Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Inquiry Concerning the Deployment of Advanced	)	GN Docket No. 20-269
Telecommunications Capability to All Americans	)	
in a Reasonable and Timely Fashion	)	

COMMENTS OF
THE FREE STATE FOUNDATION

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I. Introduction and Summary

These comments are submitted in response to the Commission's Notice of Inquiry regarding Section 706's requirement that the agency determine and report annually on "whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion." For 2019, the year in focus for the next report, market data supports an affirmative answer to that question. Indeed, even in the face of pandemic lockdown-related adversity, next-generation network deployment efforts remain strong in 2020. In contrast to the situation in other developed countries with which the U.S. is often compared, broadband networks in the United States have performed well during the pandemic, despite increased Internet traffic and dramatically altered traffic patterns. This is in large part attributable to the free market-oriented policies that have spurred deployment advances during the last three years.

Market data for 2019 shows significant continued progress in broadband deployment. For example, about 20 million U.S. wireless subscriptions were added in 2019, bringing the overall

[1] These comments express the views of Randolph May, President of the Free State Foundation, and Seth Cooper, Senior Fellow and Director of Policy Studies. The views expressed do not necessarily represent the views of others associated with the Free State Foundation. The Free State Foundation is a nonpartisan, non-profit free market-oriented think tank.

total to 442.5 million subscriptions. Approximately 46,000 new cell sites were built in the U.S. in 2019, more than in the prior three years combined. At mid-year 2019, market penetration in the U.S. and Canada for 4G LTE grew to 130%, and by year-end 2019, on-network 4G availability – that is, the proportion of time subscribers had 4G connections – increased in the U.S. to 95.9% for subscribers of Verizon, 95.4% for T-Mobile, 92.9% for AT&T, and 92.5% for Sprint.

Moreover, at year-end 2019, 94.8% of the U.S. population had access to wired broadband services with download speeds of at least 25 Mbps and 91.4% had access to wired broadband services with speeds of at least 100 Mbps. Also, fiber broadband networks became available to roughly 6.5 million additional homes in 2019, the largest one-year increase ever. Investment by U.S. wireline broadband providers also likely increased in 2019, following year-over-year increases in 2018 and 2017. For instance, Comcast announced that it has invested $12 billion to build over 33,330 route miles of new fiber just since 2017.

Developments in 2019 form part of a larger multi-year pro-deployment trend that appears to be continuing into 2020. Although it is expected that the pandemic will reduce overall deployment progress this year compared to pre-pandemic forecasts, analyst and news reports nevertheless show continuing positive results. Gigabit Internet service is now available to at least 85% of U.S. homes, up from just 6% three-and-a-half years ago. T-Mobile and AT&T have announced the availability of 5G across their nationwide footprints, and by the end of 2020 it is expected that Verizon's existing 5G coverage will expand to its entire nationwide footprint. In August 2020, average U.S. fixed broadband speeds rose to 156.66/58.96 Mbps and average mobile broadband speeds rose to 45.22/9.78 Mbps. Indeed, despite spikes in data traffic that promptly followed pandemic-related lockdowns, it is reported that between mid-March and late-July, average U.S. download speeds actually increased from 84.9 Mbps to 94.6 Mbps. This

strong performance by U.S. broadband networks was enabled by significant private sector investment, including an upward trend in spending that began in 2017.

Next-generation broadband technologies are poised to help deliver broadband Internet access services to Americans who were still unserved in 2019 or who may still be unserved today. For example, competing 5G networks are rapidly expanding and will bring average speeds up to 10 times faster than 4G as well as peak speeds up to 100 times faster. The pace of fiber deployment continues to accelerate, and through technology upgrades current wireline broadband facilities will remain competitive going forward. For example, cable broadband providers are working to deliver multi-gigabit speeds in the near future. The "10G" platform, a collection of technologies and standards, including DOCSIS® 4.0, promises up to 10 Gbps downstream and symmetric speeds, with lower latency and improved security, over existing hybrid fiber-coaxial (HFC) infrastructure. Wi-Fi 6 (and 6E) wireless routers, featuring improved capacity and reliability, will extend 5G, FTTH, and "10G" networks inside homes and businesses.

In order to best measure recent progress in extending broadband access, the Commission should retain its 25/3 Mbps speed benchmark for defining fixed broadband services. It also should maintain its LTE standard based on minimum advertised speeds of 5/1 Mbps – supplemented by speed-test data identifying areas with median speeds of at least 10/3 Mbps – for defining mobile broadband services. Those speeds are more than adequate to support popular applications actually demanded by consumers. A 25/3 Mbps connection can readily support HD streaming video as well as simultaneous data usage by multiple devices in a single home. On the other hand, quadrupling the minimum download benchmark speed for broadband to 100 Mbps, as some suggest, would result in highly misleading, drastically reduced broadband service

availability figures. And the effect would be to drive up costs unnecessarily without commensurate consumer benefit. Therefore, it would be deleterious for the Commission to pretend that anything under 100 Mbps speeds does not count as "broadband."

