

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

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

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CTIA¹ respectfully submits these comments in response to the Federal Communications Commission’s (Commission’s) *Fifteenth Broadband Deployment Report Notice of Inquiry*.² As these comments demonstrate, mobile broadband networks keep expanding throughout the United States, reaching more Americans than ever before, and improving consumers’ lives in new, meaningful ways. For these and other reasons discussed below, the Commission should find that deployment of mobile broadband services is reasonable and timely.

I. INTRODUCTION AND SUMMARY.

More American consumers have access to mobile broadband than ever before. When the Commission first surveyed the broadband landscape 20 years ago, it could not have projected the incredible growth and innovation that have occurred since. Today, mobile wireless services are an integral and ubiquitous part of Americans’ daily lives, and competition among mobile

¹ CTIA[®] (www.ctia.org) represents the U.S. wireless communications industry and the companies throughout the mobile ecosystem that enable Americans to lead a 21st-century connected life. The association’s members include wireless carriers, device manufacturers, suppliers as well as apps and content companies. CTIA vigorously advocates at all levels of government for policies that foster continued wireless innovation and investment. The association also coordinates the industry’s voluntary best practices, hosts educational events that promote the wireless industry, and co-produces the industry’s leading wireless tradeshow. CTIA was founded in 1984.

² *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, FCC 19-102 (rel. Oct. 23, 2019) (*Fifteenth Report NOI*).

broadband services drives innovation and investment to the ultimate benefit of American consumers and the U.S. economy. And the wireless industry continues to deploy mobile broadband to meet the exponentially increasing demands of consumers, expanding both the coverage and capacity of their networks to support the constant data use and high-capacity applications and services that have become central to consumers' lives.

Thanks to the widespread availability of robust, high-speed mobile broadband networks, consumers have embraced a mobile-centric lifestyle. Today, most consumers have a mobile device within arm's reach and the ability to connect to almost anyone and anything through high-speed mobile broadband services. In fact, nearly 96 percent of U.S. adults own a mobile phone of some kind, and the percentage of those consumers with a smartphone has nearly tripled over the past decade.³ Mobile broadband has never played a more central role in how Americans live, work, and play, as mobile data use is up over 73 times what it was in 2010.⁴ The wireless industry has continued to invest in 4G LTE to meet this demand, enabling consumers to nearly double their mobile data use in just one year—using 82 percent more mobile data in 2018 than in 2017.⁵ The number of innovative devices connected to wireless networks, such as connected cars, smartwatches, and health monitors, also jumped more than 10 percent last year, to 139.4 million devices in 2018.⁶ In fact, consumers keep connecting new devices, and finding new ways to

³ See Mobile Factsheet, PEW RESEARCH CTR. (June 12, 2019), <https://www.pewresearch.org/internet/fact-sheet/mobile/>; *CTIA 2019 Annual Survey Highlights*, CTIA, <https://www.ctia.org/news/2019-annual-survey-highlights> (*CTIA 2019 Annual Survey Highlights*).

⁴ *CTIA 2019 Annual Survey Highlights*.

⁵ *Mobile Data Use Nearly Doubles, CTIA Annual Survey Shows*, CTIA (June 20, 2019), <https://www.ctia.org/news/mobile-data-use-nearly-doubles-ctia-annual-survey-shows> (*CTIA June 20 Press Release*).

⁶ *CTIA 2019 Annual Survey Highlights*.

leverage the power of mobile broadband. There are nearly 1.3 mobile connected devices per consumer today, and that number is projected to grow to 15 devices per person in the next 10 years with the development and growth in Internet of Things (IoT) and the evolving mobile economy.⁷

Investment in and deployment of mobile broadband networks are doing more than meeting and exceeding consumers' increasing demands; they are also enabling the United States to establish a clear advantage in the new 5G economy. 4G services created new experiences and new industries over the past decade, and continue to serve consumers, and 5G will be even more transformative over the next decade. Mobile broadband networks will be the foundation of a new 5G economy, powered by the industries and the innovations of the future. Indeed, the wireless industry invested more than \$27 billion in 2018 alone, launching 5G commercially before anyone else with network gear from a trusted secure supply chain.⁸ From the first 5G hospital in Chicago, to the first 5G-enabled factories, smart cities, entertainment companies, and schools—we are already seeing investors poised to support the coming wave of 5G start-ups and Fortune 500 companies rapidly developing their own 5G strategies. And the economy stands to gain three million new American jobs as part of this effort.⁹

⁷ Brent Heslop, *By 2030, Each Person Will Own 15 Connected Devices – Here's What That Means for Your Business and Content*, MARTECH Advisor (Mar. 4, 2019), <https://www.martechadvisor.com/articles/iot/by-2030-each-person-will-own-15-connected-devices-heres-what-that-means-for-your-business-and-content/>.

⁸ *CTIA 2019 Annual Survey Highlights*.

⁹ Meredith Atwell Baker, *China Plays Catch Up as the U.S. Launches the 5G Economy*, CTIA BLOG, <https://www.ctia.org/news/china-plays-catch-up-as-the-u-s-launches-the-5g-economy> (Nov. 1, 2019).

For all of these reasons, the Commission should take a holistic view of progress in the deployment of mobile broadband. That approach reflects both the consumer experience and the critical importance of mobile broadband to Americans’ daily lives and the U.S. economy. Based on the data provided in these comments, the Commission should find that the deployment of mobile broadband has been reasonable and timely pursuant to Section 706 of the Telecommunications Act of 1996.¹⁰

The Commission has moved aggressively to remove unnecessary barriers to mobile broadband deployment, laid a foundation for 5G by modernizing its wireless facilities siting policies, and provided the wireless industry with spectrum resources to keep driving investment and deployment. Specifically, CTIA commends the critical steps the Commission has taken to make available flexible-use licenses in low-, mid-, and high-band spectrum, which are central to U.S. 5G success. CTIA also appreciates the Commission’s dedication to delivering mobile broadband throughout the country, especially by improving its processes for targeting resources toward unserved areas. For instance, the Commission’s recent Digital Opportunity Data Collection (DODC) initiative aligns with the bipartisan congressional efforts led by Senator Wicker to improve wireless coverage data collection to enhance the Commission’s ability to identify unserved areas for targeted support.¹¹ The Commission should continue this momentum to ensure that mobile broadband deployment *remains* reasonable and timely by: (1) allocating

¹⁰ Section 706 of the Telecommunications Act of 1996 is now codified at 47 U.S.C. § 1302(b); *see also Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, 2019 Broadband Deployment Report, 34 FCC Rcd 3857, 3896-99 ¶¶ 76-79 (2019) (*Fourteenth Report*) (finding “advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion”).

¹¹ *See generally Establishing the Digital Opportunity Data Collection et al.*, Report and Order and Second Further Notice of Proposed Rulemaking, 34 FCC Rcd 7505 (2019) (*DODC Order & FNPRM*); *see also* Reply Comments of CTIA, WC Docket Nos. 19-195, 11-10 (filed Oct. 7, 2019) (CTIA DODC Reply Comments).

more low-, mid-, and high-band spectrum for exclusive licensed use, with a particular focus on mid-band for 5G; (2) clarifying its rules to remove barriers and promote deployment on existing infrastructure; and (3) ensuring appropriate policies are in place to provide incentives and resources to deploy mobile broadband networks in rural and other high-cost areas.

Given the steady expansion of 4G LTE and the development of a new 5G economy, combined with the continued rise in mobile adoption, use, and satisfaction, the Commission should again find that mobile wireless broadband is being reasonably and timely deployed. By taking the above actions to enable wireless providers to access the spectrum, infrastructure, and other resources necessary for deployment, the Commission can promote the wireless industry's ability to continue making meaningful strides towards serving all Americans with the mobile services they increasingly demand.

II. THE COMMISSION SHOULD CONFIRM THAT MOBILE WIRELESS BROADBAND DEPLOYMENT IS REASONABLE AND TIMELY.

A. The Commission Appropriately Focuses This Inquiry on Progress in Deployment.

The Commission is right to focus its Section 706 examination again this year on whether *progress* in the deployment of advanced telecommunications capability is reasonable and timely. Congress charged the agency to report on an annual basis “whether advanced telecommunications capability *is being deployed* to all Americans in a reasonably timely fashion.”¹² The use of the present progressive tense in Section 706 (*i.e.*, “is being deployed”) to define the annual reporting requirement indicates that Congress intended for the Commission to report on the ongoing *progress* of deployment. Were it Congress's intent to seek Commission input on whether deployment to all Americans *has been achieved*, Congress easily could have

¹² 47 U.S.C. § 1302(b) (emphasis added).

done so by directing the Commission to report on whether telecommunications capability “has been deployed” in a reasonable and timely fashion—but it did not.

