	321.347	99.6%	325.117	99.8%	326.727	99.9%
Rural Areas	59.463	96.5%	60.969	97.9%	61.802	98.2%	63.204	99.1%	64.097	99.4%
Urban Areas	256.043	99.9%	257.954	100.0%	259.545	100.0%	261.912	100.0%	262.630	100.0%
Tribal Lands	3.626	92.2%	3.722	93.9%	3.788	94.9%	3.896	97.0%	3.937	97.5%
Pop. Evaluated	317.954	100.0%	320.289	100.0%	322.518	100.0%	325.716	100.0%	327.167	100.0%

Fig. 2b
Deployment (Millions) of Mobile LTE with a Median Speed of 10/3 Mbps¹²⁸

Area	2014		2015		2016		2017		2018	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%
United States	237.210	80.1%	245.843	82.5%	261.898	87.3%	269.494	89.0%	288.809	94.9%
Rural Areas	32.638	70.3%	32.193	69.3%	32.962	70.1%	32.966	69.3%	40.103	83.3%
Urban Areas	204.573	81.9%	213.650	85.0%	228.936	90.5%	236.528	92.6%	248.706	97.1%
Pop. Evaluated	296.204	93.2%	297.899	93.0%	300.036	93.0%	302.940	93.0%	304.288	93.0%

3. Deployment of Fixed Services and Mobile LTE

38. Figure 3a shows deployment across all geographic areas for both fixed terrestrial 25/3 Mbps services and 5/1 Mbps mobile LTE.¹²⁹ Overall, as of year-end 2018, approximately 309 million Americans, or 94.4% of the population, are covered by both 25/3 Mbps fixed terrestrial service and mobile LTE with a minimum advertised speed of 5/1 Mbps. In rural areas, 77.4% of Americans are covered by both services, as opposed to 98.5% of Americans in urban areas, up from 73.3% and 98.3%, respectively, in 2017. On Tribal lands, 72.1% of Americans have coverage from both services, up from 67.8% in 2017. Figure 3b shows deployment of fixed terrestrial speeds of 25/3 Mbps and mobile LTE with median speed of 10/3 Mbps. As of December 31, 2018, 91.7% of Americans live in geographic areas covered by both services, an increase of 5.9 percentage points since 2017. Further, these data

¹²⁸ The analyses in Figures 2a, 3a, and 3c include all areas of the United States (besides the U.S. Territories) and are based on Form 477 data. In contrast, the analyses in Figures 2b, 3b, and 3d are based on Ookla data, and exclude any county (and its associated census blocks) for which there is insufficient Ookla data. In addition, we do not report results for Tribal lands in Figures 2b, 3b, and 3d because we have concerns with the reliability of the Ookla data for these areas. Tribal areas not only typically have fewer speed tests, but there are also fewer of these areas relative to urban and rural areas. Thus, deployment estimates for tribal areas are more sensitive to sample variance. The population figure reported in the bottom row of these figures is the population evaluated for the reported time period and the percentage is the percentage of the U.S. population evaluated. Accordingly, the 304.288 million population evaluated figure for 2018 in Figure 2b represents 93% of the overall population in the 50 U.S. states plus the District of Columbia (304.288/327.167 = 0.93). Regardless of our deployment estimates for mobile LTE with a median speed of 10/3 Mbps, Americans residing in the counties without sufficient Ookla data to create a statistically significant county sample to be included in Figures 2b, 3b, and 3d, receive minimum advertised speeds of 5/1 Mbps, and likely receive mobile services with speeds higher than 5/1 Mbps.

¹²⁹ We present additional deployment data for fixed terrestrial 25/3 Mbps and/or mobile LTE services in the appendices. See *infra* Appxs. 1, 2 and 3 (reporting figures by state, District of Columbia, and U.S. Territory), Appx. 4 (reporting figures by county and county equivalent), Appx. 5 (reporting figures by urban and rural areas within each county or county equivalent), and Appx. 6 (reporting figures for Tribal lands).

indicate that, between 2017 and 2018, deployment increased from 56.3% to 69.8% for Americans living in rural areas, a larger increase that occurred between 2014 and 2017.

Fig. 3a
Deployment (Millions) of Fixed Terrestrial 25/3 Mbps and Mobile LTE
with a Minimum Advertised Speed of 5/1 Mbps

Area	2014		2015		2016		2017		2018	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%
United States	283.386	89.1%	287.387	89.7%	295.853	91.7%	304.216	93.4%	308.722	94.4%
Rural Areas	36.489	59.2%	37.840	60.8%	42.182	67.0%	46.731	73.3%	49.932	77.4%
Urban Areas	246.897	96.3%	249.547	96.7%	253.671	97.7%	257.485	98.3%	258.790	98.5%
Tribal Lands	2.206	56.1%	2.258	57.0%	2.491	62.4%	2.722	67.8%	2.914	72.1%
Pop. Evaluated	317.954	100.0%	320.289	100.0%	322.518	100.0%	325.716	100.0%	327.167	100.0%

Fig. 3b
Deployment (Millions) of Fixed Terrestrial 25/3 Mbps and Mobile LTE
with a Median Speed of 10/3 Mbps

Area	2014		2015		2016		2017		2018	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%
United States	221.249	74.7%	230.561	77.4%	249.802	83.3%	259.998	85.8%	279.162	91.7%
Rural Areas	22.634	48.8%	22.554	48.5%	24.947	53.1%	26.754	56.3%	33.595	69.8%
Urban Areas	198.615	79.5%	208.007	82.7%	224.855	88.9%	233.244	91.3%	245.568	95.9%
Pop. Evaluated	296.204	93.2%	297.899	93.0%	300.036	93.0%	302.940	93.0%	304.288	93.0%

39. Figure 3c reports deployment of fixed terrestrial 25/3 Mbps service *or* mobile LTE with a minimum advertised speed of 5/1 Mbps, and shows that services have been deployed to over 99.5% of the American population since 2014. Figure 3d shows that approximately 99.1% of the population in the evaluated areas are covered by either 25/3 Mbps fixed terrestrial service or mobile LTE with a median speed of at least 10/3 Mbps.

Fig. 3c
Deployment (Millions) of Fixed Terrestrial 25/3 Mbps or Mobile LTE
with a Minimum Advertised Speed of 5/1 Mbps

Area	2014		2015		2016		2017		2018	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%
United States	316.366	99.5%	319.389	99.7%	321.814	99.8%	325.373	99.9%	326.918	99.9%
Rural Areas	60.148	97.6%	61.400	98.6%	62.248	98.9%	63.455	99.5%	64.264	99.6%
Urban Areas	256.218	100.0%	257.989	100.0%	259.567	100.0%	261.919	100.0%	262.653	100.0%
Tribal Lands	3.664	93.2%	3.753	94.7%	3.817	95.6%	3.907	97.3%	3.944	97.7%
Pop. Evaluated	317.954	100.0%	320.289	100.0%	322.518	100.0%	325.716	100.0%	327.167	100.0%

Fig. 3d
Deployment (Millions) of Fixed Terrestrial 25/3 Mbps or Mobile LTE
with a Median Speed of 10/3 Mbps

Area	2014		2015		2016		2017		2018	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%
United States	288.119	97.3%	290.355	97.5%	293.855	97.9%	297.944	98.4%	301.608	99.1%
Rural Areas	40.331	86.9%	40.660	87.5%	41.888	89.1%	43.181	90.8%	45.710	94.9%
Urban Areas	247.787	99.2%	249.695	99.3%	251.967	99.6%	254.763	99.8%	255.897	99.9%
Pop. Evaluated	296.204	93.2%	297.899	93.0%	300.036	93.0%	302.940	93.0%	304.288	93.0%

40. Figure 3e reports deployment over the entire United States, including all U.S. Territories, for both fixed terrestrial 25/3 Mbps services *and* 5/1 Mbps mobile LTE as of December 31, 2018.¹³⁰ This data shows year end 2018 deployment rates comparable to those presented in Figure 1, in which the U.S. Territories are excluded.¹³¹

Fig. 3e
Deployment (Millions) of Fixed Terrestrial 25/3 Mbps and Mobile LTE with a Minimum
Advertised Speed of 5/1 Mbps for the United States, Including U.S. Territories
(As of December 31, 2018)

	Fixed Terrestrial 25/3 Mbps		Mobile LTE 5/1 Mbps		Fixed Terrestrial 25/3 Mbps and Mobile LTE 5/1 Mbps		Fixed Terrestrial 25/3 Mbps or Mobile LTE 5/1 Mbps	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%
United States	312.079	94.4%	330.245	99.9%	311.834	94.3%	330.489	99.9%
Rural Areas	50.254	77.6%	64.326	99.4%	50.079	77.4%	64.502	99.6%
Urban Areas	261.825	98.4%	265.918	100.0%	261.755	98.4%	265.988	100.0%
Pop. Evaluated	330.740	100.0%	330.740	100.0%	330.740	100.0%	330.740	100.0%

4. Additional Deployment Estimates

41. Figure 4 shows deployment of fixed terrestrial services at various speed tiers from year-end 2014 through 2018.¹³² As of December 2018, fixed terrestrial service of 50/5 Mbps service is deployed to 92.7% of the population, up from 91.6% in 2017. Between 2017 and 2018, the deployment of 100/10 Mbps increased from 88.6% to 90.5% of the population, and the deployment of 250/25 Mbps dramatically increased from 58.3% to 85.6% of the population. While deployment in rural areas and on Tribal lands lags behind deployment in urban areas at all five speed tiers, but the data show year-over-year improvements for all speeds in these areas. For example, the deployment of 250/25 Mbps increased from 28.2% to 51.6% of the rural population.

¹³⁰ Data presented in 3e includes Tribal Lands.

¹³¹ Appendices 1-5 include data for the U.S. Territories.

¹³² We present deployment estimates for all fixed services, including satellite broadband, in Appendix 8, and deployment estimates for all fixed wired services, excluding satellite and fixed wireless services, in Appendix 9. See *infra* Appx. 8 (Deployment (Millions) of Fixed Services (Including Satellite) at Different Speed Tiers), Appx. 9 (Deployment (Millions) of Fixed Wired Services at Different Speed Tiers). The data in Figure 4 and Appendices 8 and 9 exclude the U.S. Territories.

Fig. 4
Deployment (Millions) of Fixed Terrestrial Services at Different Speed Tiers

Area	2014		2015		2016		2017		2018	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%
10/1 Mbps										
United States	297.873	93.7%	302.138	94.3%	309.095	95.8%	315.656	96.9%	318.795	97.4%
Rural Areas	46.263	75.1%	48.361	77.7%	52.424	83.3%	56.169	88.1%	58.450	90.6%
Urban Areas	251.609	98.2%	253.777	98.4%	256.671	98.9%	259.487	99.1%	260.345	99.1%
Tribal Lands	2.701	68.7%	2.886	72.8%	3.201	80.2%	3.348	83.3%	3.510	86.9%
25/3 Mbps										
United States	284.246	89.4%	287.853	89.9%	296.320	91.9%	304.473	93.5%	308.913	94.4%
Rural Areas	37.174	60.3%	38.271	61.5%	42.628	67.7%	46.982	73.7%	50.099	77.7%
Urban Areas	247.072	96.4%	249.582	96.7%	253.692	97.7%	257.491	98.3%	258.814	98.5%
Tribal Lands	2.245	57.1%	2.290	57.8%	2.520	63.1%	2.734	68.1%	2.921	72.3%
50/5 Mbps										
United States	270.740	85.2%	283.329	88.5%	291.260	90.3%	298.242	91.6%	303.182	92.7%
Rural Areas	32.100	52.1%	35.316	56.7%	39.147	62.2%	42.312	66.3%	45.530	70.6%
Urban Areas	238.640	93.1%	248.013	96.1%	252.114	97.1%	255.930	97.7%	257.652	98.1%
Tribal Lands	1.913	48.6%	2.116	53.4%	2.269	56.9%	2.462	61.3%	2.639	65.3%
100/10 Mbps										
United States	201.894	63.5%	215.582	67.3%	244.110	75.7%	288.497	88.6%	296.243	90.5%
Rural Areas	16.472	26.7%	20.481	32.9%	25.781	41.0%	37.223	58.4%	40.388	62.6%
Urban Areas	185.423	72.3%	195.101	75.6%	218.329	84.1%	251.275	95.9%	255.855	97.4%
Tribal Lands	1.315	33.4%	1.669	42.1%	1.875	47.0%	2.198	54.7%	2.420	59.9%
250/25 Mbps										
United States	15.692	4.9%	67.912	21.2%	140.577	43.6%	190.041	58.3%	280.143	85.6%
Rural Areas	2.031	3.3%	5.460	8.8%	9.871	15.7%	17.991	28.2%	33.274	51.6%
Urban Areas	13.662	5.3%	62.452	24.2%	130.707	50.4%	172.050	65.7%	246.869	94.0%
Tribal Lands	0.048	1.2%	0.276	7.0%	1.330	33.3%	1.604	39.9%	1.837	45.5%
Pop. Evaluated	317.954	100.0%	320.289	100.0%	322.518	100.0%	325.716	100.0%	327.167	100.0%

C. Demographic Data

42. In Figures 5, 6, 7, and 8, we present demographic data with our deployment analysis.¹³³ Figures 5 and 6 compare the available demographic data for Americans with and without coverage by

¹³³ To present demographic data and compare the demographic data between areas where services are and are not deployed, we aggregate the census block data up to the census block group level, the lowest aggregation level for which demographic information is available. This unavoidable aggregation leads to census blocks with differing characteristics being grouped together. In the case of differing levels of deployment, we designate a census block group as without deployment if more than 5% of the population in the census block group is without services, regardless of the level of deployment in any particular census block in the group. Further, some census block groups are a mix of census blocks that are designated as rural and urban. In such instances, we designate a census block group as rural if more than 50% of the population in the census block group resides in census blocks designated as rural. Finally, we designate a census block group as Tribal lands if more than 50% of the land area in the census block group is designated as Tribal lands. We use the Census Bureau's American Community Survey (ACS) Five-Year Estimates 2014-2018 for income and poverty measures for the states, District of Columbia and Puerto Rico;

(continued...)

fixed terrestrial 25/3 Mbps service and mobile LTE. Figure 5 presents this analysis for the United States (excluding U.S. Territories other than Puerto Rico) as a whole, urban and non-urban core areas, and Tribal lands for fixed terrestrial 25/3 Mbps service and mobile LTE with a minimum advertised speed of 5/1 Mbps in 2018.¹³⁴ The data show that, generally, Americans living in areas where these services are deployed typically live in census block groups with a lower percentage of households living in poverty, and with higher average populations, population densities, per capita incomes, and median household incomes than Americans living in areas without coverage by these services.