Furthermore, the Commission should continue to focus on year-to-year comparisons to track progress objectively. Such comparisons yield useful data regarding how many additional Americans have gained access to broadband Internet access services during the relevant twelve-month period and the rate at which unserved Americans are being reached. Jettisoning this proven method for measuring progress likely would open the door to determinations based on ad hoc or arbitrary criteria. Also, the Commission's inquiry and analysis should continue to track with the plain language of Section 706 by remaining focused on services being "deployed" rather than tackle other issues such as adoption, affordability, and digital literacy. Those latter concepts fall outside of the scope of the statute and are better addressed in other venues.

For its next report, the Commission should recognize that advanced 4G LTE and 5G mobile wireless broadband services can serve as substitutes for fixed wireline broadband services for a wide range of uses. Although they possess some different functionalities, upgraded LTE and 5G mobile broadband services are capable of providing speeds above the Commission's benchmark of 25/3 Mbps and they support many of the same functions as wireline broadband services, including voice calling, Internet access and web surfing, email, social media applications, and streaming video. Indeed, it has become increasingly clear that wireless and wireline broadband services likely are part of an overall broadband communications market or broadband Internet services market – which the Commission also ought to recognize.

We fully expect additional forthcoming data will show deployment progress exceeding that which has been made in prior years. Accordingly, we urge the Commission to find that broadband

is being reasonably and timely deployed to all Americans. And even if the Commission determines once again – as it should – that advanced telecommunications capability is being reasonably and timely deployed to all Americans, the agency should continue to remove barriers to infrastructure investment.

II. The Commission Should Find That Broadband Is Being Deployed to All Americans in a Reasonable and Timely Fashion

A. Available Data for 2019 Support a Finding That Broadband Is Being Deployed to All Americans in a Reasonable and Timely Fashion

The upcoming 2021 Broadband Deployment Report will focus on progress made in deploying fixed and mobile broadband Internet access services in 2019. Publicly available deployment data and analyst reports for last year indicate that broadband Internet services continue to be reasonably and timely deployed to all Americans:

- At year-end 2019, 94.8% of the U.S. population had access to wired broadband services with download speeds of at least 25 Mbps and 91.4% had access to wired broadband services with speeds of at least 100 Mbps.[2]

- Fiber passed 46.5 million unique homes, a 16% increase since 2018. In 2019, fiber broadband networks became available to about 6.5 million additional homes, the largest one-year increase ever. Smaller providers accounted for 25% of new connections.[3]

- Approximately 20 million U.S. wireless subscribers were added in 2019, increasing the overall total to 442.5 million subscriptions.[4]

- By mid-year 2019, U.S. 4G LTE market penetration grew to 130%, or 1.3 LTE subscriptions per person, and LTE connections in the U.S. and Canada constituted 88% of all mobile connections, up from 82% a year before.[5]

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[2] Julia Tanberk, "The State of Broadband in America, Q4 2019," BroadbandNow (January 29, 2020), at: https://broadbandnow.com/research/q4-broadband-report-2019.
[3] FCC, Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans, GN Docket No. 19-285, *2020 Broadband Deployment Report* (released April 24, 2020), at ¶ 2.
[4] CTIA, 2020 Annual Survey Highlights (August 2020), available at: https://api.ctia.org/wp-content/uploads/2020/08/2020-Annual-Survey-final.pdf.
[5] 5G Americas, Press Release: "5G Network Rollouts Accelerate as LTE's Long Tail Extends," (September 19, 2019), at: https://www.5gamericas.org/5g-network-rollouts-accelerate-as-ltes-long-tail-extends/.

- At year-end 2019, on-network 4G availability increased to 95.9% for Verizon, 95.4% for T-Mobile, 92.9% for AT&T, and 92.5% for Sprint.[6]

- At the end of 2019, 5G connections in the U.S. and Canada had reached 587,000, driven in significant part by a 284% increase in the fourth quarter alone.[7]

- Wireless industry investments increased $1.7 billion from the previous year for an annual total of $29.1 billion.[8]

- About 46,000 new cell sites were built – more than in the prior three years combined – increasing the total number of active cell sites operating in the U.S. to 395,562.[9]

- Ookla speed tests show averaged fixed and mobile speeds in the U.S. rose over the course of 2019. Average fixed speeds rose from 96.25/32.88 Mbps during the second and third quarters of 2018 to 156.61/58.96 Mbps in August 2020. Average mobile speeds increased significantly, as well, from 27.33/8.63 Mbps in the first half of 2018, to 33.88/9.75 Mbps during the first two quarters of 2019, to 45.22/9.88 Mbps in August 2020.[10]