CTIA therefore agrees with the Commission’s proposal in the *Fifteenth Report NOI* that the agency conduct this inquiry, as it did last year, by measuring deployment progress over the past five years.¹³ Based on the Commission’s finding that deployment was reasonable and timely in past years’ reports and the significant deployment progress, consumer adoption, and customer satisfaction described in these comments, the Commission should find that the progress of deployment remains reasonable and timely.

B. U.S. Providers Continue to Invest in the Deployment of Mobile Broadband Coverage and Capacity.

1. 4G LTE Networks Continue to Expand Throughout the United States, Demonstrating that Mobile Broadband Continues to be Deployed in a Reasonable and Timely Manner.

Progress has been clear. More consumers throughout the United States have access to advanced wireless services than ever before, with 4G LTE service now available to at least 99.9 percent of Americans and covering more than 77 percent of the total U.S. land area.¹⁴ Since the launch of 4G in 2010, the wireless industry has made more than \$253 billion in capital investments.¹⁵ Wireless provider capital expenditures totaled \$27.4 billion dollars over the past year—an increase of nearly \$1.8 billion from 2017.¹⁶ Providers not only continue to invest in expanding coverage, but also are dedicated to improving network speeds to support more and more

¹³ *Fifteenth Report NOI* ¶ 9.

¹⁴ *Communications Marketplace Report et al.*, Report, 33 FCC Rcd 12558, 12593 (2018) (Fig. A-29) (*2018 Communications Marketplace Report*).

¹⁵ *CTIA June 20 Press Release*.

¹⁶ *Id.*

data-intensive applications. As a result, today’s consumers benefit from 90 percent faster download speeds than just five years ago.¹⁷

Wireless providers, both regional and national, are also investing in bringing coverage to underserved and unserved communities across the country. Last year, the Commission estimated that approximately 91 percent of the consumers living in rural areas had access to at least three LTE service providers, up seven percentage points from the previous year’s 84.2 percent, and up more than 10 percent from the year before.¹⁸ As wireless providers continue to invest in delivering more services to rural areas, this positive trend is expected to continue.¹⁹

These advanced networks are supported by a record 349,000 cell sites in operation at the end of 2018, an increase of more than 25,000 sites from 2017. That is the biggest year-over-year increase since 2010-11, when providers first began deploying 4G, representing 44 percent growth

¹⁷ *CTIA 2019 Annual Survey Highlights*.

¹⁸ *See 2018 Communications Marketplace Report*, 33 FCC Rcd at 12594 ¶ 45 (a figure which was itself a 3.6 percentage point jump from the prior year); *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993 et al.*, Nineteenth Report, 31 FCC Rcd 10534, Table III.A.5 (2016).

¹⁹ *See, e.g.*, John Legere, *New T-Mobile: Bridging the Digital Divide ... for GOOD*, T-MOBILE (Apr. 17, 2019), <https://www.t-mobile.com/news/new-t-mobile-bridging-digital-divide> (“T-Mobile has also already expanded our reach into rural America with our aggressive deployment of LTE on 700 MHz and 600 MHz spectrum.” (emphasis removed)); *More Than 50,000 Square Miles of LTE Coverage Added Nationwide to Support AT&T and FirstNet Users*, AT&T (Jan. 9, 2019), https://about.att.com/story/2019/firstnet_footprint_expansion.html (“We increased the LTE coverage area for the AT&T network and FirstNet public safety communications platform by more than 50,000 square miles nationwide, covering an additional 1 million individuals. Need a reference mark for the square miles? That’s bigger than the size of Louisiana.” (also emphasizing how new deployments connect “rural and remote responders”)); *see also* Fletcher, *infra* note 31 (describing how, with regard to U.S. Cellular’s planned rural 5G deployment, “U.S. Cellular said even customers with 4G devices will start to experience better network quality as the carrier upgrades [rural] cell sites with new 5G-capable technology”).

over the last decade.²⁰ This incredible infrastructure deployment growth is expected to continue, thanks in part to the Commission’s policies adopted in recent years, which facilitate and expedite small cell deployment and access to existing infrastructure. CTIA encourages the Commission to keep supporting this progress by continuing to remove barriers to deployment so that the wireless industry can deliver the next-generation networks that consumers demand.²¹

2. The United States Is Developing a Leading 5G Economy at the Same Time 4G LTE Network Access Continues to Expand.

As U.S. wireless providers continue expanding and enhancing their 4G LTE networks, they are simultaneously enabling the creation of an entirely new 5G economy. For the past few years, U.S. leadership—at the Commission, on the Hill, and in the Administration—has been dedicated to adopting policies that will help the U.S. compete on a global scale, and support a shared vision for the new 5G economy. The U.S. wireless industry heeded the call from policymakers and devoted significant resources to surpassing global competition by launching 5G commercially before any other nation.

America’s nationwide wireless providers are racing to deploy 5G services across the country and offering competitive next-generation mobile broadband packages to consumers. For instance, T-Mobile announced it will launch a nationwide 5G network on December 6, 2019. With this announcement, T-Mobile signals that it is accelerating its 5G rollout—previously projected for completion by the end of 2020—to extend its 5G services to 200 million people

²⁰ *Background on CTIA’s Wireless Industry Survey*, CTIA (July 2019), https://api.ctia.org/wp-content/uploads/2019/06/Background_on_CTIA_Wireless_Industry_Survey_2019.pdf.

²¹ *See infra* Section IV.B.

nationwide this year.²² Verizon's 5G Ultra Wideband service is available in 18 U.S. cities, including Washington, D.C., with specific wideband mapping available—and Verizon expects to announce additional cities before year end.²³ This Ultra Wideband network supports near real-time experiences with high throughput, ultra-low latency, and massive capacity, bringing applications like 4K movies and augmented reality to consumers' fingertips.²⁴ Sprint's True Mobile 5G deployments cover 16 million consumers.²⁵ Sprint's 5G service is live in nine cities, including Washington, D.C., with more cities to be announced this year.²⁶ AT&T has launched its mobile 5G+ network in parts of 21 cities, with 30 more cities on the horizon and a nationwide 5G offering planned for the first half of 2020.²⁷ AT&T also announced plans to launch its 5G network over its low-band spectrum in at least 15 markets in the coming weeks, reaching tens of millions of consumers.²⁸ Overall, the nationwide carriers have already launched more than 50 5G networks in parts of 35 cities in 24 states (plus the District of Columbia). In addition, 5G has

²² *5G Phones*, T-MOBILE, <https://www.t-mobile.com/devices/5g-phones> (select *What Did T-Mobile Announce?*) (last visited Nov. 19, 2019).

²³ *Verizon 5G Ultra Wideband Service Available in More Cities*, VERIZON (Nov. 19, 2019), <https://www.verizon.com/about/news/verizon-5g-ultra-wideband-service-available-more-cities>; see also *Explore Verizon 5G Ultra Wideband Coverage*, VERIZON, <https://www.verizonwireless.com/5g/coverage-map/> (last visited Nov. 21, 2019).

²⁴ *Id.*

²⁵ Nick Ludlum, *MWC19 Los Angeles Shows Off U.S. 5G Innovation*, CTIA (Oct. 30, 2019), <https://www.ctia.org/news/mwc-los-angeles-shows-off-u-s-5g-innovation>.

²⁶ *Sprint's True Mobile 5G*, SPRINT, <https://www.sprint.com/en/landings/5g.html> (last visited Oct. 31, 2019).

²⁷ *5G's Promise*, AT&T, <https://about.att.com/pages/5G> (last visited Oct. 31, 2019).

²⁸ *AT&T Extends 5G Leadership Across the U.S.*, AT&T (Nov. 22, 2019), https://about.att.com/story/2019/att_5g_leadership.html?Source=ESSZsPSPR00gensEM&wtExtndSource=20191122060504_ATTNEWS_TWITTER_EG_N%2FA_Innovation_Technology_5G_20191122_Boosted_Announcement_N%2FA_N%2FA_N%2FA_Awareness_No_ATTNews_tw.

been launched in 14 NFL stadiums,²⁹ with additional public venues such as college campuses, public libraries, community centers, and 10 sports arenas scheduled for 5G deployment in 2019-2020.³⁰

Regional providers are also making great strides towards launching 5G. For example, U.S. Cellular is scheduled to launch 5G service in parts of multiple cities and urban and rural communities in Iowa and Wisconsin in the first quarter of 2020, with the network completed in three years.³¹ And Bluegrass Cellular recently announced that it partnered with ClearSky Technologies to complete a strategic 5G wireless design for the deployment of 5G networks in two key cities within the network area.³² These networks will be the foundation of the new 5G economy outside of dense urban areas, powering the industries and innovations of the future.