(Continued from previous page) _____

income measures are not available for the other U.S. Territories. Per capita income and median household income in the past twelve months are measured in 2018 Inflation-Adjusted Dollars. The household poverty rate is the proportion of households living below the poverty level. Population Density is the total population residing in the census block group as of 2018 divided by the square miles of land in the census block group, with the estimate of land area is based upon the 2010 Census.

¹³⁴ Demographic data is not available for U.S. Territories other than Puerto Rico. We provide state-by-state and county-by-county demographic deployment information (including for Puerto Rico) in Appendices 4 and 5, *infra*.

Fig. 5
Comparison of Demographic Data Between Areas Where Fixed Terrestrial 25/3 Mbps and Mobile LTE with a Minimum Advertised Speed of 5/1 Mbps Have Been Deployed and Where These Services Have Not Been Deployed (As of December 31, 2018)

	Average Population	Average Population Density	Average Per Capita Income (\$2018)	Average Median Household Income (\$2018)	Average Household Poverty Rate
United States¹³⁵					
With Deployment	1,513.0***	7,387.3***	\$33,234.04***	\$67,773.48***	14.6%***
Without Deployment	1,421.7	1,075.2	\$27,355.32	\$54,201.49	15.6%
Rural Areas					
With Deployment	1,444.3***	198.2***	\$32,005.61***	\$64,942.67***	11.2%***
Without Deployment	1,339.2	75.1	\$27,289.10	\$54,209.97	14.1%
Urban Areas					
With Deployment	1,521.0***	8,232.7***	\$33,378.27***	\$68,110.57***	15.1%***
Without Deployment	1,612.2	3,383.3	\$27,509.74	\$54,181.11	19.2%
Tribal Lands (Rural and Urban Areas)					
With Deployment	1,384.1	2,088.4***	\$27,103.51***	\$52,981.74***	16.5%***
Without Deployment	1,344.4	219.0	\$22,483.97	\$46,094.31	21.1%
Tribal Rural Areas					
With Deployment	1,409.4*	179.4***	\$25,866.22***	\$53,302.74***	16.0%***
Without Deployment	1,337.9	72.3	\$22,849.44	\$46,721.15	20.5%
Tribal Urban Areas					
With Deployment	1,377.2	2,605.3***	\$27,437.28***	\$52,894.91***	16.7%***
Without Deployment	1,372.5	849.1	\$20,925.28	\$43,389.77	23.3%
We test for a statistical difference in the reported means between areas with and without deployment of these services. The level of statistical significance is indicated by the number of stars. The absence of a star indicates no statistical difference between the reported figures. * signifies statistical significance at a 90% level of confidence, ** signifies statistical significance at a 95% level of confidence, and *** signifies statistical significance at a 99% level of confidence.					

43. Figure 6 compares the available demographic data across urban and rural areas for Americans in the 50 states and District of Columbia with and without coverage by both fixed terrestrial 25/3 Mbps service and mobile LTE service with a median speed of 10/3 Mbps in 2018.¹³⁶ Like Figure 5, Figure 6 shows that Americans living in areas where these services are deployed typically live in census block groups where there is a lower percentage of households living in poverty, and where there are higher average populations, population densities, per capita incomes, and median household incomes.

¹³⁵ Data excludes U.S. Territories other than Puerto Rico.

¹³⁶ As is the case with the presentation of results based upon 10/3 Mbps Ookla data, we exclude the U.S. Territories from this analysis due to a lack of Ookla data for these areas, and we do not report separately for Tribal lands because of concerns with the representativeness of the Ookla data for these areas. *See supra* Sections IV.B.2 and IV.B.3.

Fig. 6

Comparison of Demographic Data Between Areas Where Fixed Terrestrial 25/3 Mbps and Mobile LTE with a Median Speed of 10/3 Mbps Have Been Deployed and Where These Services Have Not Been Deployed (As of December 31, 2018)

	Average Population	Average Population Density	Average Per Capita Income (\$2018)	Average Median Household Income (\$2018)	Average Household Poverty Rate
United States¹³⁷					
With Deployment	1,544.5***	7,940.4***	\$34,174.45***	\$69,911.65***	14.0%***
Without	1,502.4	1,497.4	\$28,194.59	\$56,344.62	15.0%
Rural Areas					
With Deployment	1,533.0***	196.4***	\$33,855.27***	\$69,510.34***	10.0%***
Without	1,446.0	90.1	\$28,489.00	\$57,330.60	13.0%
Urban Areas					
With Deployment	1,545.6***	8,643.9***	\$34,203.40***	\$69,948.42***	14.4%***
Without	1,577.0	3,357.1	\$27,802.86	\$54,998.17	17.6%
We test for a statistical difference in the reported means between areas with and without deployment of these services. The level of statistical significance is indicated by the number of stars. The absence of a star indicates no statistical difference between the reported figures. * signifies statistical significance at a 90% level of confidence, ** signifies statistical significance at a 95% level of confidence, and *** signifies statistical significance at a 99% level of confidence.					

44. Figure 7 shows, for 2018, how the average proportion of the population with coverage by fixed terrestrial 25/3 Mbps service and mobile LTE service with a minimum advertised speed of 5/1 Mbps varies with census block group-level median household income, census block group-level population density, and census block group-level poverty rate.¹³⁸ On average, deployment is highest in census block groups with the highest median household income, the highest population density, and the lowest poverty rate.

¹³⁷ Data excludes U.S. Territories other than Puerto Rico.

¹³⁸ We present these results at the census block group, the smallest geographic areas for which income data is available, to accurately examine how the deployment rate varies with income measures in the geographic area.

Fig. 7
Average Percentage of Population with Fixed Terrestrial 25/3 Mbps and Mobile LTE with a Minimum Advertised Speed of 5/1 Mbps by Census Block Group Level Demographic Variable (As of December 31, 2018)¹³⁹

	Fixed Terrestrial 25/ 3 Mbps	Mobile LTE 5/ 3 Mbps	Both Fixed and Mobile LTE
Median Household Income (\$2018)			
First Quartile (Lowest Median Household Income)	92.2%	99.6%	92.0%
Second Quartile	91.0%	99.8%	90.9%
Third Quartile	93.8%	99.9%	93.7%
Fourth Quartile (Highest Median Household Income)	98.1%	100.0%	98.0%
Population Density			
First Quartile (Lowest Pop. Density)	78.6%	99.3%	78.3%
Second Quartile	97.7%	100.0%	97.6%
Third Quartile	99.0%	100.0%	99.0%
Fourth Quartile (Highest Pop. Density)	99.2%	100.0%	99.2%
Household Poverty Rate			
First Quartile (Lowest Household Poverty Rate)	96.4%	99.9%	96.4%
Second Quartile	93.6%	99.9%	93.5%
Third Quartile	91.8%	99.8%	91.7%
Fourth Quartile (Highest Household Poverty Rate)	93.2%	99.7%	93.0%

45. Figure 8 depicts how the average proportion of the population with coverage by fixed terrestrial services by speed tier varies with census block-level median household income, census block-level population density, and census block-level household poverty rate. On average, deployment is highest in census block groups with the highest median household income, the highest population density and the lowest household poverty rate.

¹³⁹ Data excludes U.S. Territories other than Puerto Rico.

Fig. 8
Average Percentage of Population with Fixed Terrestrial Services
by Census Block Group Level Demographic Variable (As of December 31, 2018)¹⁴⁰

	10/ 1 Mbps	25/ 3 Mbps	50/ 5 Mbps	100/ 10 Mbps	250/ 25 Mbps
Median Household Income (\$2018)					
First Quartile (Lowest Median Household Income)	96.6%	92.2%	87.2%	84.9%	78.1%
Second Quartile	96.3%	91.0%	88.2%	85.2%	78.3%
Third Quartile	97.4%	93.8%	91.1%	88.6%	83.5%
Fourth Quartile (Highest Median Household Income)	99.0%	98.1%	97.2%	96.4%	94.0%
Population Density					
First Quartile (Lowest Pop. Density)	91.0%	78.6%	71.9%	64.8%	53.7%
Second Quartile	98.9%	97.7%	95.6%	94.3%	88.1%
Third Quartile	99.4%	99.0%	98.1%	97.7%	94.7%
Fourth Quartile (Highest Pop. Density)	99.4%	99.2%	97.7%	97.5%	96.6%
Household Poverty Rate					
First Quartile (Lowest Household Poverty Rate)	98.3%	96.4%	94.9%	93.4%	89.8%
Second Quartile	97.3%	93.6%	91.3%	88.8%	83.5%
Third Quartile	96.5%	91.8%	89.1%	86.3%	80.0%
Fourth Quartile (Highest Household Poverty Rate)	96.9%	93.2%	88.3%	86.3%	80.4%

D. Tribal Lands Data

46. In Figures 9 and 10, we present additional deployment estimates for Americans living on Tribal lands for each Tribal lands category.¹⁴¹ The Commission's data indicate that deployment in rural Tribal lands continue to lag deployment in urban Tribal lands.

47. Figure 9 presents deployment on Tribal lands from 2014 to 2018 of fixed terrestrial 25/3 Mbps services and mobile LTE service with a speed of at least 5/1 Mbps. Overall, in 2018, 72.1% of Tribal lands are covered by fixed terrestrial 25/3 Mbps services and mobile LTE with a speed of 5/1 Mbps, based on Form 477 data, an increase from 67.8% in 2017 and 62.4% in 2016. Rural Tribal lands continue to lag behind urban Tribal lands, with only 52.9% of all Tribal lands in rural areas having deployment of both services, as compared to 93.1% of Tribal lands in urban areas. But that 52.9% figure for 2018 is up from 45.7% in 2017 and 37.8% in 2016.

¹⁴⁰ Data excludes U.S. Territories other than Puerto Rico.

¹⁴¹ We group Tribal lands as designated by their 2010 census block delineations. Alaskan Villages include census blocks that are designated as Alaskan Native village statistical areas. Hawaiian Home Lands include census blocks that were established by the Hawaiian Homes Commission Act of 1921. Tribal statistical areas are statistical American Indian areas. These are defined for a federally-recognized Tribe that does not have reservation or off-reservation trust land; specifically, a Tribal-designated statistical area (TDSA) or Oklahoma Tribal statistical area (OTSA). The Lower 48 States category of includes census blocks designated as: (1) Joint Use Areas; (2) legal, federally-recognized American Indian area consisting of reservation and associated off-reservation trust land; (3) legal, federally-recognized American Indian area consisting of reservation only; and (4) legal, federally-recognized American Indian area consisting of off-reservation trust land only. We present more granular state-by-state Tribal lands data in Appx. 6 (Deployment of Fixed Terrestrial 25/3 Mbps Services and/or mobile LTE with a Minimum Advertised Speed of 5/1 Mbps by Tribal Lands and State).

Fig. 9
Deployment (Millions) on Tribal Lands of Fixed Terrestrial 25/3 Mbps and Mobile LTE
with a Minimum Advertised Speed of 5/1 Mbps

	2014		2015		2016		2017		2018	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%
Tribal Lands	2.206	56.1%	2.258	57.0%	2.491	62.4%	2.722	67.8%	2.914	72.1%
Rural Areas	0.592	29.3%	0.614	30.1%	0.780	37.8%	0.954	45.7%	1.114	52.9%
Urban Areas	1.614	84.5%	1.644	85.6%	1.711	88.8%	1.768	91.6%	1.799	93.1%
Alaskan Villages	0.110	42.9%	0.110	42.7%	0.135	51.5%	0.151	57.0%	0.176	65.9%
Rural Areas	0.039	23.7%	0.039	23.7%	0.061	36.2%	0.073	42.4%	0.093	54.1%
Urban Areas	0.071	77.0%	0.071	76.7%	0.074	79.0%	0.079	83.3%	0.083	87.3%
Hawaiian Homelands	0.032	96.9%	0.030	88.9%	0.030	88.6%	0.030	89.4%	0.030	89.1%
Rural Areas	0.005	83.0%	0.002	43.9%	0.002	43.5%	0.003	47.7%	0.003	47.8%
Urban Areas	0.027	99.8%	0.027	98.0%	0.027	98.0%	0.027	98.2%	0.027	98.2%
Lower 48 States	0.417	38.7%	0.452	41.5%	0.508	46.1%	0.595	53.3%	0.638	56.5%
Rural Areas	0.184	25.6%	0.207	28.4%	0.239	32.3%	0.311	41.3%	0.344	45.1%
Urban Areas	0.233	64.6%	0.245	67.8%	0.270	74.1%	0.284	78.1%	0.293	80.2%
Statistical Areas	1.648	64.2%	1.666	64.5%	1.818	70.2%	1.946	74.8%	2.070	79.4%
Rural Areas	0.365	32.1%	0.365	32.0%	0.478	41.5%	0.567	49.0%	0.674	57.9%
Urban Areas	1.283	89.7%	1.301	90.3%	1.341	93.0%	1.378	95.4%	1.396	96.6%
Pop. Evaluated	3.933	100.0%	3.964	100.0%	3.991	100.0%	4.017	100.0%	4.039	100.0%

48. In Figure 10, we present deployment estimates for fixed terrestrial 25/3 Mbps service and mobile LTE service with a speed of at least 5/1 Mbps on Tribal lands. As of December 31, 2018, fixed terrestrial 25/3 Mbps services is deployed to 72.3% of Americans on Tribal lands, 97.5% are covered by mobile LTE at speeds of at least 5/1 Mbps, and 72.1% are covered by both services. The figures show variability in deployment across the Tribal lands categories, with the least deployment occurring in Alaskan Villages.