- Although it has a "relatively low subscription rate" and data may overstate its availability, it appears that "satellite broadband service offering 25/3 Mbps is available to nearly all of the population,"[11] and revenues for the satellite broadband revenue reportedly grew 19% compared with 2018 to $2.8 billion.[12]

Significantly, "U.S. broadband providers invested approximately $80.0 billion in network infrastructure in 2018, up more than $3.1 billion from $76.9 billion in 2017."[13] While more recent data has not yet been released, that amount likely increased in 2019 for wireline

[6] Sue Marek, "Mobile Network Experience Report" Opensignal (January 2020), at: https://www.opensignal.com/reports/2020/01/usa/mobile-network-experience.
[7] 5G Americas, "5G Network Rollouts Accelerate as LTE's Long Tail Extends."
[8] CTIA, 2020 Annual Survey Highlights.
[9] CTIA, 2020 Annual Survey Highlights.
[10] Ookla, Speedtest: Report: United States: Mobile (July 18, 2018), at https://www.speedtest.net/reports/united-states/2018/#mobile; Ookla, Speedtest: Report: United States: Fixed (December 12, 2018), at: https://www.speedtest.net/reports/united-states/2018/#fixed; Ookla, Speedtest: Report: United States: Mobile (January 9, 2018), at: https://www.speedtest.net/reports/united-states/; Ookla, Speedtest Global Index (United States August 2020), at: https://www.speedtest.net/global-index/united-states (last checked September 16, 2020).
[11] *2020 Broadband Deployment Report*, at ¶ 30.
[12] Satellite Industry Association, Press Release: "Satellite Industry Grows at Record-Setting Pace and Dominates Global Space Economy" (July 2, 2020), at: https://sia.org/satellite-industry-grows-at-record-setting-pace-and-dominates-global-space-economy/.
[13] USTelecom, USTelecom Research Brief: "U.S. Broadband Investment Continued Upswing in 2018" (July 31, 2019), at: https://www.ustelecom.org/wp-content/uploads/2019/07/USTelecom-Research-Brief-Capex-2018-7-31-19.pdf.

broadband providers just as it did for wireless broadband providers. It was reported in the middle of this year that Comcast has "invested $12 billion to build more than 33,330 route miles of new fiber" into its network just since 2017.[14] Industry reports also identify fiber build-outs across the nation that will continue to expand access to broadband services.[15] Fiber enables gigabit (and greater) speeds, and it is reported that 23% of Americans can access gigabit service and over 67% can access 500 Mbps services as of the third quarter 2019.[16] The rise in average fixed broadband speeds in 2019, identified above, therefore correlates with strong network investment.

B. Despite Pandemic-Related Adversity, Data Show Reasonable and Timely Deployment of Broadband in Early 2020

Developments in 2019 are part of a larger multi-year pro-deployment trend that appears to have continued into 2020 despite challenges posed by the global pandemic and lockdowns. Many service providers and analysts expect that the pandemic will reduce overall investment and deployment progress in 2020 compared to pre-pandemic forecasts. Nevertheless, analyst and news reports available so far identify new service technology buildouts and increasing speeds:

- "[B]y the end of Q1 2020, North America had 1.18 million 5G connections and 494 million LTE connections. This amounted to 100% growth in 5G, a gain of 591 thousand 5G connections over the quarter and 2.34% growth in LTE, a gain of 11.3 million LTE connections over the quarter."[17]

[14] Martha DeGrasse, "Comcast touts network performance and Wall Street takes note," Fierce Telecom (June 29, 2020), at: https://www.fiercetelecom.com/operators/comcast-touts-network-performance-and-wall-street-takes-note.
[15] *See, e.g.*, Carl Weinschenk, "C Spire Expanding Fiber Broadband Footprint," Telecompetitor (October 31, 2019), at: https://www.telecompetitor.com/c-spire-expanding-fiber-broadband-footprint/; Bernie Arnason, "Verizon Exec Reveals 5G PON-on-a-Stick Proof of Concept at Calix Connextions," Telecompetitor (October 28, 2019) (reporting Verizon has been building approximately 1,400 route miles of fiber per month, across 60 markets), at: https://www.telecompetitor.com/verizon-exec-reveals-5g-pon-on-a-stick-proof-of-concept-at-calix-connexions/; Mike Robuck, "CenturyLink extends fiber reach in U.S., Europe," FierceTelecom (July 23, 2019), at: https://www.fiercetelecom.com/telecom/centurylink-goes-deep-fiber-expansion-u-s-and-europe.
[16] BroadbandNow Research, "The State of Broadband in America, Q3, 2019" (October 23, 2019), at: https://broadbandnow.com/research/q3-broadband-report-2019.
[17] 5G Americas, Press Release: "5G Continues Progress Despite COVID-19" (June 24, 2020), at: https://www.5gamericas.org/5g-continues-progress-despite-covid-19/.