The new 5G economy is already coming to life throughout the United States. From the first 5G hospital in Chicago, to the first 5G-enabled factories, smart cities, entertainment companies, and schools, consumers and businesses across sectors and across the country are

²⁹ See, e.g., Igor Bonifacic, *Verizon Brings 5G Coverage to 13 Stadiums as NFL Season Begins*, ENGADGET (Sept. 5, 2019), <https://www.engadget.com/2019/09/05/verizon-5g-13-nfl-stadiums/>; Edward C. Baig, *Verizon Brings 5G Connectivity to 13 NFL Stadiums in Time for Kickoff*, USA TODAY (Sept. 11, 2019, 3:11 PM), <https://www.usatoday.com/story/tech/2019/09/05/5-g-comes-to-nfl-stadiums/2214896001/>.

³⁰ See, e.g., *Verizon to Put 5G into 10 Arenas*, LIGHT READING (Oct. 18, 2019), <https://www.lightreading.com/mobile/5g/verizon-to-put-5g-into-10-arenas/d/d-id/754986>.

³¹ See, e.g., Bevin Fletcher, *U.S. Cellular Sets 5G Launch in Wisconsin, Iowa for Early 2020*, FIERCEWIRELESS (Oct. 2, 2019, 11:22 AM), <https://www.fiercewireless.com/5g/u-s-cellular-sets-5g-launch-wisconsin-iowa-for-early-2020>; U.S. Cellular 5G, <https://www.uscellular.com/plans/network-innovation/5g-technology> (last visited Nov. 21, 2019).

³² *Bluegrass Cellular Employs ClearSky's NetView 360 Service to Evaluate Design Options for 5G Wireless Deployment*, CCA MOBILE (July 9, 2019), <https://ccamobile.org/press/member-press/bluegrass-cellular-employs-clearskys-netview-360-service-to-evaluate-design-options-for-5g-wireless-deployment/9135697>.

already reaping the benefits of 5G.³³ 5G promises to contribute even more to America's economic success story. Wireless providers are starting to invest a projected \$275 billion to deploy 5G, creating three million jobs and adding \$500 billion to U.S. GDP.³⁴

Moreover, as the data above demonstrate, multiple providers are competing with each other to be the U.S. 5G leader. And this competition significantly benefits consumers. Providers are offering unlimited data plans, 5G-enabled devices, free content and applications, and a range of other options to win consumers over. Consumers around the world may be awaiting the delivery of 5G, but due to U.S. policymakers' commitment to 5G policies and aggressive investment and deployment by the wireless industry, American consumers will benefit from our leading 5G economy first.³⁵

³³ See, e.g., Brendan Carr, Commissioner, FCC, Keynote Address at Mobile World Congress-Los Angeles, "The Year of 5G and Beyond" (Oct. 22, 2019), <https://docs.fcc.gov/public/attachments/DOC-360365A1.pdf>; see also, e.g., Heidi Obermeyer, *This Week in 5G: The 5G Early Bird Gets the Worm*, CTIA (Jan. 11, 2019) ("AT&T is partnering with Chicago's Rush University Medical Center in Chicago to create the first 5G-enabled hospital in the U.S. 5G will enable telemedicine, smart scheduling and enhanced patient care through artificial intelligence and augmented reality training sessions for doctors.").

³⁴ See *CTIA 2019 Annual Survey Highlights*.

³⁵ In contrast, wireless providers in China did not launch any 5G services in that country until the end of October 2019, well behind their U.S. counterparts (and even then, China's wireless providers were still subject to expert warnings of adoption challenges including a lack of handsets and too-high pricing). See, e.g., Arjun Kharpal, *Race for 5G Heats Up: China's Next-Generation Networks Go Online*, CNBC (Nov. 1, 2019), <https://www.cnbc.com/2019/11/01/china-5g-mobile-networks-go-online-as-race-with-us-heats-up.html>. Elsewhere, Canada's wireless industry is not expected to launch any 5G services until 2020,³⁵ India is still waiting to auction spectrum for 5G by year-end 2019 or early 2020, and EU members are projected to trail North America when it comes to deploying 5G mobile networks. See, e.g., *5G Spectrum Auction by Year-End or Early 2020*, ECONOMIC TIMES (Sept. 13, 2019, 9:52 PM), <https://economictimes.indiatimes.com/industry/telecom/telecom-news/5g-spectrum-auction-by-year-end-or-early-2020-ravi-shankar-prasad/articleshow/71117477.cms>. Bengt Nordström, *Can Europe Compete in 5G? Not Without Addressing Barriers In Our Way*, ERICSSON (Sept. 11, 2019), <https://www.ericsson.com/en/blog/2019/9/can-europe-compete-in-5g-not-without-addressing-barriers-in-our-way>.

C. Wireless Deployment Has Made Mobile Connections Central to American Consumers' Lives, and Industry's Continued Innovation Delivers New Services and Significant Benefits.

Wireless providers' steady mobile broadband deployment and upgrades to their existing networks have made wireless services and devices increasingly integral to society today. A decade ago, consumers were just beginning to adopt smartphones. Now, a smartphone is a central component of consumers' daily lives. Nearly 10 years ago, only 35 percent of U.S. adults owned a smartphone; today, that figure has grown to 81 percent, and most consumers will not leave home (or anywhere) without their mobile device.³⁶ Indeed, 96 percent of U.S. adults now own a mobile phone of some kind, and smartphone adoption is up across demographics.³⁷ What's more, smartphone users spend almost four hours on their phones every day on average.³⁸ Consumer demand for wireless services continues to increase across all metrics—from voice minutes, to text messages, to data use. Indeed, mobile data use has nearly doubled in one year—reaching a record 23.58 trillion megabytes of mobile data—growing 82 percent from 2017 to 2018.³⁹ That's 73 times more mobile data than was used a decade ago.⁴⁰ This increased usage is due in no small part to the fact that many consumers rely almost exclusively on their wireless

³⁶ Monica Anderson, *Mobile Technology and Home Broadband 2019*, PEW RESEARCH CTR. (June 13, 2019), <https://www.pewresearch.org/internet/2019/06/13/mobile-technology-and-home-broadband-2019/>; *CTIA 2019 Annual Survey Highlights*.

³⁷ Mobile Factsheet, PEW RESEARCH CTR. (June 12, 2019), <https://www.pewresearch.org/internet/fact-sheet/mobile/>.

³⁸ *Time Spent with Media*, EMARKETER (May 30, 2019) <https://www.emarketer.com/content/us-time-spent-with-mobile-2019>.

³⁹ *CTIA 2019 Annual Survey Highlights*.

⁴⁰ *Id.*

connection; one in five U.S. adults is a “smartphone-only” internet user.⁴¹ To support this increasingly heavy demand, the wireless industry continues to invest in improving network speeds to support more and more data-intensive applications—today, consumers benefit from 90 percent faster download speeds than just five years ago.⁴²

Consistent with these statistics, more Americans than ever depend on their mobile broadband connection for access to the internet and the many benefits it inures to consumers. By some accounts, a majority of consumers are more concerned about forgetting their phone than their wallet; one-third would fix their smartphone before their refrigerator; and Americans report using smartphones as one of their most “important” pastimes.⁴³

With more Americans than ever joining the digital age, more consumers are reaping the benefits of the mobile economy.⁴⁴ Indeed, mobile connectivity boosts productivity, grows the economy, and benefits students, employees, and consumers across the country. Having a mobile

⁴¹ Mobile Factsheet, PEW RESEARCH CTR. (June 12, 2019), <https://www.pewresearch.org/internet/fact-sheet/mobile/>.

⁴² CTIA 2019 Annual Survey Highlights.

⁴³ See, e.g., Alessandro Jorje et al., *Our Love Affair with Smartphones Has Grown Deeper Than You Think*, WORLD ECON. FORUM (Mar. 6, 2019), <https://www.weforum.org/agenda/2019/03/a-smartphone-is-now-a-necessity-for-most-of-us-say-researchers/> (revealing data from a survey that “suggests most of us now see our smartphone as a necessity, not a luxury”).