Fig. 10
Deployment (Millions) of Fixed Terrestrial 25/3 Mbps and/or Mobile LTE with a Minimum
Advertised Speed of 5/1 Mbps on Tribal Lands (As of December 31, 2018)

	Pop. Evaluated	Fixed 25/3 Mbps		Mobile LTE 5/1 Mbps		Fixed 25/3 Mbps and Mobile LTE 5/1 Mbps		Fixed 25/3 Mbps or Mobile LTE 5/1 Mbps	
		Pop.	% of Pop.	Pop.	% of Pop.	Pop.	% of Pop.	Pop.	% of Pop.
All Tribal Lands	4.039	2.921	72.3%	3.937	97.5%	2.914	72.1%	3.944	97.7%
Alaskan Villages	0.267	0.177	66.5%	0.205	77.0%	0.176	65.9%	0.207	77.6%
Hawaiian Homelands	0.034	0.030	89.1%	0.034	99.9%	0.030	89.1%	0.034	99.9%
Lower 48 States	1.129	0.643	56.9%	1.092	96.7%	0.638	56.5%	1.097	97.2%
Tribal Statistical Areas	2.609	2.072	79.4%	2.605	99.9%	2.070	79.4%	2.606	99.9%

E. Adoption Data

49. We also assess the adoption of fixed broadband service¹⁴² and report adoption rates based upon year-end data from 2014 to 2018. The reported adoption rates are the ratio of residential Form 477 data subscriptions to fixed terrestrial services of at least the designated speed divided by the total number of households in the area where our Form 477 deployment data indicate that fixed terrestrial services of at least the designated speed are deployed.¹⁴³

50. Using Form 477 subscribership data, Figure 11 shows the overall adoption rates¹⁴⁴ from 2014 through 2018 for fixed terrestrial services for the United States (excluding U.S. Territories) as a whole, urban and non-urban core areas, and Tribal lands.¹⁴⁵ The data show year-to-year increases in the adoption of broadband services across the vast majority of areas, including Tribal lands.

¹⁴² We present adoption data for each state and the District of Columbia in an Appendix. *See infra* Appx. 7 (Adoption Rate for Fixed Terrestrial Services in the United States, Including the U.S. Territories (As of December 2018)).

¹⁴³ The subscriber data is reported for the census tract rather than census block. Thus, we aggregate the deployment data up to the census tract. We calculate adoption rates for the following geographic areas: the U.S. as a whole, all urban core census tracts, all non-urban core census tracts, the county (or county equivalent), and for each state and the District of Columbia. A census tract is designated as “Urban Core” if it has a land area less than three square miles and a population density of at least 1,000 people per square mile. A census tract is designated as “Non-Urban Core” if we have not designated the census tract as Urban Core. A census tract is designated Tribal lands if more than 50% of the land area is Tribal land.

¹⁴⁴ The reported adoption rates for 2014 to 2018 are based upon the Form 477 deployment data and subscriber data as of December 31, 2014, December 31, 2015, December 31, 2016, December 31, 2017, and December 31, 2018.

¹⁴⁵ As noted above, figures that include deployment data from 2014-2018 do not include U.S. Territories data. Accordingly, we do not include the U.S. Territories in Figure 11. We report adoption rates, as of December 31, 2018, for each State and U.S. Territory in Appendix 7.

Fig. 11
Overall Adoption Rate for Fixed Terrestrial Services at Different Speed Tiers

	2014	2015	2016	2017	2018
10/1 Mbps					
United States¹⁴⁶	56.0%	62.2%	66.3%	69.7%	73.3%
Non-Urban Core Areas	49.7%	55.8%	60.3%	63.4%	67.4%
Urban Core Areas	60.7%	67.0%	71.0%	74.7%	78.1%
Tribal Lands	35.5%	42.4%	43.1%	46.3%	51.2%
Non-Urban Core Areas	30.6%	36.1%	36.9%	40.4%	45.3%
Urban Core Areas	46.0%	56.8%	59.1%	62.3%	68.1%
25/3 Mbps					
United States	38.5%	48.1%	53.5%	60.2%	65.1%
Non-Urban Core Areas	34.4%	43.2%	48.9%	55.1%	59.9%
Urban Core Areas	41.3%	51.5%	56.9%	64.0%	69.2%
Tribal Lands	27.3%	31.7%	33.4%	37.9%	44.0%
Non-Urban Core Areas	23.3%	28.5%	30.3%	34.5%	38.7%
Urban Core Areas	33.9%	37.1%	39.4%	45.1%	56.1%
50/5 Mbps					
United States	24.8%	33.9%	44.4%	54.8%	60.6%
Non-Urban Core Areas	19.9%	27.8%	41.2%	50.8%	56.4%
Urban Core Areas	28.0%	38.0%	46.7%	57.7%	63.8%
Tribal Lands	22.7%	25.0%	28.9%	34.2%	37.8%
Non-Urban Core Areas	18.0%	20.4%	25.3%	30.9%	34.0%
Urban Core Areas	28.9%	32.0%	34.9%	40.5%	45.6%
100/10 Mbps					
United States	11.2%	16.7%	19.2%	29.6%	45.7%
Non-Urban Core Areas	11.7%	16.4%	17.9%	27.0%	44.3%
Urban Core Areas	11.0%	16.9%	20.0%	31.4%	46.6%
Tribal Lands	7.1%	7.4%	10.5%	18.3%	30.2%
Non-Urban Core Areas	7.4%	6.4%	9.8%	17.0%	26.4%
Urban Core Areas	6.8%	8.7%	11.6%	20.4%	37.3%
250/25 Mbps					
United States	2.5%	4.2%	1.8%	4.1%	5.5%
Non-Urban Core Areas	3.0%	6.7%	2.3%	4.1%	5.0%
Urban Core Areas	2.3%	3.1%	1.6%	4.1%	5.8%
Tribal Lands	0.1%	1.4%	1.8%	4.4%	7.5%
Non-Urban Core Areas	0.2%	1.7%	2.1%	4.5%	8.0%
Urban Core Areas	0.0%	0.2%	1.5%	4.3%	6.7%

51. Figure 12 reports average county-level overall adoption rates for fixed terrestrial services by speed tier against the quartile ranking for median household income, population density, the poverty

¹⁴⁶ All data presented for the United States in Figure 11 excludes U.S. Territories.

rate, and the proportion of the population that resides in a rural area. These data suggest that the average household adoption rate increases with median household income and population density, and the adoption rate decreases as the poverty rate and rural population rate increase.

Fig. 12
Average County Overall Adoption Rate for Fixed Terrestrial Services
by County Level Demographic Variable (As of December 31, 2018)¹⁴⁷

	10/ 1 Mbps	25/ 3 Mbps	50/ 5 Mbps	100/ 10 Mbps	250/ 25 Mbps
Median Household Income (\$2018)					
First Quartile (Lowest Median Household Income)	33.5%	23.4%	22.6%	18.1%	3.7%
Second Quartile	46.7%	37.2%	32.9%	27.4%	3.7%
Third Quartile	53.9%	43.3%	37.9%	30.4%	3.9%
Fourth Quartile (Highest Median Household Income)	67.0%	57.2%	53.0%	39.2%	5.2%
Population Density					
First Quartile (Lowest Median Population Density)	43.5%	30.2%	23.6%	19.3%	5.9%
Second Quartile	39.5%	29.9%	26.4%	20.9%	2.9%
Third Quartile	50.2%	41.8%	38.4%	30.8%	3.1%
Fourth Quartile (Highest Median Population Density)	67.8%	58.9%	59.4%	45.1%	5.1%
Household Poverty Rate					
First Quartile (Lowest Median Poverty Rate)	62.6%	51.6%	47.0%	35.5%	4.9%
Second Quartile	54.1%	44.1%	39.2%	31.4%	4.2%
Third Quartile	48.3%	39.1%	35.1%	28.7%	4.0%
Fourth Quartile (Highest Median Poverty Rate)	36.1%	26.2%	25.2%	19.8%	3.3%
Rural Population Rate					
First Quartile (Lowest Rural Population Rate)	66.8%	58.4%	57.8%	43.6%	5.6%
Second Quartile	52.9%	43.2%	39.7%	31.9%	3.3%
Third Quartile	41.7%	32.3%	28.8%	23.3%	3.2%
Fourth Quartile (Highest Rural Population Rate)	39.5%	26.9%	21.3%	17.1%	4.6%

F. Schools and Classrooms Data

52. We continue to measure availability of advanced telecommunications capability in “elementary and secondary schools and classrooms”¹⁴⁸ using a short-term and long-term goal for broadband connectivity to schools of 100 Mbps per 1,000 students and staff, and 1 Gbps per 1,000 students and staff, respectively.¹⁴⁹ According to the *2019 State of the States Report*, 99% of school

¹⁴⁷ All data presented for the United States in Figure 12 excludes U.S. Territories other than Puerto Rico.

¹⁴⁸ 47 U.S.C. § 1302(b).

¹⁴⁹ See *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, 8885, para. 34 (2014) (*2014 First E-rate Order*). We use this as the current method of measuring school and classroom connectivity and will address any future needs at

(continued....)

districts, or 46.3 million students, now meet the Commission’s short-term connectivity goal of 100 Mbps per 1,000 users, up from 44.7 million students in 2018.¹⁵⁰ This means that approximately 750,000 students are not receiving broadband service that meets the short-term connectivity goal.¹⁵¹

53. Regarding the long-term connectivity goal for schools of 1 Gbps per 1,000 users, the *2019 State of the States Report* estimates that, based on the most recent data, 38% of school districts currently meet the goal, which is up from 28% in 2018.¹⁵² The *2019 State of the States Report* also finds that 57% of the smallest rural schools districts and 23% of the 1,000 largest school districts meet the long-term goal.¹⁵³ EducationSuperHighway estimates that 743 schools still need access to fiber to meet the short- and long-term connectivity goals, down 45% from the 1,356 schools without access to fiber in 2018.¹⁵⁴

V. COMMISSION EFFORTS TO CLOSE THE DIGITAL DIVIDE

54. Since the *2019 Report*, the Commission has continued its efforts to accelerate deployment of advanced telecommunications ability and close the digital divide by removing barriers to wireline and wireless investment, modernizing its universal service programs, and making more spectrum available for the commercial marketplace. We discuss highlights of this work, much of which remains ongoing as we continue to work towards ensuring that all Americans, including those in rural areas, Tribal lands, and disaster-affected areas, have the benefits of high-speed broadband.

A. Removing Barriers to Investment

55. Section 706 of the Telecommunications Act of 1996 exhorts the Commission to encourage deployment of advanced communications capability by “remov[ing] barriers to infrastructure investment.”¹⁵⁵ Encouraging investment in broadband deployment is essential to closing the digital divide, and the Commission has continued its efforts in this area.

56. *Wireline Infrastructure.* In July 2019, the Commission adopted a *Notice of Proposed Rulemaking and Declaratory Ruling* to improve broadband deployment and competition in the nation’s apartment buildings, condominium complexes, and office buildings, known as multiple tenant environments, or MTEs.¹⁵⁶ Nearly 30% of the U.S. population lives in condominiums or apartments, and

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the appropriate time. See Benton Foundation Comments at 12 (urging the Commission to establish connectivity goals “fit for the rising demands of the next decade”).

¹⁵⁰ See *2019 State of the States Report* at 7-8. EducationSuperHighway reports the Commission’s short-term goal in terms of 100 kbps per user, rather than 100 Mbps per 1,000 users, and reports the long-term goal in terms of 1 Mbps per user, rather than 1 Gbps per 1,000 users. *2019 State of the States Report FAQ; 2014 First E-rate Order*, 29 FCC Rcd at 8885, para. 34. We acknowledge that ADTRAN argues that “EducationSuperHighway data will undercount schools that have access to broadband meeting the short-term and long-term benchmarks,” and that American Library Association claims that the Commission “does not have adequate information about the availability of or quality of broadband offered to community anchor institutions.” ADTRAN Comments at 9; American Library Association Reply at 1-1. Neither proposes an alternative source of data currently available to the Commission.

¹⁵¹ *2019 State of the States Report* at 7.

¹⁵² *Id.* at 13-14; EducationSuperHighway, *2018 State of the States Report* at 19 (Oct. 2018) (*2018 State of the States Report*) <https://s3-us-west-1.amazonaws.com/esh-sots-pdfs/2018%20State%20of%20the%20States.pdf>.

¹⁵³ *2019 State of the States Report* at 13.

¹⁵⁴ *Id.* at 7.

¹⁵⁵ 47 U.S.C. § 1302(a).

¹⁵⁶ *Improving Competitive Access to Multiple Tenant Environments, Petition for Preemption of Article 52 of the San Francisco Police Code Filed by the Multiple Family Broadband Council*, GN Docket No. 17-142, MB Docket No. 17-91, Notice of Proposed Rulemaking and Declaratory Ruling, 34 FCC Rcd 5702 (2019), *appeal pending in City & County of San Francisco v. FCC et al*, Docket No. 19-71832 (9th Cir.).

millions more work in office buildings.¹⁵⁷ To address the unique challenges associated with broadband deployment in MTEs, the Commission took a number of steps, including seeking input on additional actions it could take to accelerate the deployment of next-generation networks and services within MTEs. In particular, the Commission sought comment on the effect that revenue sharing agreements between building owners and broadband providers, exclusivity agreements regarding rooftop facilities, and exclusive wiring arrangements have on broadband competition and deployment.¹⁵⁸ The Commission also clarified that it welcomes state and local experimentation to increase access to MTEs—so long as those actions are consistent with federal law and policy.¹⁵⁹ Finally, the Commission preempted part of an outlier San Francisco ordinance to the extent it required the sharing of in-use wiring in MTEs, as requiring sharing of in-use wiring deters broadband deployment, undercuts the Commission’s rules regarding control of cable wiring in residential MTEs, and threatens the Commission’s framework to protect the technical integrity of cable systems for the benefit of viewers.¹⁶⁰

57. *Wireless Infrastructure.* In April 2019, the Commission proposed to update its rule for over-the-air reception devices (OTARD) to help spur 5G deployment by eliminating the restriction that currently excludes hub and relay antennas from the scope of the rule.¹⁶¹ This proposal is intended to allow fixed wireless providers to deploy these antennas more quickly and efficiently, spurring investment in and deployment of needed infrastructure in a manner that is consistent with the public interest.¹⁶²

58. *Cable Franchising.* In August 2019, the Commission took actions to promote broadband deployment by cable operators through updates to the cable franchising rules.¹⁶³ To facilitate the deployment of broadband infrastructure, the Commission concluded that under the Communications Act, cable-related, non-monetary contributions required by a local franchise are franchise fees subject to the statutory five percent cap, with limited exceptions.¹⁶⁴ The Commission also prohibited local franchising authorities from regulating under Title VI the provision of most non-cable services offered over franchised cable systems, including broadband Internet access service and preempted any state or local regulation of a cable operator’s non-cable services that imposes obligations on franchised cable operators beyond what is permissible under Title VI the Act.¹⁶⁵

59. *Broadband Deployment Advisory Committee.* The Broadband Deployment Advisory Committee (BDAC), a federal advisory committee originally chartered in March 2017, was re-chartered on March 1, 2019. In its second term, the BDAC is continuing its work to craft recommendations for the Commission on ways to accelerate the deployment of broadband by reducing and/or removing regulatory barriers to infrastructure investment and strengthening existing broadband networks in communities

¹⁵⁷ *Id.* at 5703, para. 1.