- A survey found that 4G availability for mobile users of the four major providers increased to an average of 94.6% of the time.[18]

- "[T]elecom capex outlook remains favorable, even with increased uncertainty caused by the COVID-19 pandemic" with "worldwide telecom capex – the sum of wireless and wireline telecom investments – to grow at a 1 percent CAGR between 2019 and 2022."[19]

- Gigabit Internet service is available to at least 85% of U.S. homes, compared to only 6% of U.S. homes three-and-a-half years ago.[20]

- AT&T announced in July that its 5G network is available nationwide, covering a potential 205 million U.S. consumers, up from 179 million in late June of this year.[21]

- Although the pandemic may result in a decline in total wireless infrastructure revenue for 2020, "[w]orldwide 5G network infrastructure market revenue will almost double in 2020 to reach $8.1 billion," and North America "will reach 5G coverage across 95% of national populations by 2023."[22]

- T-Mobile announced in August that it launched standalone 5G service nationwide, increasing its 5G footprint 30% so that it covers 1.3 million square miles.[23] And in September it announced activation of 5G mid-band spectrum in 81 new areas.[24]

- It was reported in July that Verizon is providing 5G service in parts of 35 cities, with plans to be in 60 cities with its Ultra Wideband 5G service by year's end. Verizon intends to be in 10 markets with its 5G Home fixed wireless service this year, and it announced in late July that it will offer "LTE Home Internet" in select rural areas.[25]

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[18] Sue Marek, "Mobile Network Experience Report," OpenSignal (July 2020), at: https://www.opensignal.com/reports/2020/07/usa/mobile-network-experience.
[19] Broadband Communities Magazine, "Fiber-to-the-home leaders and innovators for 2020: A BBC Staff Report" (May/June 2020), at: https://www.bbcmag.com/pub/doc/BBC_May20_Top100.pdf.
[20] Mike Saperstein, "USTelecom Industry Metrics and Trends 2020: Update" USTelecom (April 27, 2020), at: https://www.ustelecom.org/research/ustelecom-industry-metrics-and-trends-2020-update/.
[21] AT&T, Press Release: "AT&T 5G. Today Nationwide." (July 23, 2020), at: https://about.att.com/story/2020/att_5g_nationwide.html; Bevin Fletcher, "AT&T adds 5G to 28 new markets, expands DSS deployment," *Fierce Wireless* (June 29, 2020), at: https://www.fiercewireless.com/5g/at-t-expands-5g-to-28-new-markets-continues-dss-deployment.
[22] Gartner, Press Release: "Gartner Says Worldwide 5G Network Infrastructure Spending to Almost Double in 2020" (July 28, 2020), at: https://www.gartner.com/en/newsroom/press-releases/gartner-says-worldwide-5g-network-infrastructure-spending-to-almost-double-in-2020.
[23] T-Mobile, Press Release: "T-Mobile Launches World's First Nationwide Standalone 5G Network" (August 4, 2020), at: https://www.t-mobile.com/news/network/standalone-5g-launch.
[24] Bevin Fletcher, "T-Mobile turns on 2.5 GHz in 81 new locations," *Fierce Wireless* (September 2, 2020), at: https://www.fiercewireless.com/5g/t-mobile-turns-2-5-ghz-81-new-locations.
[25] Monica Alleven, "Verizon takes delivery of Ericsson's U.S.-made 5G base station," *Fierce Wireless* (July 28, 2020), at: https://www.fiercewireless.com/operators/verizon-takes-delivery-ericsson-s-u-s-made-5g-base-station; Mike Dano, "Verizon fashionably late to the LTE fixed wireless party," *LightReading* (July 30, 2020), at: https://www.lightreading.com/4g3gwifi/verizon-fashionably-late-to-lte-fixed-wireless-party/d/d-id/762817?_mc.

- Charter's Spectrum Mobile announced in March that its unlimited data plans include access to 5G service in select areas, and Xfinity Mobile announced in May that it is offering 5G service at no extra cost across all its data plans.[26]

- According to WhistleOut, amidst pandemic-related lockdowns and surging data traffic, between mid-March and late-July the average U.S. download speed actually increased from 84.9 Mbps to 94.6 Mbps.[27]

These encouraging figures from the first part of 2020 confirm the continuation of the pro-deployment trend seen in 2019. And they lend further support for a positive determination by the Commission regarding broadband deployment in its upcoming report.