⁴⁴ See, e.g., Eli Zimmerman, *More Students Rely On Mobile Devices to Complete Online Classes*, EDTECH (July 13, 2018) (“Nearly 67 percent of students now use mobile devices to complete their online coursework, according to a study conducted by Learning House and Aslanian Market Research”); Dave Zielinski, *Blue-Collar Workers More Likely to Search for Jobs on Their Smartphones*, SHRM (June 3, 2019), <https://www.shrm.org/resourcesandtools/hr-topics/talent-acquisition/pages/blue-collar-workers-search-for-jobs-smartphones.aspx> (“Almost 60 percent of Glassdoor users are now looking on their phones for jobs. ... Mobile technology has infiltrated daily life in ways that no longer make having less education a barrier to using a mobile devices[.]”).

broadband connection has never been more central to consumers' lives, and dependence on mobile broadband will only increase going forward.

D. The Reasonable and Timely Deployment of Mobile Wireless Broadband Services Is Driving the Rapid Growth in Internet of Things.

The steady deployment, increased capacity, and faster speeds of mobile broadband networks are promoting advances across sectors and continue to spur IoT development. As a result, the number of IoT devices grew by more than 10 percent in 2018, driven by a variety of exciting new use cases.⁴⁵ Consumers keep connecting new devices, and finding new ways to leverage the power of mobile broadband. Just last year, the number of IoT devices surpassed the number of mobile subscriptions for the first time—there are nearly 1.3 devices per consumer today, and that number is projected to grow to 15 devices per person in the next ten years.⁴⁶ Consumers are embracing connected cars, smartwatches, and health monitors like never before. Some reports estimate that, by 2025, the average connected person is expected to interact with IoT devices every 18 seconds.⁴⁷ Such projections are not surprising, given that the number of mobile devices, connected by wireless networks, jumped to 139.4 million this year.⁴⁸ For context,

⁴⁵ See *CTIA 2019 Annual Survey Highlights; Mobile Data Usage Surges 82% Amid IoT Growth, Survey Shows*, MOBILE MARKETER (June 21, 2019), <https://www.mobilemarketer.com/news/mobile-data-usage-surges-82-amid-iot-growth-survey-shows/557336/>; *Ericsson Mobility Report*, ERICSSON, at 8 (June 2019), <https://www.ericsson.com/49d1d9/assets/local/mobility-report/documents/2019/ericsson-mobility-report-june-2019.pdf> (*Ericsson Mobility Report*).

⁴⁶ Brent Heslop, *By 2030, Each Person Will Own 15 Connected Devices – Here's What That Means for Your Business and Content*, MARTECH ADVISOR (Mar, 4, 2019), <https://www.martechadvisor.com/articles/iot/by-2030-each-person-will-own-15-connected-devices-heres-what-that-means-for-your-business-and-content/>.

⁴⁷ *Ericsson Mobility Report* at 8, 34.

⁴⁸ *CTIA 2019 Annual Survey Highlights*.

this figure is analogous to every person in America's four biggest cities (Los Angeles, New York City, Chicago, and Houston) each having eight connected devices.⁴⁹

In light of this significant growth opportunity, wireless service providers are building next-generation networks with ever-increasing speeds, higher capacity, and lower latency to support the constant, instantaneous data transfers required for IoT applications. In 2019, the wireless industry announced numerous IoT network offers spurred by competition among providers and new entrants:

- AT&T offers a Multi-Network Connect (MNC) platform, a unified offering designed to streamline the management of many types of IoT products, offering a broad-based platform that can bring together input from nearly any type of licensed network, allowing integration across multiple platforms and use cases.⁵⁰
- Bluegrass Cellular offers a marketplace of business-centered solutions,⁵¹ including IoT solutions such as fleet management.⁵² The company's "MiFleet" solution allows businesses to access information regarding vehicles and drivers all in one platform.
- Cellcom offers IoT business solutions including a range of consumer, business, and enterprise sensors for a range of applications,⁵³ as well as fleet and asset management solutions.⁵⁴
- Sprint offers a range of IoT offerings under the umbrella of the company's IoT Factory store, with an emphasis on various types of sensor-based services, including restaurant

⁴⁹ *Id.*

⁵⁰ See John Gold, *Big Four Carriers Want to Rule IoT by Simplifying It*, NETWORK WORLD (Oct. 31, 2019, 9:00 PM), <https://www.networkworld.com/article/3449820/big-four-carriers-want-to-rule-iot-by-simplifying-it.html>.

⁵¹ *Marketplace*, BLUEGRASS CELLULAR, <https://marketplace.bluegrasscellular.com/home> (last visited Nov. 11, 2019).

⁵² *MiFleet Fleet Management*, BLUEGRASS CELLULAR, <https://marketplace.bluegrasscellular.com/apps/187682/mifleet-fleet-management#!overview> (last visited Nov. 11, 2019).

⁵³ See *IoT (Internet of Things) Business Solutions*, CELLCOM, <https://www.cellcom.com/internetofthings.html?navtype=business> (last visited Nov. 11, 2019).

⁵⁴ See *Fleet and Asset Management*, CELLCOM <https://www.cellcom.com/m2m-asset-management.html?navtype=business> (last visited Nov. 11, 2019).

and food-service storage temperatures, smart building solutions for commercial property, and fleet management.⁵⁵

- T-Mobile focuses on asset tracking, smart city technology, smart vehicles, and fleet management. It also runs the CONNECT partner program to facilitate use of the T-Mobile network by makers of IoT solutions.⁵⁶
- Verizon offers its Thingspace IoT platform designed to facilitate all types of IoT solutions on a broad range of networks in a single platform. The company has delivered solutions in several verticals including energy and health care. In addition to connectivity, Verizon also sells a Critical Asset Sensor that combines a number of sensor capabilities critical to most IoT use cases.⁵⁷
- U.S. Cellular offers “smart connectivity” solutions for use cases including public safety, smart farming, utilities management, and property management, along with a “ConnectHQ” dashboard allowing customers to manage all of their IoT devices from one dashboard.⁵⁸

None of the above-described use cases or products would be possible absent high-capacity, high-speed, widely deployed mobile broadband networks that continue to expand and improve to support exponential IoT growth. This further reinforces that the Commission should again find that mobile broadband is being reasonably and timely deployed.

III. THE COMMISSION SHOULD CONSIDER AVAILABLE DATA TO DETERMINE THAT MOBILE BROADBAND DEPLOYMENT IS REASONABLE AND TIMELY.

A. The Commission Should Consider Various Data Points to Determine Whether Mobile Broadband is Being Deployed in a Reasonable and Timely Fashion.

As the Commission accurately noted in the *Fourteenth Report* and reiterates in the *Fifteenth Report NOI*, “the inherent variability of mobile services, as well as certain data

⁵⁵ See Gold *supra* note 50.

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ *Smart Connectivity*, U.S. CELLULAR, <https://business.uscellular.com/solutions/smart-connectivity/> (last visited Nov. 11, 2019) (including links to germane case studies).

limitations, continue to make the use of a single mobile speed benchmark unworkable.”⁵⁹

Accordingly, the Commission finds that “use of various data points is still the best method to assess the extent to which American consumers have mobile advanced telecommunications capability available.”⁶⁰ Yet the *Fifteenth Report NOI* nevertheless proposes to establish the same benchmark’s as last year’s report—estimating the availability of wireless services at 5/1 and 10/3 Mbps, using Form 477 and Ookla data.⁶¹ Given that many factors affect consumers’ wireless experiences, the Commission should take a holistic view of deployment progress that looks beyond just speeds and coverage data to other data that reflect the consumer mobile experience today.

As the Commission recognizes, rigid speed benchmarks are an inadequate way to measure whether deployment is reasonable and timely. Various mobile broadband speeds and service characteristics are needed to support divergent use cases. Further, consumers have the option to choose from a variety of wireless plans, and can opt for the speeds and services that meet their needs. As a result, 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.

While the Form 477 data collection has been and continues to be a valuable resource for coverage data, CTIA appreciates the Commission’s efforts to evolve its collection of mobile wireless deployment data in this and other proceedings to more closely reflect consumers’ experiences. As CTIA noted in its recent DODC comments, “[m]obile wireless coverage data is

⁵⁹ *Fifteenth Report NOI* ¶ 12.

⁶⁰ *Id.* ¶ 12.

⁶¹ *See id.* ¶¶ 20-21.

essential to the Commission’s public policy initiatives, including efforts to close the digital divide by identifying unserved areas for targeted support.”⁶² Accordingly, in the DODC proceeding, CTIA proffered constructive proposals for improving the quality of mobile broadband availability data for the creation of improved coverage maps that mobile wireless providers submit to the Commission.⁶³

In keeping with the spirit of these efforts, the Commission is correct to rely in this proceeding on various data points—rather than just mobile speed benchmarks—to assess the extent of broadband availability. The goal of Section 706 is to determine the adequacy of deployment’s progress. Accordingly, a holistic approach better reflects consumers’ experiences—including exponentially increasing consumer demand for mobile data, continued adoption of mobile broadband and connected devices, and satisfaction with mobile broadband services—all of which demonstrate that mobile broadband is being reasonably and timely deployed.