¹⁵⁸ *Id.* at 5710-20, paras. 14-31.

¹⁵⁹ *Id.* at 5724, paras. 40-41.

¹⁶⁰ *Id.* at 5724-45.

¹⁶¹ See *Updating the Commission’s Rule for Over-the-Air Reception Devices*, WT Docket No. 19-71, Notice of Proposed Rulemaking, 34 FCC Rcd 2695 (2019).

¹⁶² *Id.* at 2697, para. 7.

¹⁶³ *Implementation of Section 621(a)(1) of the Cable Communications Policy Act of 1984 as Amended by the Cable Television Consumer Protection and Competition Act of 1992*, MB Docket No. 05-311, Third Report and Order, 34 FCC Rcd 6844 (2019).

¹⁶⁴ See *id.* at 6849-78, paras. 8-63.

¹⁶⁵ See *id.* at 6879-903, paras. 64-110. The Commission also concluded that requirement concerning local franchising authority regulation of cable operators should apply to state-level franchising actions and state regulations related to local franchising. See *id.* at 6904-07, paras. 111-19.

across the country.¹⁶⁶ The BDAC continues to be a forum for interested stakeholders to exchange ideas and develop recommendations to the Commission on broadband deployment, which in turn enhances the Commission's ability to carry out its statutory responsibility to encourage the deployment of broadband to all Americans.¹⁶⁷

60. The re-chartered BDAC is organized into three working groups, each with a distinct purpose.¹⁶⁸ The Disaster Response and Recovery Working Group is charged with recommending measures to improve resiliency of broadband infrastructure before a disaster occurs, and strategies that can be used during and after the response to a disaster to minimize broadband network downtime.¹⁶⁹ The Broadband Infrastructure Deployment Job Skills and Training Opportunities Working Group is charged with making recommendations on ways to make job skills training more widely available and improve development opportunities for the broadband infrastructure deployment workforce.¹⁷⁰ The Increasing Broadband Investment in Low-Income Communities Working Group is tasked with identifying new ways to encourage the deployment of high-speed broadband infrastructure and services to low-income communities.¹⁷¹

61. This term, the BDAC has worked diligently to fulfill the charges given to it by the Commission. Since the Commission released the *2019 Report*, the BDAC has met three times, on June 13, 2019, September 19, 2019, and December 3, 2019, during which the BDAC members have discussed their charges and the progress being made by the working groups toward developing final reports for consideration and approval by the full BDAC.¹⁷² The BDAC has three meetings scheduled for 2020 where the working groups are expected to present their recommendations.

62. *Precision Agriculture Connectivity Task Force.* The Agriculture Improvement Act of 2018 directed the Commission to establish a task force to examine and promote broadband service on agricultural land.¹⁷³ Chairman Pai chartered the Precision Agriculture Connectivity Task Force under the Federal Advisory Committee Act for a two-year term to make policy recommendations on how to

¹⁶⁶ *FCC Announces Re-Chartered BDAC Membership and First Meeting*, GN Docket No. 17-83, Public Notice, 34 FCC Rcd 3251 (2019), at 1 (*2019 Re-Chartered BDAC PN*).

¹⁶⁷ *Id.*

¹⁶⁸ On July 1, 2019, Chairman Pai appointed members to serve on two new working groups of the BDAC: the Broadband Infrastructure Deployment Job Skills and Training Opportunities Working Group, and the Increasing Broadband Investment in Low-Income Communities Working Group. *FCC Announces the Membership of Two Broadband Deployment Advisory Committee Working Groups*, GN Docket No. 17-83, Public Notice, 34 FCC Rcd 5226 (2019). This followed the 2018 appointment of members to the Disaster Response and Recovery Working Group during the first BDAC. The Disaster Response and Recovery Working Group was re-chartered to continue its work during the current term. *See FCC Seeks Applicants for BDAC Disaster Response and Recovery Group*, Public Notice, DA 18-837 (WCB Aug. 9, 2018).

¹⁶⁹ *2019 Re-Chartered BDAC PN*, 34 FCC Rcd 3251, at 1.

¹⁷⁰ *Id.* at 2.

¹⁷¹ *Id.* at 1.

¹⁷² *See 2019 Re-Chartered BDAC PN*, 34 FCC Rcd 3251, at 1; *FCC Announces the Next Meeting of the Broadband Deployment Advisory Committee*, GN Docket No. 17-83, Public Notice, 34 FCC Rcd 7714 (2019); *FCC Announces the Next Meeting of the Broadband Deployment Advisory Committee*, GN Docket No. 17-83, Public Notice, 34 FCC Rcd 9557 (2019). Video from each of the 2019 BDAC meetings and links to related materials can be found on the Commission's BDAC page: <https://www.fcc.gov/broadband-deployment-advisory-committee>.

¹⁷³ Agriculture Improvement Act of 2018, Pub. L. No. 115-334, 132 Stat. 4490, § 12511(b)(2) (2018 Farm Bill). The Precision Agriculture Connectivity Task Force will perform duties and submit reports consistent with Section 12511 of the 2018 Farm Bill and in consultation with the Department of Agriculture in successive terms until the Task Force ends on January 1, 2025.

accelerate broadband deployment on agricultural lands.¹⁷⁴ The Task Force will examine policy, regulatory, and technical solutions to encourage the adoption of broadband on farms and ranches and promote the advancement of precision agriculture in the United States.¹⁷⁵ In November 2019, Chairman Pai, in consultation with Secretary of Agriculture Sonny Perdue, appointed fifteen members of the Task Force including agricultural producers representing diverse geographic regions and farm sizes, equipment manufacturers, and industry representatives, as well as Tribal, state and local government representatives.¹⁷⁶ The Precision Agriculture Task Force held its first meeting in December 2019. Four working groups will assist the Task Force in carrying out its work: (1) mapping and analyzing connectivity on agricultural lands; (2) examining current and future connectivity demand for precision agriculture; (3) encouraging adoption of precision agriculture and availability of high-quality jobs on connected farms; and (4) accelerating broadband deployment on unserved agricultural lands.¹⁷⁷ The Precision Agriculture Connectivity Task Force will begin to present recommendations later this year.

B. Universal Service Fund

63. Universal service plays an essential role in deploying broadband networks and encouraging competition. The Commission's Universal Service Fund (USF) provides funding to increase the availability of fixed and mobile broadband services in unserved rural areas.¹⁷⁸ The Fund targets support to these areas and, as part of its oversight responsibilities, the Commission routinely considers ways to maximize the effect of available USF funding to support broadband deployment.¹⁷⁹

64. *High-Cost Reforms.* The Commission has successfully conducted the Connect America Fund Phase II auction to award funding to service providers that commit to offer voice and broadband services to fixed locations in unserved high-cost areas. In 2018, the Phase II auction awarded more than \$1.488 billion over ten years to 103 winning bidders to serve more than 713,000 rural homes and businesses.¹⁸⁰ The Commission began authorizing Phase II Auction funding in May 2019,¹⁸¹ authorizing a

¹⁷⁴ *FCC Announces the Establishment of the Task Force for Reviewing Connectivity and Technology Needs of Precision Agriculture in the United States and Seeks Nominations for Membership*, Public Notice, 34 FCC Rcd 5057 (2019) (*Precision Agriculture Task Force Public Notice*); Precision Agriculture Advisory Committee Charter (December 2019), <https://www.fcc.gov/sites/default/files/precision-ag-task-force-charter-12042019.pdf>.

¹⁷⁵ *Precision Agriculture Task Force Public Notice*, 34 FCC Rcd at 5057.

¹⁷⁶ *FCC Announces the Membership of and First Meeting of the Task Force for Reviewing the Connectivity and Technology Needs of Precision Agriculture in the United States*, GN Docket No. 19-329, Public Notice, 34 FCC Rcd 10493 (2019) (*Precision Agriculture Task Force Membership Public Notice*).

¹⁷⁷ *Precision Agriculture Task Force Membership Public Notice*, 34 FCC Rcd at 10493; *FCC Announces the Membership of the Working Groups of the Task Force for Reviewing the Connectivity and Technology Needs of Precision Agriculture in the United States*, GN Docket No. 19-329, Public Notice, DA 20-260 (Mar. 13, 2020).

¹⁷⁸ *Connect America Fund et al.*, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663, 17668-69, paras. 1-5 (2011) (*USF/ICC Transformation Order*), *aff'd sub nom. In re: FCC 11-161*, 753 F.3d 1015 (10th Cir. 2014).

¹⁷⁹ *Connect America Fund; ETC Annual Reports and Certifications; Establishing Just and Reasonable Rates for Local Exchange Carriers; Developing a Unified Intercarrier Compensation Regime*; WC Docket Nos. 10-90, 14-58, and 07-135, CC Docket No. 01-92; Report and Order, Third Order on Reconsideration, and Notice of Proposed Rulemaking, 33 FCC Rcd 2990, 2992, para. 4 (2018) (taking several steps to increase broadband deployment in rural areas through the High Cost program, including maximizing available funding for broadband networks); *Promoting Telehealth in Rural America*, WC Docket No. 17-310, Report and Order, 33 FCC Rcd 6574, para. 1 (2018) (*Telehealth Report and Order*) (increasing the funding cap for the Rural Healthcare program to \$571 million to prevent pro-rata funding reductions that could have disproportionately affected rural health care providers, especially those in Alaska).

¹⁸⁰ *Connect America Fund Phase II Auction Scheduled for July 24, 2018 Notice and Filing Requirements and Other Procedures for Auction 903*, AU Docket No. 17-182, WC Docket No. 10-90, Public Notice, 33 FCC Rcd 1428 (2018); *220 Applicants Qualified to Bid in the Connect America Fund Phase II Auction (Auction 903); Bidding to*

(continued....)

total of ten waves of support through March 2020.¹⁸² As of March 2020, the Commission has authorized a total of nearly \$1.4 billion in Phase II auction funding, which is expanding connectivity to 627,000 homes and small businesses nationwide.¹⁸³ Funding rounds will continue until the authorization process is complete.

65. Building on the success of the CAF Phase II auction, this past January the Commission established the Rural Digital Opportunity Fund, as it had proposed to do in an August 2019 Notice of Proposed Rulemaking.¹⁸⁴ The Rural Digital Opportunity Fund will provide up to \$20.4 billion to expand broadband in unserved rural areas, representing the Commission's biggest single step to date toward closing the rural digital divide.¹⁸⁵ Phase I of the Rural Digital Opportunity Fund will allocate up to \$16 billion in funding over the next decade targeting areas that current data show are wholly unserved by 25/3 Mbps broadband and voice.¹⁸⁶ The Phase I auction will use a multi-round, reverse auction that favors bids offering faster services with lower latency and encourages intermodal competition to ensure that the greatest possible number of Americans will be connected to the best possible networks, all at a competitive cost.¹⁸⁷ Phase II of the Rural Digital Opportunity Fund will use granular, precise broadband availability maps being developed in the Commission's *Digital Opportunity Data Collection* proceeding to allocate at least \$4.4 billion to target unserved locations within partially served areas, as well as any areas not won in Phase I.¹⁸⁸

66. In addition, the Commission continues to work to close the digital divide through other initiatives focused on small, rural carriers serving high-cost areas, known as rate-of-return carriers. Most recently, in August 2019, the Commission authorized over \$4.9 billion in support for rate-of-return carriers for maintaining, improving, and expanding broadband in rural areas over the next decade.¹⁸⁹ This support will ensure broadband access for approximately 455,000 homes and businesses served by 171 carriers in 40 states and territories, including more than 44,000 locations on Tribal lands.¹⁹⁰

67. In May 2018, in an effort to make additional universal service support available to rebuild fixed and mobile voice and broadband networks damaged in the 2017 hurricane season, the

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Begin on July 24, 2018, AU Docket No. 17-182, WC Docket No. 10-90, Public Notice, 33 FCC Rcd 6171 (2018) (announcing the qualified bidders for the auction and confirming timing); *Connect America Fund Phase II Auction (Auction 903) Closes; Winning Bidders Announced*, AU Docket No. 17-182, WC Docket No. 10-90, Public Notice, 33 FCC Rcd 8257 (2018).

¹⁸¹ News Release, FCC, FCC Authorizes \$521,000 to Tribal Provider to Bring Broadband to Rural Idaho (Mar. 16, 2020), <https://docs.fcc.gov/public/attachments/DOC-363069A1.pdf>.

¹⁸² News Release, FCC, FCC Authorizes Nearly \$89.2 Million in Funding for Rural Broadband (Dec. 16, 2019), <https://docs.fcc.gov/public/attachments/DOC-361387A1.pdf>.

¹⁸³ *Id.*

¹⁸⁴ *Rural Digital Opportunity Fund Order*, 35 FCC Rcd at 687, para. 2;; *Rural Digital Opportunity Connect America Fund*, WC Dockets No. 19-126, 10-90, Notice of Proposed Rulemaking, 34 FCC Rcd 6778 (2019) (*Rural Digital Opportunity Fund NPRM*).

¹⁸⁵ *Rural Digital Opportunity Fund Order*, 35 FCC Rcd at 687, para. 2.

¹⁸⁶ *Id.* at 689-90, para. 8.

¹⁸⁷ *Id.* at 688, para. 5, 694-95, paras. 17-18.

¹⁸⁸ *Id.* at 688, para. 5, 690, para. 9.

¹⁸⁹ *See Wireline Competition Bureau Authorizes 171 Rate-of-Return Companies to Receive \$491 Million Annually in Alternative Connect America Cost Model II Support to Expand Rural Broadband*, WC Docket No. 10-90, Public Notice, 34 FCC Rcd 7271 (WCB 2019).

¹⁹⁰ News Release, FCC, FCC Authorizes Support for Broadband in Over 44,000 Tribal Homes and Businesses Nationwide (Aug. 22, 2019), <https://docs.fcc.gov/public/attachments/DOC-359226A1.pdf>.