C. Next-Generation Technologies Now Being Deployed and Developed Will Soon Be Deployed to More Unserved Americans

The pro-deployment trend that began in 2017 is likely to continue with the significant aid of next-generation broadband technologies that will provide access to faster and more reliable services to many more Americans within the next few years. For example, rapidly expanding 5G networks coverage will bring increased mobile data capacity compared to 4G networks. Average speeds are up to 10 times faster for 5G networks than for 4G and peak speeds are up to 100 times faster.[28]

Also, as described above, the pace of FTTH deployments continues to pick up speed. Direct fiber connections can deliver high speeds today – and through technology upgrades can remain competitive going forward. Additionally, cable broadband providers are working to

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[26] Charter, Press Release: "Charter Announces Spectrum Mobile™ Now Carrying Samsung Galaxy S20 5G Phones" (March 6, 2020), at: https://corporate.charter.com/newsroom/charter-announces-spectrum-mobile-now-carrying-samsung-galaxy-s20-5g-phones; Comcast, Press Release: "Xfinity Mobile Introduces 5G Data Options" (May 18, 2020), at: https://corporate.comcast.com/press/releases/xfinity-mobile-5g-speeds-all-data-plans-by-the-gig-unlimited.

[27] N.F. Mendoza "86% of US states increased internet speeds during COVID-19 lockdown," *TechRepublic* (August 27, 2020), at: https://www.techrepublic.com/article/86-of-us-states-increased-internet-speeds-during-covid-19-lockdown/.

[28] *See* Sanjay Dhar, Tejas Rao, and Majed Al Amine, "Smart Cities: How 5G Can Help Municipalities Become Vibrant Smart Cities," Accenture Strategy (February 27, 2017), at: https://www.accenture.com/_acnmedia/pdf-43/accenture-5g-municipalities-become-smart-cities.pdf.

deliver multi-gigabit speeds in the near future. The "10G" platform, a collection of technologies and standards, including DOCSIS® 4.0, promises to enable higher (up to 10 Gbps downstream) and symmetric speeds, lower latency, improved security, and greater reliability, all over existing hybrid fiber-coaxial (HFC) infrastructure.[29]

Moreover, consumers will benefit from improved capacity and reliability through unlicensed home-networking devices that support the Wi-Fi 6 specification, which is now being deployed.[30] Wi-Fi capabilities will continue to increase now that the FCC has issued an order to make 1200 MHz of spectrum in the 6 GHz band available for flexible uses.[31]

These technological advancements are poised to help deliver broadband Internet access services to Americans who were still unserved in 2019 or who may still be unserved today. Not only will companies compete with one another for customers, but, given their unique strengths, they also will complement one other. Wi-Fi 6 (and 6E) wireless routers will extend 5G, FTTH, and "10G" networks inside homes and businesses. 5G will serve as a mobile alternative to fixed technologies. And "10G" and fiber can provide backhaul services for 5G. Working together, the next generation of connectivity solutions will deliver faster, more ubiquitous broadband.

III. The Commission Should Retain Its Existing Speed Benchmarks, Its 5-Year Timeframe for Tracking Progress, and Its Focus on Deployment

For purposes of defining "advanced telecommunications capability," the Commission's next report should retain its 25/3 Mbps fixed speed benchmark and similarly retain its dual 4G

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[29] *See* Andrew Long, "'10 G' Can Help Future-Proof Broadband Infrastructure," *Perspectives from FSF Scholars*, Vol. 15, No. 47 (September 11, 2020), at: https://freestatefoundation.org/wp-content/uploads/2020/09/10G-Can-Help-Future-Proof-Broadband-Infrastructure-091120.pdf.

[30] "Wi-Fi 6E" is the consumer-facing label for Wi-Fi 6 devices able to operate in the 6 GHz band, which are just beginning to be introduced commercially. *See, e.g.*, Ry Crist, "Asus just announced the first router that supports next-gen Wi-Fi 6E connections," *CNET* (September 1, 2020), at: https://www.cnet.com/news/asus-just-announced-the-first-router-that-supports-next-gen-wi-fi-6e-connections-rog-rapture-gt-axe11000.

[31] *See* FCC, Unlicensed Use of the 6 GHz Band, ET Docket No. 18-295, Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz, GN Docket No. 17-183, Report and Order and Further Notice of Proposed Rulemaking (released April 24, 2020).

LTE speed benchmark of 5/1 Mbps minimum advertised speed and 10/3 Mbps median tested speed. And in order to present a more complete analysis, the next report should again feature figures for a wider range of available speed tiers.

The Commission should once again decline to quadruple the agency's broadband benchmark to 100 Mbps. Section 706's requirement that the Commission annually determine and issue a report on "whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion" is to be based on an analysis of available services capable of supporting widely demanded applications and uses. Popular online video services require download speeds of not more than 10 Mbps for HD streaming video or 5 Mbps for standard definition streaming video. Netflix, for example, recommends 5 Mbps for HD streaming and 3 Mbps for standard definition streaming.[32] It recommends a minimum of 25 Mbps – an amount equal to the Commission's existing benchmark – only for Ultra HD streaming. Hulu recommends 16 Mbps for Ultra HD or 4K streaming, 8 Mbps for live streams, and 3 Mbps for streams from its content library.[33] Zoom recommends download speeds of 2 to 6 Mbps for triple screen rooms.[34] A 25 Mbps connection also readily supports Web surfing. Moreover, streaming audio and voice calls typically use far less than 1 Mbps of bandwidth. Thus, a 25/3 Mbps connection can readily support HD streaming video as well as simultaneous data usage by multiple devices in a single home.