B. The Data Show That Mobile Broadband Deployment Is Meeting and Exceeding Consumers’ Demands.

Mobile broadband providers are investing in expanding and enhancing the capabilities of their networks, including upgrading existing facilities and deploying additional facilities across the country. They are also launching evolutionary upgrades, including LTE and 5G deployments.⁶⁴ As a result of the wireless industry’s investment, consumer satisfaction with providers of mobile wireless broadband has continued to rise. In fact, 82 percent of consumers

⁶² CTIA DODC Reply Comments at 1.

⁶³ *Id.* at 4-8.

⁶⁴ *See supra* Section II.B.

surveyed said that wireless provides value, and a majority of consumers found they get more value from their mobile connection than they did five years ago. The American Consumer Satisfaction Index report on Wireless Telephone Service demonstrates this upward trend, with wireless scoring higher satisfaction ratings for the fourth year in a row.⁶⁵ And JD Power reports that wireless network quality continues to improve year over year, with some of the largest positive changes occurring in data speeds and connectivity—crucial features for next-generation applications.⁶⁶

In addition, consumers are continuing to adopt mobile broadband, and increasingly relying on their mobile broadband connection for more of their daily needs. The percentage of wireless-only households grows each year, and mobile data use continues to grow, as discussed above. As Connected Nation explains, distilling the latest American Community Survey Data published by the Census Bureau, nearly 103 million U.S. households had smartphones in 2018, representing 84 percent of homes in the country—with nearly 11 million of these being smartphone-only households.⁶⁷ Overall, one in eight households—representing over 14 million households—only had a cellular data plan with no other type of internet service at home.⁶⁸ The

⁶⁵ *Benchmarks by Company – Wireless Telephone Service*, AM. CONSUMER SATISFACTION INDEX, https://www.theacsi.org/index.php?option=com_content&view=article&id=149&catid=&Itemid=214&i=Wireless+Telephone+Service (last visited Nov. 1, 2019). Satisfaction ratings are available on a variety of wireless-related topics, from satisfaction with network quality, to customer service, to the features supported by wireless providers and devices.

⁶⁶ *Wireless Network Quality Improves Nationwide as Carriers Invest in 5G Future*, J.D. Power Finds, J.D. POWER (July 18, 2019), <https://www.jdpower.com/business/press-releases/2019-us-wireless-network-quality-performance-study-vol-1>.

⁶⁷ *U.S. Census Shares New Broadband Adoption Data*, CONNECTED NATION (Oct. 4, 2019), <https://connectednation.org/blog/2019/10/04/u-s-census-shares-new-broadband-adoption-data/>.

⁶⁸ *Id.*

multi-million household jump in mobile-broadband-only households (from 10 percent of the U.S. population in 2016 to 12 percent in 2018)⁶⁹ further evidences the degree to which mobile broadband deployment continues to satisfy consumers' expectations.

Consumers across demographics benefit from the continued deployment and availability of next-generation mobile broadband. For instance, the smartphone-only trend is particularly pronounced among Hispanic, African-American, young adult, and low-income consumers.⁷⁰ The Pew Research Center reported that 37 percent of U.S. adults said they “mostly” use a smartphone when accessing the internet. This share has nearly doubled since 2013. At that point, just 19 percent of Americans said their smartphone was their primary device for going online.⁷¹ As Pew also notes, “[o]ne-quarter of Hispanics and a comparable share of blacks are smartphone only internet users, compared with about one-in-ten whites.”⁷²

In low-income communities, more than 70 percent of adults own smartphones, and roughly one-in-four lower-income adults are “smartphone only” internet users.⁷³ In fact, the share of lower-income Americans who rely on their smartphone for going online has roughly doubled since 2013, rising from 12 percent to 26 percent in 2019.⁷⁴

⁶⁹ *See id.* (measuring increase in number of U.S. households that have cellular data plans and no other internet subscription).

⁷⁰ *Id.* (smartphone-only users total 17 percent of U.S. adults overall, but 23 percent of African-Americans, 25 percent of Hispanics, and 26 percent of people with incomes under \$30,000).

⁷¹ *Id.*

⁷² *Id.*

⁷³ *Id.*

⁷⁴ Monica Anderson & Madhumitha Kumar, *Digital Divide Persists Even As Lower-Income Americans Make Gains in Tech Adoption*, PEW RESEARCH CTR. (May 7, 2019), <https://www.pewresearch.org/fact-tank/2019/05/07/digital-divide-persists-even-as-lower-income-americans-make-gains-in-tech-adoption/> (reporting 71 percent of adults in households with incomes of less than \$30,000 own smartphones.).

Older adults are also increasingly adopting mobile broadband. Nearly 10 years ago, just 11 percent of Americans 65 and older owned smartphones, but that percentage has dramatically increased to 53 percent at the start of 2019.⁷⁵ Indeed, 68 percent of Baby Boomers (born 1946-1964) and 40 percent of the Silent generation (born 1945 and earlier) owned smartphones at the start of 2019.⁷⁶

The reasonable and timely deployment of mobile broadband networks has also benefited people with disabilities and disabled veterans, which in turn have especially embraced mobile broadband and the many applications and resources it supports.⁷⁷ Recent data from the Rehabilitation Engineering Research Center for Wireless Inclusive Technologies (Wireless RERC) indicated that 96.9 percent of people with disabilities reported owning or using a wireless

⁷⁵ Compare Aaron Smith, *35% of American Adults Own a Smartphone*, PEW RESEARCH CTR. (July 11, 2011), https://www.pewinternet.org/wp-content/uploads/sites/9/media/Files/Reports/2011/PIP_Smartphones.pdf with *Mobile Fact Sheet*, PEW RESEARCH CTR. (June 12, 2019), <https://www.pewresearch.org/internet/fact-sheet/mobile/>.

⁷⁶ Emily Vogels, *Millennials Stand Out for Their Technology Use, but Older Generations Embrace Digital Life*, PEW RESEARCH CTR. (Sept. 9, 2019), <https://pewresearch-org-preprod.go-vip.co/fact-tank/2019/09/09/us-generations-technology-use/>.

⁷⁷ CTIA's relaunched AccessWireless.org continues to make the latest wireless accessibility information and resources available for consumers, includes a new A-Z database of "Wireless Accessibility Services," and supports use of the Global Accessibility Reporting Initiative (GARI) tool (a searchable database with information on the accessibility settings and features available on more than 1,100 devices such as mobile phones, tablets and wearables) to help consumers quickly find information from the many wireless service providers and manufacturers that offer accessibility resources. See *Access Wireless: Wireless for All*, ACCESSWIRELESS, <https://www.accesswireless.org/> (last visited Nov. 20, 2019). CTIA continues to provide wireless accessibility information and resources specific to seniors, disabled veterans, and individuals with specific needs related to hearing, vision, mobility, speech, and cognition. The wireless industry recognizes the service and sacrifice of active duty and retired members of the U.S. Armed Forces, and offers various wireless plans and programs to keep veterans and military families connected. *Veterans: A Guide to Wireless Services and Resources*, ACCESSWIRELESS, <https://www.accesswireless.org/resources-for-consumers/veterans-resources> (last visited Nov. 1, 2019).

device, such as a traditional cellular phone, smartphone, tablet, or wearable device; 87.7 percent reported owning a smartphone.⁷⁸ And this year, the Wireless RERC reported that “over three-fourths” of the same group of smartphone users indicated that they were “satisfied or very satisfied with their smartphones.”⁷⁹ Today’s wireless networks support accessible services and features including real-time text (RTT), voice recognition, voice output, hands-free settings, and distractionless modes, and enable innovations such as rapid improvement in speech recognition technology.⁸⁰

Next-generation wireless networks will further benefit the accessibility community as well as veterans with disabilities.⁸¹ Virtual and augmented reality, for example, can help consumers learn skills such as reading facial expressions and navigating crowded streets in a safe environment, and low-latency video conferencing powered by 5G can benefit American Sign

⁷⁸ *Survey of User Needs, SUNspot 1: Use of Mobile Phones by Individuals with Disabilities, 2017-2018, Volume 2019, Number 19-01*, WIRELESS INCLUSIVE RERC (April 2019), http://www.wirelessrerc.gatech.edu/sites/default/files/publications/sunspot_2019-01_final_use_of_mobile_phones_by_individuals_with_disabilities_2017-2018.pdf.