Commission established the Uniendo a Puerto Rico Fund (“Bringing Puerto Rico Together”) and the Connect USVI Fund.¹⁹¹ In September 2019, the Commission approved nearly \$950 million in Stage 2 funding to improve, expand, and harden communications networks in Puerto Rico and the U.S. Virgin Islands.¹⁹² To accomplish these goals in Puerto Rico, the Commission will allocate more than \$500 million over ten years in fixed broadband support and more than \$250 million over three years in mobile broadband support.¹⁹³ In the U.S. Virgin Islands, the Commission allocated more than \$180 million over ten years in support for fixed networks, more than \$4 million over three years for mobile networks.¹⁹⁴ Fixed broadband support will be awarded through a competitive process, in which service providers will bid to serve every location in each covered area with storm-hardened networks at up to gigabit speeds.¹⁹⁵ Support for mobile services is allocated to providers that were offering mobile services in Puerto Rico and the U.S. Virgin Islands prior to the hurricanes to expand and harden 4G LTE networks and deploy next-generation 5G networks.¹⁹⁶

68. In October 2019, the Commission approved performance testing procedures for all carriers receiving high-cost support to deploy fixed broadband networks to unserved Americans living in rural areas.¹⁹⁷ The Commission maintained an existing requirement that carriers conduct quarterly speed and latency tests between specified numbers of active subscribers’ homes and the Internet and made targeted modifications to the testing procedures.¹⁹⁸ These procedures will help to ensure that rural Americans have access to the same high-quality networks as Americans in urban areas, while also ensuring that carriers remain accountable to consumers, taxpayers, and the Commission, and are delivering the network performance they have committed to provide.

69. *Rural Health Care Reforms.* The Commission’s Rural Health Care (RHC) Program has long supported vital telehealth services and helps rural communities overcome obstacles to accessing healthcare. As the demand for telemedicine has increased, the RHC Program has witnessed a dramatic increase in health care provider participation, which in turn has put extreme demands on limited Program funding. Following on reforms to the RHC Program that the Commission adopted in 2017 and 2018,¹⁹⁹ the Commission adopted a *Report and Order* on August 1, 2019 reforming the distribution of RHC funding.²⁰⁰ In the *Rural Health Care Reform Order*, the Commission revised the rules governing the

¹⁹¹ *Connect America Fund*, WC Docket No. 10-90, Order, 32 FCC Rcd 7981 (2017); *The Uniendo a Puerto Rico Fund and the Connect USVI Fund*, Order and Notice of Proposed Rulemaking, WC Docket No. 18-143, 33 FCC Rcd 5404 (2018); *Connect America Fund*, WC Docket No. 10-90, Order, 32 FCC Rcd 7981 (2017).

¹⁹² *The Uniendo a Puerto Rico Fund and the Connect USVI Fund; Connect America Fund; ETC Annual Reports and Certifications*, WC Docket Nos. 18-143 et al., Report and Order and Order on Reconsideration, 34 FCC Rcd 9109, 9110, para. 3 (2019).

¹⁹³ *Id.* at 9146, para. 67.

¹⁹⁴ *Id.* at 9163, para. 102.

¹⁹⁵ *Id.* at 9114-43, paras. 11-66.

¹⁹⁶ *Id.* at 9162-34, paras. 101-32.

¹⁹⁷ See News Release, FCC, FCC Takes Steps to Enforce Quality Standards for Rural Broadband Networks (Oct. 25, 2019), <https://docs.fcc.gov/public/attachments/DOC-360424A1.pdf>; *Connect America Fund*, WC Docket No. 10-90, Order on Reconsideration, 34 FCC Rcd 10109 (2019) (*CAF Performance Standards Order on Reconsideration*).

¹⁹⁸ *CAF Performance Standards Order on Reconsideration*, 34 FCC Rcd at 10112-16, paras. 12-19, 10124-26, paras. 18-19, 10139-49, paras. 39-49, 10156-94, paras. 130-44.

¹⁹⁹ See *Promoting Telehealth in Rural America*, WC Docket No. 17-310, Notice of Proposed Rulemaking and Order, 32 FCC Rcd 10631, 10639-71, paras. 15-117 (2017); *Promoting Telehealth in Rural America*, WC Docket No. 17-310, Report and Order, 33 FCC Rcd 6574, 6578-85, paras. 10-28 (2018).

²⁰⁰ *Promoting Telehealth in Rural America*, WC Docket No. 17-310, Report and Order, 34 FCC Rcd 7335 (2019) (*Rural Health Care Reform Order*).

Telecom Program to simplify calculation of the urban rate (the amount health care providers pay) and the rural rate (the rate provided to customers in comparable rural areas),²⁰¹ and adjust the Telecom Program's \$150 million annual cap on multi-year and upfront payment requests annually for inflation.²⁰² Other reforms outlined in the *Rural Health Care Reform Order* include targeting funding to rural areas in the most need of health care services funding by prioritizing support based on rurality and whether the area is medically underserved when demand exceeds available funding, increasing the effectiveness of competitive bidding, and streamlining program administration.²⁰³

70. In addition, on March 13, 2020, in an effort to help ensure that healthcare providers have the resources they need to promote telehealth solutions, the Commission adopted an Order to fully fund all eligible Rural Health Care Program services for Funding Year 2019 with an additional \$42.19 million in funding.²⁰⁴ The Order permits USAC to carry forward additional unused funds from prior years to cover a funding gap between demand and available funding, and waives the cap on multi-year commitments and upfront payments that would have resulted in unnecessary reductions in support for rural health care providers and their patients.²⁰⁵

71. *Connected Care Pilot Program.* On March 31, 2020, the Commission adopted a Report and Order establishing a three-year, \$100 million Connected Care Pilot Program to help defray the cost of bringing telehealth services directly to low-income patients and veterans.²⁰⁶ The Connected Care Pilot Program will provide an 85% discount on qualifying broadband connectivity for broadband-enabled telehealth services that connect patients directly to their health care providers and are used to treat a wide range of health conditions.²⁰⁷ These services can facilitate the effective treatment of chronic conditions outside of the health care provider's office at significant cost savings for patients and health care providers. Data gathered through the Pilot Program will be used to analyze how USF funds can support health care provider and patient use of connected care services and the possible benefits that support of broadband service for connected care may bring.²⁰⁸

72. At the same time that we adopted the Connected Care Pilot Program, we also established the COVID-19 Telehealth Program in response to the Coronavirus Aid, Relief, and Economic Security (CARES) Act, signed into law on March 27, 2020 in response to the COVID-19 outbreak.²⁰⁹ Under this standalone initiative the Commission will provide \$200 million "to support health care providers in the fight against the ongoing pandemic."²¹⁰

73. *E-Rate.* The Commission's E-Rate program is a vital source of support for connectivity to, and within, schools and libraries. In December 2019, the Commission released a *Report and Order* making permanent the "category two budget" approach for funding internal connections in schools and libraries, which consists of five-year budgets that provide a set amount of funding to support these

²⁰¹ *Id.* at 7354-72, paras. 38-75. The Telecom Program provides a discount to service providers equal to the difference between the urban and rural rates. *See id.* at 7341, para. 10; *see also* 47 U.S.C. § 254(h)(1)(A).

²⁰² *Rural Health Care Reform Order*, 34 FCC Rcd at 7400-02, paras. 138-40.

²⁰³ *Id.* at 7385-430, paras. 107-202.

²⁰⁴ *Rural Health Care Support Mechanism*, WC Docket No. 02-60, Order, FCC 20-30, paras. 8-9 (Mar. 13, 2020).

²⁰⁵ *Id.*

²⁰⁶ *Promoting Telehealth for Low-Income Consumers; COVID-19 Telehealth Program*, WC Docket No. 18-213, WC Docket No. 20-89, Report and Order, FCC 20-44, at para. 5 (rel. Apr. 2, 2020).

²⁰⁷ *Id.* at para. 38.

²⁰⁸ *Id.* at para. 5.

²⁰⁹ *Id.* at para. 2.

²¹⁰ *Id.*

internal connections.²¹¹ Following a five-year test period,²¹² the Commission concluded that the category two budget approach has provided broader, more equitable, and more predictable funding for schools and libraries than under the prior rules.²¹³ The budget amount provided to schools and libraries during the test period also proved to be successful, and, the Commission intends to generally remain within those parameters of support going forward.²¹⁴

74. To further promote the deployment of high-speed networks to unserved and underserved schools and libraries, in January 2020, the Commission voted to permanently eliminate the requirement that E-Rate applicants amortize over three years upfront, non-recurring category one charges of \$500,000 or more, including charges for special construction projects.²¹⁵ The Commission determined that suspension of the amortization requirement had created a more certain path for reimbursement, which made applicants and service providers more willing to invest in new broadband infrastructure, resulting in lower costs to both applicants and the USF.²¹⁶

75. *Improving Broadband Deployment Data.* On August 1, 2019, the Commission adopted the *Digital Opportunity Data Collection Order*, in which we initiated a new data collection, the Digital Opportunity Data Collection, for collecting fixed broadband data to better pinpoint where broadband is available to consumers and where service is lacking.²¹⁷ The Digital Opportunity Data Collection will collect geospatial broadband coverage maps from fixed and mobile broadband Internet service providers depicting the areas where they make fixed service available.²¹⁸ This geospatial data will facilitate development of granular, high-quality fixed broadband deployment maps, which will improve the Commission's ability to target support for broadband expansion through the agency's Universal Service Fund programs.²¹⁹ The Commission also adopted a process to collect public input on the accuracy of

²¹¹ *Modernizing the E-Rate Program for Schools and Libraries*, WC Docket No. 13-184, Report and Order, 34 FCC Rcd 11219, 11219-20, para. 1 (2019).

²¹² See *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, 8898-922, Section IV.B. (2014); *Modernizing the E-Rate Program for Schools and Libraries; Connect America Fund*, WC Docket Nos. 13-184, 10-90, Second Report and Order and Order on Reconsideration, 29 FCC Rcd 15538, 15571-78, Section III.A. (2014).

²¹³ *Modernizing the E-Rate Program for Schools and Libraries*, 34 FCC Rcd at 11220, para. 2.

²¹⁴ *Id.*

²¹⁵ *E-Rate Program Amortization Requirement, Modernizing the E-Rate Program for Schools and Libraries*, WC Docket Nos. 19-2, 13-184, Report and Order, 35 FCC Rcd 672, 672-73, para. 2 (2020) (*E-Rate Amortization Elimination Order*); see also *E-Rate Program Amortization Requirement, Modernizing the E-Rate Program for Schools and Libraries*, WC Docket Nos. 19-2, 13-184, Notice of Proposed Rulemaking and Order, 34 FCC Rcd 785 (2019). The components of special construction costs eligible for E-Rate discounts include costs for design and engineering, project management, digging trenches, and laying fiber. See *Modernizing the E-rate Program for Schools and Libraries*, WC Docket No. 13-184, Order, 31 FCC Rcd 9767, 9775 (2016); *Schools and Libraries Universal Service Support Mechanism, A National Broadband Plan for our Future*, CC Docket No. 02-6, GN Docket No. 09-51, Order, 25 FCC Rcd 18762, 18773 n.54 (2010).

²¹⁶ *E-Rate Amortization Elimination Order*, 35 FCC Rcd at 674-75, paras. 8-9.

²¹⁷ *Digital Opportunity Data Collection Order*, 34 FCC Rcd 7505. In a Second Further Notice of Proposed Rulemaking, the Commission also sought comment on how best to incorporate mobile wireless voice and broadband coverage into the Digital Opportunity Data Collection, and on how to implement a database of broadband-serviceable structures. *Id.* at 7549, para. 112.

²¹⁸ *Id.* at 7506, para. 2.

²¹⁹ *Id.* at 7509, paras. 10-11.

service providers' broadband maps, facilitated by a crowd-sourcing portal that will gather input from consumers as well as from state, local, and Tribal governments.²²⁰

76. *Promoting Broadband Access for Veterans.* In May 2019, the Wireline Competition Bureau submitted a report to Congress examining the current state of broadband access and adoption by veterans, and providing recommendations on how to promote their access to broadband, so that they may fully participate in the digital economy.²²¹ In the *Veterans Broadband Access Report*, the Bureau found that, while many veterans have access to both fixed and mobile broadband options, a significant number still lack access to fixed broadband, mobile broadband, or both.²²² Additionally, the Bureau found that households with veterans subscribe to mobile broadband services at lower rates than households without veterans, and that barriers to broadband adoption for veterans may include lack of deployment where they live, price, and digital illiteracy or perceived irrelevance.²²³

77. *Tribal Lands.* In May 2019, the Consumer and Governmental Affairs Bureau, Wireless Telecommunications Bureau, and Wireline Competition Bureau submitted a report to Congress providing an analysis of broadband deployment on Tribal lands.²²⁴ The *Tribal Lands Broadband Access Deployment Report* shows that, while deployment to Tribal lands has increased in recent years, Tribal lands experience lower rates of both fixed and mobile broadband deployment as compared to non-Tribal areas of the United States, particularly in rural areas.²²⁵ The *Tribal Lands Broadband Access Deployment Report* also describes in detail the Commission's efforts to leverage its available programs to increase the availability of broadband on Tribal lands, including universal service program reforms, expanded direct consultation with Tribes, and making available additional, valuable spectrum resources.²²⁶ The Commission took steps in the *Rural Digital Opportunity Fund Order* to specifically target broadband deployment in census blocks on rural Tribal lands. Specifically, we adopted a policy that has the effect of increasing the auction reserve price for serving such census blocks compared to the typical census blocks eligible for the auction, which we expect will encourage deployment on Tribal lands.²²⁷

C. Access to Spectrum

78. Since release of the *2019 Report*, the Commission has continued efforts to expand access to spectrum to support 5G and other advanced wireless services. With respect to high-band spectrum, the Commission, in March of 2019, concluded the first of its *Spectrum Frontiers* auctions. Auction 101 made a total of 850 megahertz of 28 GHz band spectrum available and raised over \$700 million dollars for the U.S. Treasury.²²⁸ Shortly thereafter Auction 102 made 700 megahertz of 24 GHz band spectrum

²²⁰ *Id.* at 7506, para. 3, 7521-37, paras. 35-75.

²²¹ FCC, WCB, Report on Promoting Broadband Internet Access Service for Veterans, Pursuant to the Repack Airwaves Yielding Better Access for Users of Modern Services Act of 2018 (WCB 2019), <https://docs.fcc.gov/public/attachments/DOC-357270A1.pdf> (*Veterans Broadband Access Report*).

²²² *Id.* at 5-11.