A drastic or "audacious" re-definition of the agency's broadband benchmarks, as

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[32] *See* Netflix, "Internet Connection Speed Recommendations," at: https://help.netflix.com/en/node/306#:~:text=%20Internet%20Connection%20Speed%20Recommendations%20%201%20Watch,to%20check%20your%20connection%20speed%20within...%20More%20 (last checked September 10, 2020).

[33] *See* Hulu, "Internet Speed Recommendations" (May 11, 2020), at: https://help.hulu.com/s/article/speed-recommendations?language=en_US.

[34] *See* Zoom, "System Requirements for Zoom Rooms," at: https://support.zoom.us/hc/en-us/articles/204003179-System-Requirements-for-Zoom-Rooms (last checked September 10, 2020).

advocated by Commissioner Jessica Rosenworcel, has no basis in the plain language of Section 706's mandate, and it appears contrary to the statute's directive that the Commission make its deployment determination based on a reasonableness standard.[35] There is nothing reasonable about the Commission mistakenly suggesting that nothing less than 100 Mbps qualifies as broadband services. And the Commission should not place itself in the position of advocating that consumers purchase more bandwidth than they need to satisfy their present demands.

Although we do *not* recommend the Commission increase its benchmark speeds, if the agency does choose to do so, it should consider only a modest change. Sharply raising the threshold from 25 Mbps to 100 Mbps would instantaneously "manufacture" a marketplace in which the number of competitors offering "broadband" services is dramatically decreased. Such a jerry-rigged result, which undoubtedly would be used to serve as justification for more regulation, would conflict with the marketplace reality for millions upon millions of Americans who have access to broadband services.

Additionally, in order to present a more complete analysis, the next report should again feature figures for a wider range of available speed tiers and consider deployment progress on a five-year time horizon for 2015-2019. It is eminently reasonable for the Commission to start with a fixed point and track the extent of improvement over time. Jettisoning year-to-year comparisons in broadband availability, as Commissioner Geoffrey Stark advocates,[36] would significantly undermine objectivity in the Commission's analysis. Year-to-year comparisons yield figures regarding how many Americans have access to broadband Internet access services and the rate at which unserved Americans are being reached. In determining whether broadband

[35] *See* Statement of Commissioner Jessica Rosenworcel, Dissenting, GN Docket 20-269; 47 U.S.C. 1302(b) ("In the inquiry, the Commission shall determine whether advanced telecommunications capability is being deployed to all Americans in a *reasonable* and timely fashion") (emphasis added).
[36] *See* Statement of Commissioner Geoffrey Starks, Dissenting, GN Docket 20-269.

Internet service capability is being reasonably and timely deployed to all Americans, the Commission can and should consider ongoing universal service initiatives and anticipated private sector deployment efforts. But eliminating objective year-to-year criteria would invite the use of ad hoc or arbitrary criteria for measuring broadband deployment progress.

Furthermore, the Commission's inquiry and analysis should remain focused on broadband "deployment," as that is the express focus of the statute. Broadband adoption, affordability, and digital literacy are separate concepts involving different social dynamics that implicate unrelated considerations. Although important, those matters are better evaluated and addressed in other venues.

Finally, although some voices already have criticized this proceeding, along with its predecessor, by making claims about the reliability of broadband availability data for certain geographic areas, those criticisms do not change the fact that the Commission has a statutory duty to prepare its report. The Commission should carry out that duty using the best data at its disposal, while at the same time, continuing to press Congress to provide the funding needed for the agency to undertake new broadband mapping work.

IV. The Commission Should Recognize That Advanced LTE and 5G Mobile Services Are Substitutes or Potential Substitutes for Wireline Broadband Services

Similar to prior reports, the 2020 Broadband Deployment Report found that "fixed broadband and mobile wireless broadband services are not functional substitutes in all cases."[37] However, the Commission's emphasis on functional equivalence between wired and wireless broadband services "in all cases" and "for all uses and customer groups" is based on an inapt view of substitution that is too dismissive of the competition-enhancing effects of actual and potential substitution for broadband Internet services. For its next report, the Commission should

[37] *2020 Broadband Deployment Report*, at ¶ 12.

revisit its approach to substitution and recognize that advanced 4G LTE and 5G wireless services can serve as substitutes for wireline services for a wide range of uses.

In his book *Competitive Advantage*, Professor Michael E. Porter recognized that substitution is a key competitive force determining industry profitability because it "plays a prominent role in determining industry supply and firm's demand" and because "the threat of substitution places a ceiling on industry prices."[38] Importantly, these key competitive effects of substitution do not depend on a product and a substitute functioning the same way in every respect. Rather, as Porter explained, "[a] substitute may also perform a wider or narrower range of functions than an industry's product."[39] According to Porter, identification of substitutes necessarily includes "products that can perform functions in addition to those of an industry's product, as well as products that can perform any significant function among those the industry's product can perform."[40] The Commission should adopt a view of substitution that takes account of competitive dynamics recognized by Porter and other economists and incorporate it into analyses of wireless/wireline substitution.