⁷⁹ *Id.*

⁸⁰ *See, e.g.*, John Markoff, *From Your Mouth to Your Screen, Transcribing Takes the Next Step*, N.Y. TIMES (Oct. 2, 2019), <https://www.nytimes.com/2019/10/02/technology/automatic-speech-transcription-ai.html?mod=djem10point>.

⁸¹ *See, e.g.*, Kara Graves, *5G Will Spur New Opportunities for Americans with Disabilities*, CTIA (May 7, 2018), <https://www.ctia.org/news/5g-will-spur-new-opportunities-for-americans-with-disabilities> (“Virtual and augmented reality technologies, for instance, will dramatically improve economic and social opportunities for people living with learning or social disabilities. . . . 5G connected self-driving cars meanwhile offer to reduce transportation obstacles for the accessibility community and seniors aging in place, creating new opportunities for employment and civic engagement. . . . The increased densification of 5G networks will also support enhanced geo-location and navigation services for people who are blind or visually impaired, making it easier for users to navigate their communities, identify their destinations, find a seat on the next bus, and more. And with networks up to 100 times faster than 4G and up to five times more responsive, video conferencing will improve immensely, which will benefit those who communicate in American Sign Language (ASL).”).

Language users and telecommuters.⁸² People with disabilities as well as disabled veterans increasingly leverage the power of telehealth services, powered by advanced telecommunications networks.⁸³ As Chairman Pai has noted, “telehealth can dramatically improve the quality of health care for millions of Americans,” but “we can’t realize the promise of telehealth without connectivity.”⁸⁴ U.S. wireless providers agree, and continue to deploy the next-generation networks necessary to support these and many other services that have become critical parts of mobile-centric consumers’ lives.

C. New Data Collection Efforts Will Better Demonstrate the Availability of Mobile Wireless Coverage and Will Help Efforts to Target Further Deployment.

Mobile broadband coverage data is essential to the Commission’s public policy initiatives, and CTIA supports the Commission’s ongoing efforts to enhance the quality of public data on broadband availability. As the Commission recognizes, “the measurement of mobile broadband service at any specific location [is] complex, as many factors can affect a user’s experience, making it difficult to develop a coverage map that provides the exact mobile coverage and speed that a consumer experiences.”⁸⁵ Given the highly probabilistic nature of depicting mobile wireless coverage on a map, wireless providers work hard to present

⁸² *5G Will Spur New Opportunities for Americans with Disabilities*, ACCESSWIRELESS, <https://www.accesswireless.org/blogs-media/5g-will-spur-new-opportunities-for-americans-with-disabilities> (last visited Nov. 17, 2019).

⁸³ See, e.g., *VA Telehealth Services: Fact Sheet*, Dept. of Veterans Affairs, https://www.va.gov/COMMUNITYCARE/docs/news/VA_Telehealth_Services.pdf.

⁸⁴ Remarks of Ajit Pai, Chairman, FCC, at the U.S. Department of Veteran’s Affairs Telehealth/Virtual Care Thought Leader Summit (Dec. 6, 2018), <https://docs.fcc.gov/public/attachments/DOC-355421A1.pdf>; see also *Why Is Telehealth Important for Rural Providers?*, HEALTHIT.GOV (Sept. 10, 2019), <https://www.healthit.gov/faq/why-telehealth-important-rural-providers> (last visited Nov. 22, 2019).

⁸⁵ *DODC Order & FNPRM*, 34 FCC Rcd at 7549.

information that reflects coverage using sophisticated engineering techniques. Efforts to modify the Form 477 data collection process and the DODC proceeding can help the Commission close the digital divide by identifying areas lacking competitive options for mobile broadband and in need of targeted support from the federal Universal Service Fund (“USF”).

While the Form 477 process has yielded information that reflects the tremendous investment and innovations in mobile wireless voice and broadband services, CTIA appreciates the Commission’s efforts to evolve the collection of mobile wireless deployment data to more closely reflect consumers’ experiences. In the DODC proceeding, CTIA offered specific proposals for a standardized framework for mobile wireless coverage maps that reflect consumer experience while avoiding unnecessary burdens.⁸⁶ Under this framework, facilities-based mobile broadband providers would submit standardized 4G LTE coverage maps meeting specified service-level requirements, consistent with recent bipartisan Congressional efforts.⁸⁷

In its Section 706 reports, including the instant effort, the Commission is right to rely on a data-driven approach to assess the reasonableness and timeliness of mobile wireless broadband deployment. The DODC, when adopted and implemented, will allow for a more detailed analysis. For this year’s report, however, the Commission should consider the wealth of data from a variety of sources—including the data provided herein and the record developed in this proceeding—in addition to the Form 477 data to determine whether broadband is being reasonably and timely deployed. Considering the evidence of the rapid and consumer-satisfying pace of mobile broadband deployment, the Commission should make an affirmative finding in response to the *Fifteenth Report NOI*.

⁸⁶ See Comments of CTIA, WC Docket Nos. 19-195, at 11-10 (filed Sept. 23, 2019).

⁸⁷ *Id.* at 4-8.

IV. THE COMMISSION SHOULD ENSURE MOBILE BROADBAND DEPLOYMENT REMAINS REASONABLE AND TIMELY BY PROMOTING ACCESS TO RESOURCES THAT SUPPORT NEXT-GENERATION SERVICES.

The Commission has made significant progress establishing policies that promote investment, especially over the past year, and should continue its strong support for mobile broadband and 5G deployment. CTIA commends in particular the steps the Commission has taken to modernize its infrastructure siting rules—including providing guardrails around the local siting review process to provide clarity for communities and providers alike—to reflect the scope and scale of next-generation network architecture.⁸⁸ CTIA also commends the Commission for its progress in making available low-, mid-, and high-band spectrum that will be critical to the United States' 5G success. The agency's recent efforts—including completing two high-band spectrum auctions for 24 GHz and 28 GHz spectrum in 2019,⁸⁹ scheduling a third high-band auction to begin this December,⁹⁰ and scheduling a mid-band auction set to begin in

⁸⁸ See generally *Accelerating Wireline Broadband Deployment by Removing Barriers to Infrastructure Investment et al.*, Third Report and Order and Declaratory Ruling, 33 FCC Rcd 7705 (2018); *Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment*, Declaratory Ruling and Third Report and Order, 33 FCC Rcd 9088 (2018) (*State/Local Infrastructure Order*).

⁸⁹ See generally *Auction 101: Spectrum Frontiers – 28 GHz*, FCC, <https://www.fcc.gov/auction/101> (last visited Nov. 11, 2019); *Auction 102: Spectrum Frontiers – 24 GHz*, FCC, <https://www.fcc.gov/auction/102> (last visited Nov. 11, 2019).

⁹⁰ See generally, e.g., *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*, Public Notice, Docket No. 19-59, DA 19-1109 (rel. Oct. 31, 2019) (*Auction 103 Qualified Participant PN*) (detailing 35 qualified participants for Auction 103, with bidding in the clock phase set to commence on Dec. 10, 2019); see also *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*, Public Notice, 34 FCC Rcd 5532 (2019) (setting the procedural schedule for Auction 103).

2020⁹¹—provide necessary inputs to ensure continued reasonable and timely wireless deployment.

To keep driving this forward momentum, there are further steps that the Commission can take to help ensure that the deployment of advanced telecommunications capability remains reasonable and timely for mobile consumers. To that end, the Commission can and should consider and act upon the following recommendations:

- Allocating more spectrum for exclusive, flexible licensed use, with a particular focus on mid-band spectrum for 5G;
- Continuing to modernize siting policies to advance wireless infrastructure deployment, particularly on existing facilities; and
- Ensuring that there are appropriate policies in place to provide incentives to deploy mobile broadband networks, particularly in unserved rural areas where deployment is more costly and challenging.

By taking these steps, the Commission will help ensure an enduring regulatory environment that promotes the continued expansion of mobile broadband capabilities on a reasonable and timely basis.

A. The Commission Should Continue to Make Available Commercial, Licensed Spectrum, Which Is Critical to Continued Reasonable and Timely Deployment of Mobile Broadband.

CTIA commends the Commission for the continued execution of the 5G Fast Plan, which among other things prioritizes freeing up spectrum in low-, mid-, and high-band frequencies.⁹²

An all-of-the-above approach to spectrum is key to maintaining U.S. leadership in wireless

⁹¹ See, e.g., *Auction of Priority Access Licenses for the 3550-3650 MHz Band et al.*, Public Notice, Docket No. 19-244, FCC 19-96 (rel. Sept. 27, 2019).