²²³ *Id.* at 10, 12-13.

²²⁴ FCC, CGB, WTB, and WCB, Report on Broadband Deployment in Indian Country, Pursuant to the Repack Airwaves Yielding Better Access for Users of Modern Services Act of 2018 (2019), <https://docs.fcc.gov/public/attachments/DOC-357269A1.pdf> (*Tribal Lands Broadband Access Deployment Report*).

²²⁵ *Id.* at 1.

²²⁶ *Id.* at 9-18.

²²⁷ *Rural Digital Opportunity Fund Order*, 35 FCC Rcd at 694, para. 16.

²²⁸ *Auction of 28 GHz Upper Microwave Flexible Use Service Licenses for Next-Generation Wireless Services Closes; Gross Winning Bids Amounts Announced for Auction 101*, AU Docket No. 18-85, Public Notice, 34 FCC Rcd 75, 75, para. 1 (2019).

available and raised over \$2 billion dollars for the U.S. Treasury.²²⁹ On December 10, 2019, the Commission began auctioning spectrum in the Upper 37 GHz, 39 GHz, and 47 GHz bands that collectively will make 3,400 megahertz of spectrum available.²³⁰ This auction, Auction 103, concluded on March 5, 2020 and raised \$7.6 billion in gross auction proceeds.²³¹

79. The Commission also has improved access to mid-band spectrum. First, the Commission took several steps to open the 3.5 GHz band for commercial use. The 3.5 GHz band will allow access to up to 150 megahertz of spectrum for shared federal and non-federal use of the band among and between users, classified into one of three tiers of authorization: Incumbent Access (most protected), Priority Access, and General Authorized Access (least protected).²³² This three-tiered, dynamic sharing framework is facilitated by an automated frequency coordinator, known as a Spectrum Access System (SAS).²³³ The Commission recently certified the first group of SAS Administrators for full commercial deployments,²³⁴ and it adopted procedures for an auction of up to seven, 10-megahertz Priority Access Licenses (PALs) in the 3550-3650 MHz band, which is scheduled to begin on July 23, 2020.²³⁵

80. Second, the Commission reformed the regulatory framework for a portion of the 2.5 GHz band (2496-2690 MHz), which is the largest band of contiguous spectrum below 3 gigahertz, to make this spectrum more available for advanced wireless services, including 5G.²³⁶ As part of this effort, the

²²⁹ *Auctions of Upper Microwave Flexible Use Licenses for Next-Generation Wireless Services et al.*, AU Docket No. 18-85, Public Notice, 33 FCC Rcd 4103, 4105, paras. 2-3 (2018); Press Release, FCC, FCC Concludes First High-Band 5G Airwaves Auctions (rel. May 28, 2019), <https://docs.fcc.gov/public/attachments/DOC-357702A1.pdf>.

²³⁰ *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, GN Docket No. 14-177, Fourth Report and Order, 33 FCC Rcd 12168, 12169, para. 2 (2018); Press Release, FCC, FCC's Next 5G Spectrum Auction Is Underway (Dec. 10, 2019), <https://docs.fcc.gov/public/attachments/DOC-361255A1.pdf>.

²³¹ *Incentive Auction of Upper Microwave Flexible Use Service Licenses in the Upper 37 GHz, 39 GHz, and 47 GHz Bands for Next-Generation Wireless Services Closes; Winning Bidders Announced for Auction 103*, AU Docket No. 19-59, Public Notice, DA 20-253, para. 2 (rel. Mar. 12, 2020).

²³² *See Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, GN Docket No. 12-354, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959, 3961, para. 4 (2015) (*3.5 GHz Order and Second FNPRM*); *Auction of Priority Access Licenses for the 3550-3650 MHz Band; Comment Sought on Competitive Bidding Procedures for Auction 105*, AU Docket No. 19-244, Public Notice, 34 FCC Rcd 9215, 9217, para. 5 (2019) (*Auction 105 Comment Notice*); *Auction 105: 3.5 GHz*, <https://www.fcc.gov/auction/105> (last visited Mar. 2, 2020).

²³³ *See 3.5 GHz Order and Second FNPRM*, 30 FCC Rcd at 3985-87, paras. 80-86; *Auction 105 Comment Notice*, 34 FCC Rcd at 9216-17, para. 3.

²³⁴ *Wireless Telecommunications Bureau and Office of Engineering and Technology Approve Four Spectrum Access System Administrators for Full Scale Commercial Deployment in the 3.5 GHz Band and Emphasize Licensee Compliance Obligations in the 3650-3700 MHz Band Under Part 96*, GN Docket No. 15-319, Public Notice, DA 20-110 (WTB Jan. 27, 2020); *3.5 GHz Band Overview*, FCC.gov, <https://www.fcc.gov/wireless/bureau-divisions/mobility-division/35-ghz-band/35-ghz-band-overview> (last visited Mar. 2, 2020).

²³⁵ *See Auction of Priority Access Licenses for the 3550-3650 MHz Band Rescheduled to Begin July 23, 2020; Auction 105 Short-Form Application Deadline Postponed to May 7, 2020*, AU Docket No. 19-244, Public Notice, DA 20-330 (OEA-WTB Mar. 25, 2020); *see also Auction of Priority Access Licenses for the 3550-3650 MHz Band; Notice and Filing Requirements, Minimum Opening Bids, Upfront Payments, and Other Procedures for Auction 105; Bidding in Auction 105 Scheduled to Begin June 25, 2020*, AU Docket No. 19-244, Public Notice, FCC 20-18 (Mar. 2, 2020).

²³⁶ *Transforming the 2.5 GHz Band*, WT Docket No. 18-120, Report and Order, 34 FCC Rcd 5446, 5447, 5450, paras. 3, 13 (2019) (*2.5 GHz Order*). (In this Report and Order, the Commission replaced the regulatory framework for the Educational Broadband Service, which is comprised of twenty channels (for a total of 112.5 megahertz), with one of flexible use). *See id.* at 5447, 5450, paras. 4, 13.

Commission allowed for more efficient and effective use of the spectrum by incumbent licensees, adopted a rural Tribal priority filing window to give Tribal entities the opportunity to license unassigned spectrum for the deployment of advanced wireless services on rural Tribal lands, and announced that it would make any remaining unassigned spectrum available for commercial use via competitive bidding.²³⁷ The rural Tribal priority window opened on February 3, 2020, and will remain open until August 3, 2020.²³⁸ Commission staff have conducted extensive outreach following adoption of the 2019 2.5 GHz Order to provide interested, eligible Tribes with information and assistance on how to apply for spectrum during the window.²³⁹

81. Third, the Commission adopted an order to make 280 megahertz of the 3.7-4.2 GHz band available for 5G services while relocating existing satellite operations to the upper part of the band.²⁴⁰ The 3.7-4.2 GHz band is immediately adjacent to the 3.5 GHz band, which the Commission also made available for expanded deployment of advanced wireless services.²⁴¹ Moreover, several international governing bodies are reviewing the suitability of the 3.7-4.2 GHz band for next-generation 5G wireless services.²⁴² In its *Report and Order and Order of Proposed Modification*, the Commission found that licensing 280 megahertz of the 3.7-4.2 GHz band for flexible use would “lead to substantial economic gains, with some economists estimating billions of dollars in increases on spending, new jobs, and America’s economy.”²⁴³ At the same time the Commission adopted the *Report and Order and Order of Proposed Modification*, the agency sought comment on bidding procedures for an auction beginning in December 8, 2020 of new, flexible-use overlay licenses in the 3.7-3.98 GHz band.²⁴⁴

82. Fourth, the Commission recently proposed to reallocate all or a portion of spectrum in the 5.9 GHz band (5.850-5.925) to new advanced uses.²⁴⁵ Over the past two decades, the Commission reserved this 75 megahertz of spectrum for use by Dedicated Short-Range Communications (DSRC), a service whose rules and protocols were designed to enable transportation and vehicle safety-related communications.²⁴⁶ Since that time, the DSRC service has not been widely deployed within the consumer

²³⁷ See *id.* at 5450, 5463, 5472, paras. 14, 47, 75; see also *Federal Communications Commission Announces 2.5 GHz Rural Tribal Window and Technical Workshop*, WT Docket No. 18-120, Public Notice, 34 FCC Rcd 11138 (WTB 2019) (*2.5 GHz Rural Tribal Window Public Notice*); *Wireless Telecommunications Bureau Announces Procedures for 2.5 GHz Rural Tribal Priority Window*, WT Docket No. 18-120, Public Notice, DA 20-18 (WTB Jan. 6, 2020).

²³⁸ See *2.5 GHz Rural Tribal Window Public Notice*.

²³⁹ The Commission has established a dedicated website that provides access to information regarding the window, including the location and dates of outreach and education opportunities. 2.5 GHz Rural Tribal Window. | Federal Communications Commission, <https://www.fcc.gov/RuralTribalWindow> (last visited Mar. 25, 2020). The Commission has also created a dedicated mapping tool to assist Tribes in assessing their eligibility and the amount of unassigned 2.5 GHz spectrum over their Rural Tribal Lands. 2.5 GHz Rural Tribal Maps. | Federal Communications Commission, <https://www.fcc.gov/25-ghz-rural-tribal-maps> (last visited Mar. 25, 2020). The FCC took part in at least 28 educational events between July 2019 and March 2020.

²⁴⁰ *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*, GN Docket No. 18-122, Report and Order and Order of Proposed Modification, FCC 20-22 (Mar. 3, 2020).

²⁴¹ *Id.* at para. 12.

²⁴² *Id.* at para. 7.

²⁴³ *Id.* at para. 20.

²⁴⁴ See *Auction of Flexible-Use Service Licenses in the 3.7-3.95 GHz Band for Next-Generation Wireless Services; Comment Sought on Competitive Bidding Procedures for Auction 107*, AU Docket No. 20-25, Public Notice, FCC 20-23, at para. 1 (Mar. 3, 2020).

²⁴⁵ See *Use of the 5.850-5.925 GHz Band*, ET Docket No. 19-138, Notice of Proposed Rulemaking, 34 FCC Rcd 12603 (2019).

²⁴⁶ *Id.* at 12604, para. 3.

automobile market.²⁴⁷ At the same time, growth in unlicensed services, such as Wi-Fi, have grown exponentially, and these devices rely significantly on spectrum in neighboring segments of the 5 GHz band.²⁴⁸ In the NPRM, the Commission proposed to designate the lower 45 megahertz of the 5.9 GHz band for unlicensed use, while the remaining 30 megahertz would continue to be used for transportation and safety-related communication services like the next-generation cellular vehicle to everything (CV2X) service.²⁴⁹

83. Fifth, the Commission proposed changes to the rules governing the 3.1-3.55 GHz band, which would be the first step to making spectrum in this band potentially available for advanced commercial service, including 5G.²⁵⁰ Specifically, the Commission proposed to reallocate the 3.3-3.55 GHz band and relocate incumbent non-federal operations out of the band, in order to prepare the band for possible expanded commercial wireless use.²⁵¹ The Commission took this step in furtherance of Congress's direction in the MOBILE NOW Act to identify spectrum for new mobile and fixed wireless use and, specifically, to work in consultation with NTIA to evaluate the feasibility of allowing commercial wireless services to share use of spectrum between 3.1 and 3.55 GHz.²⁵²

84. In addition, the Commission also has taken action to use below-1 GHz spectrum more efficiently. In 2017, the Commission concluded an incentive auction repurposing 70 megahertz of spectrum in the 600 MHz band from broadcast to other wireless uses, such as for mobile broadband.²⁵³ The multi-year transition period for this spectrum band is ongoing and is expected to be completed later this year.²⁵⁴ Spectrum from this auction is already being used to deliver services, including 5G, in large parts of the country.²⁵⁵ As part of its recently approved transaction, T-Mobile has committed, post-consummation, to deploying 5G service on both low-band and mid-band spectrum to 99% of Americans within six years, including covering 90% of those living in rural America within the same timeframe.²⁵⁶ Furthermore, the Commission approved certain extensions and conditions related to DISH, the contingent purchaser of the divested Boost Mobile.²⁵⁷ Specifically, DISH committed, among other things, to

²⁴⁷ *Id.* at 12604-05, para. 4.

²⁴⁸ *Id.* at 12606, para 6.

²⁴⁹ *See generally id.*

²⁵⁰ *Facilitating Shared Use in the 3.1-3.55 GHz Band*, WT Docket No. 19-348, Notice of Proposed Rulemaking, 34 FCC Rcd 12662, 12662, para. 1 (2019).

²⁵¹ *Id.*

²⁵² *Id.*

²⁵³ *Incentive Auction Closing and Channel Reassignment et al.*, AU Docket No. 14-252 et al., Public Notice, 32 FCC Rcd 2786, 2793, para. 15 (2017).

²⁵⁴ *Id.* at 2788, 2805, paras. 1, 60.

²⁵⁵ *See* Press Release, FCC, FCC Announces Results of World's First Broadcast Incentive Auction (Apr. 13, 2017); Press Release, T-Mobile, T-Mobile's Spectrum Haul is a Game Changer for Wireless Consumers (Apr. 12, 2017), <https://www.t-mobile.com/news/tmobile-spectrum-auction-win>; Press Release, T-Mobile, T-Mobile 5G: It's On! (Dec. 2, 2019), <https://investor.t-mobile.com/news-and-events/t-mobile-us-press-releases/press-release-details/2019/T-Mobile-5G-Its-On/default.aspx>.

²⁵⁶ *Applications of T-Mobile US, Inc., and Sprint Corporation For Consent to Transfer Control of Licenses and Authorizations; Applications of American H Block Wireless L.L.C, DBSD Corporation, Gamma Acquisition L.L.C., and Manifest Wireless L.L.C. for Extension of Time*, WT Docket No. 18-197, Memorandum Opinion and Order, Declaratory Ruling, and Order of Proposed Modification, 34 FCC Rcd 10578, 10589-91, paras. 26-32 (2019).