Although they possess some different functionalities, advanced LTE and 5G mobile wireless broadband services capable of providing speeds above the Commission's benchmark of 25/3 Mbps can support many of the same functions that are also supported by wireline broadband services, including:

- *Voice calling*: The National Health Interview survey found that 60.3% of adults lived in homes that were wireless-only for voice services as of December 2019. Moreover, 81.7% of adults between 25 and 29 and 81.1% of adults between 30 and 34 lived in wireless-only homes as of that date.[41]

[38] Michael Porter, *Competitive Advantage: Creating and Sustaining Superior Performance* (2004 ed.), at 273.
[39] Porter, *Competitive Advantage*, at 275 (emphasis in original).
[40] Porter, *Competitive Advantage*, at 275.
[41] Stephen J. Blumberg and Julian V. Lake, "Wireless Substitution: Early Release of Estimates From the National Health Interview Survey, July-December 2019," Division of Health Interview Statistics, National Center for Health Statistics (released September 9, 2020), at: https://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless202009-508.pdf.

- *Broadband Internet access and web surfing*: According to an early 2019 survey by Pew Research Center, 17% of U.S. adults are "smartphone-only Internet users," a share that has doubled since 2013.[42] About one fourth of lower-income adults are "smartphone-only" Internet users. Also, 37% of U.S. adults say they mostly use a smartphone when accessing the Internet.

- *Email, social media, and news*: The *2020 Broadband Deployment Report* acknowledged that U.S. consumers "can substitute fixed and mobile broadband when accessing certain services and applications (such as e-mail or social media, for example)."[43] And a late 2019 Pew survey found that 57% of U.S. adults often access news on a mobile device compared to 30% who often do so on a desktop or laptop computer.[44]

- *Video*: Ericsson finds that mobile video is the primary fuel for increasing average data volume per subscriber.[45] It forecasts that global video traffic on mobile networks will grow about 30% annually up to 2025, at which point, it will account for almost three-quarters of total mobile data traffic, up from just over 60% in 2019. Additionally, eMarketer finds that "growth in mobile video is part of a bigger trend toward digital video," and it predicts that U.S. adults will increase their daily viewing of digital video via mobile devices from 42 minutes per day in 2019 up to 47 minutes in 2020 and up to 51 minutes in 2022.[46]

The Free State Foundation's April 2020 comments to the Commission in its *Communications Marketplace Report* proceeding presented several data points and more detailed arguments regarding wireless/wireline substitution.[47] Those comments are included as Attachment A.

It deserves emphasizing that the rapid nationwide deployment of competing 5G networks provides the strongest case yet for the Commission to acknowledge wireless/wireline broadband substitution. Given 5G networks' potential to deliver average speeds at least ten times faster than

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[42] Monica Anderson, "Mobile Technology and Home Broadband 2019" Pew Research Center (June 13, 2019), at: https://www.pewresearch.org/internet/2019/06/13/mobile-technology-and-home-broadband-2019/.
[43] FCC, *2020 Broadband Deployment Report*, at ¶ 11.
[44] Mason Walker, "Americans favor mobile devices over desktops and laptops for getting news," Pew Research Center (November 19, 2019), at: https://www.pewresearch.org/fact-tank/2019/11/19/americans-favor-mobile-devices-over-desktops-and-laptops-for-getting-news/.
[45] Ericsson Mobility Report, (June 2020), at 17-18, at: https://www.ericsson.com/49da93/assets/local/mobility-report/documents/2020/june2020-ericsson-mobility-report.pdf.
[46] Yoram Wurmser, "The Pandemic Is Accelerating Time Spent with Mobile Video and Gaming," eMarketer (July 22, 2020), at: https://www.emarketer.com/content/pandemic-accelerating-time-spent-with-mobile-video-gaming.
[47] Comments of the Free State Foundation, The State of Competition in the Communications Marketplace, GN Docket No. 20-60 (April 27, 2020), at 6-15, at: https://freestatefoundation.org/wp-content/uploads/2020/04/FSF-Comments-Communications-Marketplace-Competition-042720.pdf.

LTE networks, deliver peak speeds exceeding LTE perhaps by up to 100 times, and deliver fixed residential broadband services, the functional equivalencies between 5G and wireline broadband are too great to deny the reality of effective substitutability. In prior reports, the Commission nodded in the direction of 5G substitutability. The 2019 *Broadband Deployment Report* stated: "[W]e anticipate that, in the future, mobile services will continue to expand and become more versatile, with technological advances such as 5G potentially allowing mobile services to provide performance characteristics such as speed and service quality that are similar to fixed services."[48] Similarly, the 2020 *Broadband Deployment Report* stated that "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."[49] The Commission's next report should go further. It should track the real-world capabilities of 5G deployments and find that 5G services are substitutes or potential substitutes for fixed wireline broadband services.