⁹² *FCC Initiatives: The FCC's 5G Fast Plan*, FCC, <https://www.fcc.gov/5G> (last visited Nov. 12, 2019) (describing the Commission's comprehensive strategy to facilitate America's superiority in 5G technology).

broadband. Today, America’s wireless industry supports more than 4.7 million jobs and contributes \$475 billion annually to the economy.⁹³ Making additional spectrum available for commercial use will drive billions more wireless industry investments in 5G networks,⁹⁴ create millions of American jobs quickly, and add tremendous value to our economy.⁹⁵ And those benefits are just the beginning. Advancements in healthcare, transportation, and robotics stemming from next-generation networks will drive the U.S. economy of the future.

To support this vision, the Commission is moving aggressively to make commercial high-band spectrum available, which is “critical to supporting the [] high-bandwidth, ultra-low latency applications” made possible with 5G.⁹⁶ As noted above, this year the Commission concluded two high-band auctions for 28 GHz and 24 GHz that together pushed 1,550 megahertz of spectrum into the marketplace.⁹⁷ And CTIA’s members are gearing up for the auction of

⁹³ *A National Spectrum Strategy to Lead in 5G*, CTIA (Apr. 2019), <https://api.ctia.org/wpcontent/uploads/2019/04/A-National-Spectrum-Strategy-to-Lead-in-5G.pdf>.

⁹⁴ *CTIA 2019 Annual Survey Highlights* (“Wireless providers are starting to invest a projected \$275 billion to deploy 5G, creating three million jobs and adding \$500 billion to U.S. GDP.”).

⁹⁵ *The Global Race to 5G*, CTIA, at 2 (Apr. 2018), <https://api.ctia.org/wpcontent/uploads/2018/04/Raceto-5G-Report.pdf>.

⁹⁶ *See Hearing on Oversight of the Federal Communications Commission: Spectrum Auctions Program*, Sen. Subcomm. on Fin. Servs. and Gen. Gov’t, 116 Cong. 1 (statement of Ajit Pai, Chairman, FCC), <https://docs.fcc.gov/public/attachments/DOC-360266A1.pdf> (Pai Spectrum Hearing Testimony).

⁹⁷ *See Winning Bidders Announced for Auction of 28 GHz Upper Microwave Flexible Use Service Licenses (Auction 101)*, Public Notice, 34 FCC Rcd 4279 (OEA/WTB 2019); *Auction of 24 GHz Upper Microwave Flexible Use Service Licenses Closes et al.*, Public Notice, 34 FCC Rcd 4294 (OEA/WTB 2019).

Upper 37 GHz, 39 GHz, and 47 GHz spectrum, which will free up an additional 3,400 megahertz of high-band spectrum.⁹⁸

While high-band spectrum holds tremendous promise because it can accommodate wide bandwidths that enable exceedingly fast and robust services, its high frequencies also mean more limited signal propagation. The Commission is therefore rightly also focused on mid-band spectrum, which offers both coverage and capacity—and is ideal spectrum for mobile broadband. In 2018, the Commission updated the rules governing Priority Access Licenses (PALs) in the 3.5 GHz Citizens Broadband Radio Service to better support investment-friendly policies for new 5G networks.⁹⁹ In September, the Commission approved initial commercial deployments in the 3.5 GHz band, opening up 150 megahertz for General Authorized Access use that will support fixed and mobile wireless services.¹⁰⁰ And, the auction of 70 megahertz of licensed PAL spectrum will begin in June 2020, representing the first licensed mobile wireless mid-band spectrum opportunity.¹⁰¹

Given the importance of mid-band spectrum to the U.S. 5G spectrum strategy, the Commission should swiftly free up additional mid-band spectrum for exclusive, flexible use

⁹⁸ *Incentive Auction of Upper Microwave Flexible Use Service Licenses in the Upper 37, 39, and 47 GHz Bands for Next-Generation Wireless Services; Procedures for Auction 103*, Public Notice, 34 FCC Rcd 5532 (OEA 2019).

⁹⁹ *Promoting Investment in the 3550-3700 MHz Band*, Report and Order, 33 FCC Rcd 10598 (2018).

¹⁰⁰ *Wireless Telecommunications Bureau and Office of Engineering and Technology Approve Five Spectrum Access System Administrators to Begin Initial Commercial Deployments in the 3.5 GHz Band*, Public Notice, 34 FCC Rcd 8106 (OET/WTB 2019).

¹⁰¹ *Auction 103 Qualified Participant PN*.

licenses.¹⁰² CTIA commends Chairman Pai for his continued leadership on the 3.7-4.2 GHz band and for the recent, clear direction provided for making this spectrum available for wireless use.¹⁰³ CTIA looks forward to swift action on that proceeding, so that hundreds of megahertz of spectrum will be available for next-generation wireless services with 5G-focused rules as soon as possible.

CTIA also encourages the Commission to use the opportunity at 6 GHz to enable both licensed and unlicensed uses by providing a better balance between licensed and unlicensed spectrum.¹⁰⁴ Additionally, CTIA supports the Commission's efforts to work with NTIA to identify additional bands for potential commercial wireless use. For example, NTIA is currently studying the potential for commercial wireless operations in the 3.1-3.55 GHz band, pursuant to the 2018 MOBILE NOW Act,¹⁰⁵ and CTIA applauds the Commission for proposing to prepare

¹⁰² *See, e.g.*, Testimony of Scott Bergmann, SVP Regulatory Affairs, CTIA, on Our Wireless Future: Building a Comprehensive Approach to Spectrum Policy before the U.S. House of Rep. Comm. on Energy & Commerce, Subcomm. On Commc'ns & Tech, at 8-11 (July 16, 2019).

¹⁰³ *See* Letter from Ajit Pai, Chairman, FCC to Roger Wicker, Chairman, Comm. on Commerce, Science, and Transportation (Nov. 18, 2019) (announcing public auction of 280 megahertz of the C-Band guided by four principles: make available a significant amount of C-band spectrum for 5G; make that spectrum available for 5G quickly; generate revenue for the federal government; and protect incumbent services so they can keep being delivered to the American people); *see also* Twitter, Ajit Pai (Nov. 18, 2019, 8:42 a.m.), <https://twitter.com/AjitPaiFCC/status/1196468857025835009>.

¹⁰⁴ *See generally* Comments of CTIA, GN Docket No. 17-183 (filed Feb. 15, 2019). As CTIA has stated in its filings in this proceeding, a positive control interference protection framework must be adopted for all unlicensed devices in the 6 GHz band, including low-power indoor and very low power indoor/outdoor devices. Positive control via Automatic Frequency Coordination (AFC) is necessary both to prevent interference and to resolve interference when it does occur, regardless of unlicensed device location or power level.

¹⁰⁵ *See* Consolidated Appropriations Act, 2018, Pub. L. No. 115-141, Division P (RAY BAUM'S Act of 2018), Title VI (MOBILE NOW Act) § 605(a), 132 Stat. 348 (requiring NTIA, in consultation with other federal agencies, to submit a report by March 23, 2020 that evaluates "the feasibility of allowing commercial wireless services, licensed or unlicensed, to share use of the frequencies between 3100 megahertz and 3550 megahertz.").

the 3.3-3.55 GHz band for potential shared use between federal incumbents and commercial wireless services.¹⁰⁶ The 7 GHz band, which is currently allocated for federal fixed links, likewise creates an opportunity to relocate some fixed links out of the 6 GHz band to open the door for more licensed opportunities in the mid-band range. CTIA encourages the Commission to work with NTIA to make the 7 GHz band available for non-federal use.¹⁰⁷

In addition, low-band spectrum continues to serve as the cornerstone of effective 4G LTE coverage and is an important piece of the 5G puzzle. Regarding one piece, the Commission should be applauded for successfully keeping the 600 MHz repacking on track. Chairman Pai recently noted that most stations have already relocated from their old frequencies and wireless carriers are already using 600 MHz spectrum to meet consumers' needs across the country.¹⁰⁸

B. The Commission Should Continue Its Efforts to Remove Barriers to the Deployment of Wireless Infrastructure.

The Commission's previous actions to remove barriers to broadband deployment have helped drive more investment in needed new communications infrastructure. However, as Chairman Pai and Commissioners Carr and O'Rielly have stated, the Commission should take

¹⁰⁶ See FCC Chairman Ajit Pai, *A Small Number, A Big Difference*, FCC Blog (Nov. 20, 2019), <https://www.fcc.gov/news-events/blog/2019/11/20/small-number-big-difference>.