²⁵⁷ *Id.* at 10583, para. 12.

accelerate its construction deadlines for its 600 MHz licenses and ensure that this spectrum is used to deploy 5G broadband service.²⁵⁸

85. The Commission also proposed rules to reconfigure the 900 MHz band to facilitate the development of broadband technologies and services.²⁵⁹ The proposal seeks to realign the 900 MHz band to create a broadband segment and reserve the remainder for incumbent narrowband operations.²⁶⁰

86. The Commission has similarly proposed to reallocate spectrum in the 1675-1680 MHz band for shared use between incumbent federal operations and new, non-federal flexible-use wireless operations, including for advanced telecommunications capability.²⁶¹

87. Further, the Commission continues to seek ways to enhance broadband and other innovative uses through use of unlicensed operations. For example, the Commission has proposed targeted changes to its rules to provide additional opportunities for unlicensed white space devices operating in the broadcast television bands to deliver wireless broadband services in rural areas and applications associated with the Internet of Things.²⁶² This region of the spectrum has excellent propagation characteristics that make it particularly attractive for delivering communications services over long distances, coping with variations in terrain, as well as providing coverage into and within buildings.²⁶³ The Commission's proposals are intended to spur continued growth of the white space device ecosystem, especially for providing affordable broadband service to rural and underserved communities.²⁶⁴

88. With respect to satellite services, there is significant industry interest in developing and deploying large constellations of non-geostationary (NGSO) satellites with robust capabilities to be used for global broadband connectivity. Over the last several years, the Commission has granted applications for a number of established operators and new entrants to provide broadband services using a new generation of low-Earth orbit (LEO) satellite technologies in the Ku-, Ka-, and V-band frequencies.²⁶⁵

89. In 2019, the Commission took action on several applications that promise to speed the deployment of high-speed satellite broadband to unserved and underserved portions of the United

²⁵⁸ *Id.* at 10742, 10745, paras. 369, 375, 382.

²⁵⁹ *See Review of the Commission's Rules Governing the 896-901/935-940 MHz Band*, WT Docket No. 17-200, Notice of Proposed Rulemaking, 34 FCC Rcd 1550 (2019).

²⁶⁰ *Id.* at 1553, para. 9.

²⁶¹ *Allocation and Service Rules for the 1675-1680 MHz Band*, WT Docket No. 19-116, Notice of Proposed Rulemaking and Order, 34 FCC Rcd 3552 (2019).

²⁶² *Unlicensed White Space Device Operations in the Television Bands*, ET Docket No. 20-36, Notice of Proposed Rulemaking, FCC 20-17, at para. 1 (Mar. 2, 2020).

²⁶³ *Id.*

²⁶⁴ *Id.*

²⁶⁵ *Space Exploration Holdings, LLC; Application For Approval for Orbital Deployment and Operating Authority for the SpaceX NGSO Satellite System; Application For Approval For Orbital Deployment And Operating Authority for the SpaceX NGSO Satellite System Supplement, Memorandum Opinion, Order and Authorization*, 33 FCC Rcd 3391 (2018); *see also Space Norway AS; Petition for a Declaratory Ruling Granting Access to the U.S. Market for the Arctic Satellite Broadband Mission*, Order and Declaratory Ruling, 32 FCC Rcd 9649 (2017); *Telesat Canada; Petition for Declaratory Ruling to Grant Access to the U.S. Market for Telesat's NGSO Constellation*, Order and Declaratory Ruling, 32 FCC Rcd 9663 (2017); *O3b Limited; Request for Modification of U.S. Market Access for O3b Limited's Non-Geostationary Satellite Orbit System in the Fixed-Satellite Service and in the Mobile-Satellite Service*, Order and Declaratory Ruling, 33 FCC Rcd 5508 (2018); *Space Exploration Holdings, LLC; Application for Approval for Orbital Deployment and Operating Authority for the SpaceX V-band NGSO Satellite System*, Memorandum Opinion, Order and Authorization, FCC 18-161 (Nov. 19, 2018).

States.²⁶⁶ For instance, the Commission approved two applications allowing SpaceX to modify its Ku- and Ka-band NGSO Starlink constellation to accelerate its deployment of broadband services to areas underserved or unserved by terrestrial systems.²⁶⁷ In addition, it granted a modification application that will enable Hughes Network Systems, LLC, to use additional frequencies in the Ka-band for the planned high-throughput Jupiter 3 satellite to provide broadband service to consumers.²⁶⁸

VI. SECTION 706 FINDING

90. Based on the extensive evidence above, we conclude that advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion. The available data clearly demonstrate progress in the deployment of “advanced telecommunications capability” from 2017 to 2018. For example, the number of Americans without access to fixed terrestrial broadband deployment decreased by 14% in 2018, with decreases in urban, rural, and Tribal areas.²⁶⁹ More Americans—94.9%—have access to mobile LTE with median speeds of 10/3 Mbps, up from 89.0% in 2017.²⁷⁰ Indeed, there were deployment increases in both fixed and mobile services, both apart and when combined.²⁷¹ We also are encouraged by the significant year-over-year increases in fixed terrestrial services at every speed examined in this Report—10/1 Mbps mobile broadband, and 25/3 Mbps, 50/5 Mbps, 100/10 Mbps, and 250/25 Mbps fixed broadband.²⁷² Moreover, some of the Commission’s more recent actions undertaken to speed broadband deployment likely are not yet fully reflected by the data used in our analysis here, as those data only provide the extent of U.S. broadband deployment through December 2018.

91. Indeed, recent broadband investment throughout the country demonstrates that the Commission’s actions to date to encourage and stimulate broadband deployment and innovation are working as intended. U.S. broadband providers invested approximately \$80 billion in network infrastructure in 2018, up more than \$3.1 billion from 2017.²⁷³ Broadband providers, both small and large, built and upgraded networks across the country, with fiber deployment in the United States now passing 46.5 million unique homes, a 16% increase in homes passed by fiber since 2018.²⁷⁴ In 2019

²⁶⁶ *Space Exploration Holdings, LLC; Request for Modification of the Authorization for the SpaceX NGSO Satellite System*, Order and Authorization, 34 FCC Rcd 2526 (IB 2019); *Space Exploration Holdings, LLC, Request for Modification of the Authorization for the SpaceX NGSO Satellite System*, Order and Authorization, 34 FCC Rcd 12307, 12307, para. 1 (IB 2019) (*SpaceX NGSO Authorization*). (SpaceX has been conducting launches of Starlink satellites since May 2019). Space Exploration Holdings, *Starlink Mission* (May 24, 2019), <https://www.spacex.com/news/2019/05/24/starlink-mission>; see also Space Exploration Holdings, LLC, *Starlink Mission* (Feb. 17, 2020), <https://www.spacex.com/news/2020/02/17/starlink-mission>.

²⁶⁷ *SpaceX NGSO Authorization*, 34 FCC Rcd 12307.

²⁶⁸ See Satellite Policy Branch Information, Actions Taken, Public Notice, Report No. SAT-01396 (IB Sat. Div. June 14, 2019); see also Hughes Network Systems, LLC, Request for Modification of the Authorization to Launch and Operate EchoStar XXIV, IBFS File No. SAT-MOD-20190212-00011 (granted June 13, 2019). Similarly, the Commission authorized a number of gateway earth stations necessary to operate satellite constellations that offer or will offer broadband services consumers. See Satellite Communications Services Information, Actions Taken, Public Notice, SES-02217 (IB Sat. Div., Nov. 13, 2019); Satellite Communications Services Information, Actions Taken, Public Notice, Report No. SES-02134 (IB Sat. Div., Feb. 6, 2019).

²⁶⁹ See *supra* Fig. 1.

²⁷⁰ See *supra* Fig. 2b.

²⁷¹ See *supra* Figs. 1, 2b, 3a, and 3b.

²⁷² See *supra* Fig. 4.

²⁷³ See generally Patrick Brogan, Vice President for Industry Analysis, USTelecom, U.S. Broadband Investment Continued upswing in 2018 (2019), <https://www.ustelecom.org/wp-content/uploads/2019/07/USTelecom-Research-Brief-Capex-2018-7-31-19.pdf>.

²⁷⁴ See Fiber Broadband Association Dec. 16, 2019 *Ex Parte* Letter, at 1 n.1.

alone, fiber broadband networks became available to roughly 6.5 million additional unique homes, the largest one-year increase ever, with smaller providers accounting for 25% of these new fiber connections.²⁷⁵ AT&T, T-Mobile, Sprint, and Verizon are also rapidly expanding their 5G deployment, with 5G networks in aggregate now covering more than 200 million consumers across the country, especially in urban areas, with more live launches planned for 2020.²⁷⁶

92. Both commenters and industry reports indicate that our policy efforts are making a difference. For example, recent Fiber Broadband Association research shows that the industry is currently on pace to deploy all-fiber networks to about 50% of U.S. households by 2025, in part due to our efforts to spur deployment.²⁷⁷ Commenters also predict that the positive trends in deployment of advanced telecommunications capability reported in recent years will continue, due in part to Commission policies that promote investment.²⁷⁸

93. We disagree with commenters that contend that the section 706 requirements have not been met.²⁷⁹ In particular, we reject the arguments of commenters that urge us to conduct our section 706

²⁷⁵ *Id.*

²⁷⁶ See AT&T, AT&T 5G Now Live for Consumers in 10 Markets (Dec. 13, 2019), https://about.att.com/story/2019/5g_launch.html (announcing live launch of AT&T 5G to consumers and businesses in the Birmingham, AL; Indianapolis; Los Angeles; Milwaukee; Pittsburgh; Providence, RI; Rochester, NY; San Diego, San Francisco, and San Jose, CA market areas, and plans to expand service availability to other markets soon as it works toward offering nationwide coverage in the first half of 2020); T-Mobile, T-Mobile 5G: It's On! (Dec. 2, 2019), <https://investor.t-mobile.com/news-and-events/t-mobile-us-press-releases/press-release-details/2019/T-Mobile-5G-Its-On/default.aspx>; Sprint, Sprint 5g Overview (Nov. 1, 2019), <https://newsroom.sprint.com/sprint-5g-overview-1-2.htm> (touting Sprint 5G availability in parts of 9 cities – Atlanta, Chicago, Dallas-Ft. Worth, Houston, Kansas City, Los Angeles, New York City, Phoenix, and Washington, DC – as well as Sprint partnerships with multiple U.S. cities on Smart City applications leveraging Sprint's 5G and IoT offerings); Verizon, When Will Verizon Have 5G? (Dec. 5, 2019), <https://www.verizon.com/about/our-company/5g/when-will-verizon-have-5g> (discussing current availability of Verizon's 5G ultra-wideband service in parts of select cities, and plans for further rollouts in 2020).

²⁷⁷ Press Release, Fiber Broadband Association, New Study Finds All-Fiber Deployments to 90% of Households Achievable in Next Decade (Sept. 10, 2019), <https://www.fiberbroadband.org/blog/new-study-finds-all-fiber-deployments-to-90-of-households-achievable-in-next-decade> (“These accelerated all-fiber builds are driven by increasing consumer demand for higher performance broadband, . . . and government efforts to lower barriers to deployment costs and provide targeted subsidies.”).

²⁷⁸ See, e.g., Internet Innovation Alliance Comments at 6-7 (“In 2019, as they have for years, broadband providers are constantly increasing speeds in response to competitive pressures and as a result of new deployments thanks to policies that promote investment . . . We expect this positive trend to continue and indeed accelerate as the Nation transitions to 5G wireless broadband . . .”); *id.* at 7-8 (“Thanks to policies that reward investment and promote innovation and the pressures of a competitive broadband marketplace, we expect that the 2020 Broadband Deployment Report and those in future years will continue to show a story of progress in the important task of ensuring that all Americans have access to fast, reliable broadband, no matter how they access the broadband internet.”); ITTA Comments at 10 (“[T]he Commission has ample grounds to once again find that its ‘policymaking efforts . . . are promoting broadband deployment, and that [Internet Service Providers] are making strong progress in deploying advanced telecommunications capability to more and more Americans.’”).

²⁷⁹ See, e.g., Benton Foundation Comments at 2 (coupled with continued reliance on Form 477, Commission's “progress-based approach” misrepresents the true reach of broadband in the U.S.); INCOMPAS Comments at 7 n.11 (“[T]he Commission cannot retain a baseline benchmark for fixed service that is adequate for purposes of finding that broadband is being deployed in a timely and reasonable manner, but is by no means ‘advanced’ given our current understanding of broadband services available to the typical consumer.”); CWA Reply Comments at 13 (“The Commission should find that advanced telecommunications services are not being deployed in a reasonable and timely fashion, . . . and condition the 2020 Broadband Deployment Report with the understanding that the underlying Form 477 data is flawed.”); Public Knowledge et al. Reply Comments at 9-10 (“The Commission's two prior Broadband Deployment Reports departed significantly from nearly a decade of precedent since the Broadband

(continued....)

assessment based only on the number of Americans with access to broadband instead of measuring year-over-year progress. As the Commission has previously stated, the statute requires that we determine whether advanced telecommunications capability “*is being deployed* to all Americans”—not whether it has already been deployed to all Americans—and reading section 706(b) to require universal availability as a prerequisite for a positive finding would disregard the statute’s “reasonable and timely” language.²⁸⁰ With respect to those that contend that the inaccuracies inherent in our current data render it impossible for us to come to any conclusion under section 706, we reiterate both our recognition of the problems with the Form 477 data, and that the Commission’s efforts to improve our data collection are already underway.²⁸¹ In the interim, however, we are still obligated to conduct our annual section 706 inquiry, and, it remains the case that, despite its deficiencies, Form 477 data remains the most comprehensive, reliable data available to us to meet our statutory obligation.²⁸² The Form 477 data also provides a consistent means to measure progress in deployment from year-to-year and over the course of several years. Our policymaking efforts over the last few years are promoting broadband deployment,²⁸³ and we are confident that even a perfectly designed and implemented data collection, if such a thing were possible, would still show that ISPs are making strong progress in deploying advanced telecommunications capability to more and more Americans.²⁸⁴ The across-the-board progress demonstrated by the deployment data is consistent with the evidence in the record showing substantial levels of network investment in 2018.²⁸⁵ Thus, we find that the data we do have is sufficiently indicative

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Data Improvement Act by concluding that broadband is being deployed to the U.S. in a timely and reasonable manner. . . . [C]ongressional reports show that it was Congress’ intent to look at current broadband deployment rather than come to its conclusion based on the progress from the prior year.”).

²⁸⁰ See *2019 Report*, 34 FCC Rcd at 3859-60, para. 8, 3898-99, para. 78; *2018 Report*, 33 FCC Rcd at 1663-64, paras. 10-13; see also ADTRAN Reply Comments at 2 (“Public Knowledge et al. contends that the Commission should abandon its progress-based approach and revert back to a more simplistic assessment of whether or not all Americans have access to advanced telecommunications capabilities. . . . Their assertion is based on a misreading of the Senate Report for the Broadband Data Improvement Act, which was addressing the quality of the data collected, not how to interpret Section 706. The Commission correctly interprets the Section 706 language . . . as supporting a progress-based standard.”).

²⁸¹ See *supra* Section IV.A; *2019 Report*, 34 FCC Rcd at 3868, para. 24; *Establishing the Digital Opportunity Data Collection, Modernizing the FCC Form 477 Data Program*, WC Docket No. 19-195, Docket No. 11-10, Report and Order and Second Further Notice of Proposed Rulemaking, 34 FCC Rcd 7505 (2019).

²⁸² See, e.g., *2019 Report*, 34 FCC Rcd at 3868-69, paras. 24-26; ADTRAN Comments at 9 (“ADTRAN recognizes that the current Form 477 data has flaws, and the Commission is in the process of improving that broadband deployment data. Notwithstanding the potential for Form 477 to overstate broadband deployment, it remains the most comprehensive data available.”); Colville Confederated Tribes Comments at 6 (“CCT recognizes that the FCC form 477 data is the most reliable data available, but it is far from comprehensive. The fact of the matter is there are no other options available to use as of now . . .”); Next Century Cities Comments at 6 (“The Commission is aware that its reliance on the 477 data collection overstates the number of households with broadband coverage We support the Commission’s effort to establish a more accurate data collection via the Digital Opportunity Data Collection.”); UST Comments at 12 (“USTelecom agrees with the Commission that Form 477 deployment data for fixed technologies is currently the most reliable and comprehensive dataset with which to assess availability of fixed services.”).

²⁸³ See *supra* Section V.

²⁸⁴ As NCTA notes, “the explosion of new video streaming services is premised on the widespread deployment of networks that are capable of handling the streaming demands of millions of American households. If deployment were not occurring in a reasonable and timely fashion, there would be no streaming wars.” NCTA Reply Comments at 3.

²⁸⁵ Moreover, there is no documented evidence in the record suggesting that the progress in deployment shown in the data is a function of data deficiencies.

to give us reasonable confidence that advanced telecommunications capability is being deployed in a reasonable and timely manner. These circumstances warrant a positive finding.

94. Once again, we recognize that, despite our positive finding today, our work to close the digital divide is not complete. For instance, the 2018 data demonstrate that 5.6% of Americans, nearly 18.3 million people, lack access to fixed terrestrial advanced telecommunications capability.²⁸⁶ While deployment is improving in all geographic areas, we recognize that there is still significant work to do to encourage deployment to rural areas, where 22.3% of Americans lack access, and Tribal lands, where 27.7% of Americans lack access.²⁸⁷ We agree with the Free State Foundation that, notwithstanding our finding that advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion, “the imperative to proactively identify and remove regulatory barriers to broadband infrastructure investment remains.”²⁸⁸ Thus, the further deployment of advanced telecommunications capability to close the digital divide will remain a top priority of the Commission as we continue our efforts to deliver the benefits of broadband to all Americans.

VII. ORDERING CLAUSE

95. Accordingly, IT IS ORDERED that, pursuant to section 706 of the Telecommunications Act of 1996, as amended, 47 U.S.C. § 1302, this Report IS ADOPTED.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

²⁸⁶ *See supra* Fig. 1.

²⁸⁷ *Id.*

²⁸⁸ Free State Foundation Comments at 10.

**STATEMENT OF
COMMISSIONER MICHAEL O'RIELLY**

Re: *Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, GN Docket 19-285, 2020 Broadband Deployment Report.

The finding in this year's report—that advanced telecommunications capability *is being deployed* to all Americans in a reasonable and timely fashion—is undoubtedly accurate. Nonetheless, it bears repeating (for the third year in a row) that this finding does not suggest that we have succeeded in our mission to bring broadband access to all Americans, and I personally will not rest until that work is done. Nor does it suggest that the dataset we rely on is perfect or even satisfactory. Form 477 data is obviously extremely flawed and problematically applied as a basis for distributing USF funding, as recognized by Congress in the Broadband DATA Act, and this point is especially clear in light of the huge discrepancies between this item's charts and the entire premise underlying the Rural 5G Fund Notice concurrently under the Commission's consideration. However, we should be crystal clear that Form 477 data is being used here for the limited purpose of tracking progress from year-to-year, per our statutory obligation. Otherwise, we risk unfairly conflating two very separate issues.

While I am pleased that we continue to rely on a realistic and text-based reading of section 706, I wish we would have extended that pragmatism to our evaluation framework. It's obvious that mobile and fixed broadband are increasingly converging into a single market, and I am dismayed that for yet another year, we have opted to rehash our tired, siloed approach rather than pursue a technology neutral analysis. Especially given recent calls for the FCC to support wireless hotspots to improve access for distance-learning during the COVID-19 pandemic, including to provide two-way video-based applications, it does seem that there's broad recognition of the services' substitutability, even among the most die-hard proponents of universal fiber-to-the-home. And, that's not to mention the characteristics of 5G service, which obliterate any basis for maintaining our outdated approach.

Nonetheless, I do appreciate that the item makes a sincere effort to discuss the substitutability issue more comprehensively than previous iterations of this report, and more evenhandedly compares mobile to fixed, rather than exclusively focusing on the shortcomings of the former compared to the latter. While I think we are still unnecessarily preoccupied with whether the two technologies are interchangeable for every potential use and function, this language at least moves the needle in the right direction.

Finally, I would have preferred to include data from the satellite industry in our main report, rather than relegate it to the appendices. While I appreciate that satellite providers face capacity constraints, limited capacity is by no means unique to satellite technology. Here, again, I would have preferred to take a technology neutral approach rather than engage in a somewhat arbitrary line-drawing process.

Despite the concerns I have identified, I support our overall effort and vote to approve.

**STATEMENT OF
COMMISSIONER BRENDAN CARR**

Re: *Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, GN Docket 19-285, 2020 Broadband Deployment Report.

The momentum behind America's 5G leadership is now unmistakable. As this report shows, we have turned the page on the failed broadband policies of the previous administration, and the private sector has responded. America's broadband builders are now trenching conduit, pulling fiber, and installing new high-speed cell sites at an unprecedented clip. While we are far from the finish line, the significant progress we're making in closing the digital divide is welcome news.

Regulations matter. And for years, the FCC pursued partisan policies that only made it harder for the private sector to bring more broadband to more Americans. From 2014 to 2017, for instance, the deployment of high-speed mobile wireless services in rural communities stagnated.²⁸⁹ Our pro-deployment policies have enabled the private sector to turn that around, and new builds are once again on the rise.

Internet speeds are also increasing. Since the end of 2016, the percentage of Americans with access to 250/25 Mbps has nearly doubled, from 43.6% to 85.6% at the end of 2018.²⁹⁰ Data from third-party monitors show that Internet speeds are up roughly 85% since year-end 2016. Internet providers have also built out more miles of high-speed fiber in 2019 than ever before—smashing prior records. The digital divide has narrowed substantially—closing by about 30% between year-end 2016 and 2018. Competition has also increased, with the percentage of Americans having more than two options for 25/3 Mbps high-speed services increasing 52% over that same time period.

Results like these should put the partisan effort to seize greater government control of the Internet in the rear view window. Indeed, it is more clear than ever before that the prior FCC's years-long effort to apply heavy-handed utility-style regulation to the Internet elevated politics over policy. It slowed down the important work needed to close the digital divide and held back competition. As the current pandemic highlights, we should all come together around policies that will encourage the accelerated buildout of high-speed networks in every community in this country.

²⁸⁹ Figure 2b.

²⁹⁰ Figure 4.

**STATEMENT OF
COMMISSIONER JESSICA ROSENWORCEL,
DISSENTING**

Re: *Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, GN Docket 19-285, 2020 Broadband Deployment Report.

This report is baffling.

We are in the middle of a pandemic. So much of modern life has migrated online. As a result, it has become painfully clear there are too many people in the United States who lack access to broadband. In fact, if this crisis has revealed anything, it is the hard truth that the digital divide is very real and very big.

But you'll find no evidence acknowledging that in today's Broadband Progress Report from the Federal Communications Commission. Instead, you'll find a glowing assessment that all is well. According to this rosy report the nation's broadband efforts are all good. They are proceeding in a reasonable and timely fashion and they are reaching all Americans.

This is just not right.

Check the headlines decrying the lack of broadband in this country. Look at Congress constantly pressing for new programs to extend the reach of internet access in the United States. See governors establishing committees and support systems to expand broadband to those who are not connected. Take note of mayors everywhere clamoring for better broadband so their communities have a fair shot at digital age success.

Then look all around us. Because this crisis is exposing what has long been obvious: too many Americans across the country do not have access to broadband.

In this disaster, Parking-Lot Wi-Fi has become a thing. So many people in so many cars sitting in front of shuttered libraries and coffee shops, just to pick up a free wi-fi signal. It is the only way they have to connect.

Schools have shuttered and more than 50 million students have been told to head online for class. But millions of them can't get there because they fall into the Homework Gap and lack internet access at home. It's not just a problem in rural America, it's a challenge in urban America too, where in cities like Detroit more than half of the students live in homes without broadband.

The use of telemedicine has exploded as doctors and patients seek safe ways to deliver and secure care without the risk of viral transmission. But in rural communities this is often not possible. Changes to laws in Iowa, for instance, recently expanded telehealth in the state but also demonstrated that one in five Iowans lack the bandwidth required for video consultations.

Businesses everywhere are trying to hold on in this economy. But if connectivity is limited so are revenue opportunities. With more than seven million small businesses at risk of closing during this crisis, we need to ensure they have every tool at their disposal to reach consumers safely and effectively.

All of this adds up. It means this report ignores the lived experiences of so many people struggling to get access to the broadband in they need right now for work, education, healthcare, and more. On top of this, the agency's methods for concluding that broadband deployment is reasonable are seriously flawed.

For starters, the FCC concludes that there are only 18 million people in the United States without access to broadband. This number wildly understates the extent of the digital divide in this country. That's because if a broadband provider tells the FCC that it can offer service to a single customer in a census block, the agency assumes that service is available throughout. The result is data that

systematically overstates service across the country. Other studies have shown that the true number of people without broadband access is 42 million or even as high as 162 million.

Making matters worse, the FCC relies on information submitted by providers without a system to independently verify the data. Last year, this allowed one company overstate its service coverage by tens of millions of people. This year, one of the country's largest providers found that it too had overstated its coverage in thousands of areas.

So it's no wonder the FCC's broadband data has been the subject of nonstop criticism from consumers and Congress. In fact, just last month Congress passed the Broadband DATA Act directing the FCC to clean up its act and develop data and maps that reflect the true state of broadband access in the United States. But you'll find no evidence of that effort in this report. Instead, the FCC ignores this mandate from Congress and presses forward with data that have repeatedly been shown to be wrong.

The FCC is also using a broadband standard that is too low for a nation that has moved so much of life online. Many households with multiple users are video calling, streaming entertainment, and searching online at the same time. Yet the FCC's report uses a download standard of 25 megabits per second that it adopted more than five years ago. We need to set audacious goals if we want to do big things. With so many of our nation's providers rolling out gigabit service, it's time for the FCC to adjust its baseline upward, too. We need to reset this standard to 100 megabits per second. While we're at it we need to revisit our thinking about upload speeds. At present, our standard is 3 megabits per second. But this asymmetrical approach is dated. We need to recognize that with extraordinary changes in data processing and cloud storage, upload speeds should be rethought.

Last but not least, the FCC fails to meaningfully discuss big issues that contribute to the digital divide. It refuses to consider price and affordability. It barely mentions digital literacy. If the agency is serious about living up to its duty under the law to report on the state of broadband in this country, these omissions render its conclusions suspect.

Crises can reveal a lot. This pandemic has demonstrated conclusively that broadband is no longer nice-to-have. It's need-to-have. What we also need is an honest accounting from the FCC about the state of broadband in this country. Because when we get to the other side of this crisis, we need to rebuild our economy and closing the digital divide is the right place to start. I wish that this report could contribute to that effort. I wish it could provide accurate data to inform our action. I wish it could provide a meaningful template for broadband for all. But it does not. I dissent.

**STATEMENT OF
COMMISSIONER GEOFFREY STARKS,
DISSENTING**

Re: *Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, GN Docket 19-285, 2020 Broadband Deployment Report.

The FCC's limited progress on new broadband maps has left the Commission without high-quality, nationwide data on the deployment of Advanced Telecommunications Capability. It is a shame that we are once again relying on Form 477 data, with all its inaccuracies. At this point, Form 477's problems are well documented, acknowledged throughout the telecommunications industry, and recognized by bipartisan majorities in both houses of Congress. And they are recounted in the 2018 and 2019 iterations of this report. We are all well versed in Form 477's flaws.

The fact that this report must rely on the unreliable should be reflected in its conclusions. I cannot approve the report's confident declaration that this data constitutes "compelling evidence" that Advanced Telecommunications Capability is being deployed on a reasonable and timely basis. We do not have a strong basis for that conclusion, and we should say so. I therefore respectfully dissent.

This report, which I have called the "State of the Union" for the digital divide, calls closing the digital divide "the Commission's top priority." I wholeheartedly agree with that aspiration, which has not always been evident in the Commission's actions. Earlier this year, the Commission committed more than \$16 billion to bringing broadband to our hardest to reach areas through the Rural Digital Opportunity Fund. But we know that the digital divide is not just a rural issue. Census Bureau surveys show that three times as many households in urban areas remain unconnected as in rural areas.²⁹¹ When it comes to making sure all Americans can access affordable, high-quality broadband, we have a long way to go.

In light of the struggles many Americans have faced over the last six weeks, it is especially perplexing and disturbing that the majority would cast this report as a victory lap. When public health requires social distancing and even quarantine, closing the digital divide becomes central to our safety and economic security. But too many Americans cannot access online work, medical help, and distance learning because broadband is too expensive or not available. As we enact emergency efforts to respond to the COVID-19 crisis, I will continue to call on the Commission to speed the work of correcting our broadband deployment data and to develop better data and policy on affordability—critical steps toward a lasting solution to the digital divide.

I thank the many staff members from across the Commission who contributed to the creation of this report.

²⁹¹ See Blair Levin and Larry Downes, *Cities, not rural areas, are the real Internet deserts*, N.Y. Times (Sept. 13, 2019), <https://www.washingtonpost.com/technology/2019/09/13/cities-not-rural-areas-are-real-internet-deserts/>.