¹⁰⁷ Indeed, NTIA recently sent a memo asking federal agencies to review and report by April 2020 on their assignments in, and use of, this band. See Memorandum from Diane Rinaldo, Acting Assistant Secretary of Commerce for Communications and Information, to Executive Branch Departments and Agencies (Aug. 1, 2019), https://www.ntia.doc.gov/files/ntia/publications/guidance_to_agencies_on_current_spectrum_usage_final_08-01-2019.pdf.

¹⁰⁸ See Pai Spectrum Hearing Testimony. Additionally, T-Mobile recently announced that its 5G network will launch on December 6, 2019, and will cover 200 million people, and more than 5,000 cities and towns using its 600 MHz spectrum. See Alex Wagner, *T-Mobile 5G Network Will Launch on December 6th*, TMONEWS (Nov. 7, 2019), <https://www.tmonews.com/2019/11/t-mobile-5g-network-launch-december-6/>.

further actions to promote deployment of the infrastructure needed for 5G.¹⁰⁹ The Commission can accomplish this goal by granting the pending petitions filed by CTIA, the Wireless Infrastructure Association (WIA), and Verizon to resolve practical questions that have arisen around the implementation of the Commission’s rules for siting on existing infrastructure. These actions will resolve lingering disputes and remove barriers to wireless infrastructure deployment that will enable providers to deliver more swiftly the benefits of next-generation wireless services to consumers across America.

As the Commission is aware, CTIA and WIA filed separate petitions asking the Commission to clarify its rules to promote wireless deployment on existing infrastructure.¹¹⁰

¹⁰⁹ Remarks of Ajit Pai, Chairman, FCC, to the New York State Wireless Association (June 21, 2019) (“When it comes to 5G policy, infrastructure is essential. We need to install hundreds of thousands of small cells – an exponential increase in the number of antenna locations for our wireless networks.”); Keynote Remarks of FCC Commissioner Brendan Carr at the WISPAmerica Convention, “Grain Elevators, Water Towers, and Other Ways to Connect to America,” Cincinnati, Ohio (Mar. 20, 2019) (“[W]e’re not going to slow down in our efforts to modernize our infrastructure rules. This year, I am taking another look at the federal rules governing wireless infrastructure deployment. We will look to fully and faithfully implement the decisions Congress has made to streamline the deployment of next-generation technologies. We will push the government to be more pro-infrastructure by eliminating needless restrictions on siting wireless facilities.”); Remarks of FCC Commissioner Michael O’Rielly Before the Mobile World Congress Americas 2019 Everything Policy Track, Los Angeles, CA, at 3 (Oct. 23, 2019) (“[T]here are other actions we can take to alleviate the barriers to infrastructure siting, especially for macro towers.”); *State/Local Infrastructure Order*, Statement of Commissioner Jessica Rosenworcel, Approving in Part and Dissenting in Part (advocating that the over-the-air reception device rule be modified to “create more opportunities for rural deployment by giving providers more siting and backhaul options and creating new use cases for signal boosters. Add this up and you get more competitive, more ubiquitous and less costly 5G deployment.”); Statement of Geoffrey Starks, Commissioner, Federal Communications Commission, Before the Subcommittee on Communications and Technology, Committee on Energy & Commerce, United State House of Representatives (May 15, 2019) (“While I am committed to ‘winning the race to 5G,’ I am equally committed to the far too many communities with ‘no-G.’ ... It is absolutely imperative that we make sure that quality, affordable broadband is available to all Americans.”).

¹¹⁰ CTIA Petition for Declaratory Ruling, *Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment et al.*, WT Docket No. 19-250, WC Docket No.

The petitions demonstrate that, despite Congress’s command in Section 6409(a) of the Spectrum Act of 2012¹¹¹ that localities “may not deny, and shall approve” enhanced use of existing facilities, some localities are denying streamlined treatment to eligible applications—and approvals are often slow, subject to unlawful conditions, or not granted at all.¹¹² Granting the relief these petitions seek will materially promote the availability of advanced wireless services nationwide. CTIA also demonstrated that some utilities are denying access to some of their poles altogether, and others are imposing unreasonable restrictions that Section 224 does not allow, making access exceedingly difficult, slow and costly.¹¹³ Quick action to remove these obstacles will directly advance the deployment of wireless infrastructure on these facilities, making more services available to the public.

Verizon also filed a petition this year to seek Commission action to promote wireless deployment. In its filing, Verizon demonstrated that the excessive siting fees charged by Clark County, Nevada violate Section 253 and the Commission’s September 2018 *State/Local Infrastructure Order* because the fees are not based on the jurisdiction’s costs and are materially impeding deployment.¹¹⁴ As CTIA and other commenters explained, Clark County’s unlawful

17-84 (Sept. 19, 2019) (CTIA Petition); WIA Petition for Declaratory Ruling, *Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment et al.*, WT Docket No. 19-250 (Aug. 27, 2019) (WIA Declaratory Ruling Petition). WIA also filed a Petition for Rulemaking seeking discrete rule changes. *See* WIA Petition for Rulemaking to Accelerate Wireless Broadband Deployment by Amending the Rules Implementing Section 6409 of the Spectrum Act, RM-11849 (Aug. 27, 2019) (WIA Rulemaking Petition).

¹¹¹ Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, Title VI, § 6409(a), *codified at* 47 U.S.C. § 1455.

¹¹² *See, e.g.*, CTIA Petition at 8-19; WIA Rulemaking Petition at 4-10; WIA Declaratory Ruling Petition at 5-23.

¹¹³ *See generally* CTIA Petition at 20-31.

¹¹⁴ *See generally* Petition for Declaratory Ruling of Verizon, WT Docket No. 19-230 (filed Aug. 8, 2019) (“The Commission should declare that the high recurring fees charged by Clark County,

fees will not only inhibit deployment in that community, but also in communities across the country. Granting Verizon’s petition will give force to Congress’s intent in Section 253 as well as the Commission’s September 2018 order interpreting it, and will spur the availability of broadband by addressing this economic obstacle to deployment.

These proceedings give the Commission multiple ways it can promote policies that will expedite mobile broadband deployment and increase the availability of advanced telecommunications services to all Americans.

C. The Commission Should Ensure That Targeted Support is Available for Mobile Broadband Deployment in Unserved Rural Areas.

CTIA shares the Commission’s focus on delivering mobile wireless services to unserved rural areas of the United States as an effective means of helping to ensure mobile broadband deployment remains reasonable and timely. Despite the extensive deployment of mobile broadband networks discussed above, some rural areas remain unserved by 4G LTE services—and the deployment of 5G services will require significant investment and resources. To ensure that mobile broadband deployment remains reasonable and timely, the Commission should continue to identify ways federal USF support can advance the deployment of mobile broadband services in unserved areas across the country. For instance, the Commission’s Mobility Fund II Challenge Process Order’s proposals for collecting mobile coverage data can help close the digital divide by ensuring that finite Mobility Fund II resources are targeted to truly unserved rural areas.¹¹⁵ In addition, as noted above, CTIA continues to support the Commission’s efforts

Nevada for placing and maintaining small wireless facilities in public rights-of-way are unlawful. These fees materially inhibit the provision of telecommunications services by Verizon, violate Section 253 of the Communications Act, and are preempted.”).

¹¹⁵ See, e.g., Comments of CTIA, WC Docket Nos. 19-195, 11-10, at 2 n.3 (filed Sept. 23, 2019). Separating the MF II challenge process for universal service funding from the general coverage

to hone its mapping efforts because, as the Commission has noted, “[e]ffectively targeting federal and state spending efforts to bring broadband to those areas most in need of it means understanding where broadband is available and where it is not.”¹¹⁶ CTIA looks forward to continuing to engage with the Commission to support these efforts to ensure all Americans can benefit from next-generation wireless services and embrace a mobile-centric lifestyle.

V. CONCLUSION.

More consumers have access to mobile broadband than ever before. As booming mobile data use and increasing mobile adoption and reliance demonstrate, wireless providers are not only expanding mobile broadband coverage, but also enhancing their network capabilities to meet and exceed consumer demands. Accordingly, the Commission should find that the deployment of mobile broadband has been and continues to be reasonable and timely.

In order to continue the significant progress the Commission has already made in promoting deployment of next-generation wireless services, the agency should make more spectrum available for 5G, remove barriers to wireless infrastructure access, and ensure that the agency’s universal service and mapping resources are optimized to promote deployment in the rural and unserved areas that need support most. By doing so, the Commission will help ensure the continued reasonable and timely deployment of mobile broadband and the success of the new 5G economy.

data reconciliation process for DODC has merit and CTIA urges the Commission to evaluate the best way to do so. *See* CTIA DODC Reply Comments at 8.

¹¹⁶ *DODC Order & FNPRM*, 34 FCC Rcd at 7505.

Respectfully submitted,

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