Finally, as the Free State Foundation's comments in the *Communications Marketplace Report* proceeding explained, wireless and wireline broadband services likely are part of an overall broadband communications market or broadband Internet services market.[50] This product market for competitive broadband Internet access services should encompass fixed, mobile, and satellite broadband services that satisfy the Commission's speed benchmark threshold of 25 Mbps download/3 Mbps upload for "advanced telecommunications capability." By recognizing a

[48] FCC, Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, GN Docket No. 18-238, *2019 Broadband Deployment Report*, (released May 29, 2019), at ¶ 11.
[49] *2020 Broadband Deployment Report*, at ¶ 11.
[50] Comments of the Free State Foundation, The State of Competition in the Communications Marketplace, GN Docket No. 20-60, at 14-15.

broader and more realistic product market, the Commission likely would be better situated to analyze and recognize the extent of existing wireless/wireline substitution.

V. The Commission Should Take Additional Actions to Remove Regulatory Barriers to Broadband Infrastructure Investment

Over the past year, the Commission has taken important steps to spur investment and accelerate broadband Internet access to unserved Americans. For example, and to the Commission's credit, the agency is now implementing its Rural Digital Opportunity Fund (RDOF) rules for disbursing universal service money through reverse auctions. Commendably, the Commission also has proposed reverse auction rules for its 5G Fund. Even if the Commission determines – as it should in this proceeding – that advanced telecommunications capability is being reasonably and timely deployed to all Americans, it should continue to proactively identify and remove regulatory barriers to broadband infrastructure investment. The Commission should build on the pro-investment and pro-deployment momentum that now exists by taking the following actions:

- Ensure that Universal Service Fund programs target unserved areas and not overbuilds in areas already served by incumbent providers. By definition, unserved geographic areas should be limited to those places where Americans do not have access to fixed broadband services with 25 Mbps/3 Mbps capabilities.

- Pursue options, such as working with Congress or exercising its forbearance authority under Section 10, to eliminate the Eligible Telecommunications Carrier (ETC) requirement for participation in broadband-specific Universal Service Fund programs.[51]

- Continue to urge Congress to fund the Commission's efforts to produce modernized broadband coverage maps that will identify unserved areas and target those areas for broadband service subsidies.[52]

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[51] *See* Andrew Long, "The ETC Requirement for Accessing Broadband Funds Should Be Eliminated," *Perspectives from FSF Scholars*, Vol. 15, No. 34 (June 19, 2020), at: https://freestatefoundation.org/wp-content/uploads/2020/06/The-ETC-Requirement-for-Accessing-Broadband-Funds-Should-Be-Eliminated-061920.pdf.

[52] *See* Andrew Long, "Legislative 'Best Practices' to Expand and Accelerate Broadband Coverage," *Perspectives from FSF Scholars*, Vol. 15, No. 42 (July 29, 2020), at 5-7, at: https://freestatefoundation.org/wp-content/uploads/2020/07/Legislative-Best-Practices-to-Expand-and-Accelerate-Broadband-Coverage-072920.pdf.

- Auction C-Band spectrum as scheduled for December 2020, with incentives for incumbent satellite operators to expeditiously vacate for terrestrial mobile use.

- Adopt its proposal to reallocate the lower 45 MHz of the 5.9 GHz band for unlicensed flexible use. That 45 MHz could be combined with spectrum already used for Wi-Fi in the adjacent 5 GHz band to create a contiguous wideband (160 MHz) Wi-Fi 6 channel.[53]

- Expeditiously pursue its proposal to repurpose 100 megahertz in the 3.45-3.55 GHz for flexible use, including 5G.[54] Also identify as much additional spectrum within the 3.1-3.45 GHz band as may reasonably be reallocated for licensed commercial usage. Once it has done so, the Commission should undertake efforts that will be needed to relocate existing users and free up that spectrum for public auction.

- Issue a declaratory ruling that would obligate cable operators and wireline telco providers to pay only the incremental costs that they cause in hastening the replacement of old utility poles with new ones. It also should put pole attachment complaints in unserved areas on the Commission's accelerated docket for faster resolution.[55]

- Issue a declaratory ruling clarifying when modifications or excavations outside an existing cell tower site receive streamlined approval for non-substantial modifications under Spectrum Act Section 6409(a).[56]

- Adopt its proposal to update its Over-the-Air Device (OTARD) rule to include hub and relay antennas for fixed wireless signals, thereby prohibiting local restrictions on use of such equipment in areas within a property user's exclusive control.[57]

- Pare back legacy "unbundling" regulation to reflect competitive marketplace realities and to remove unnecessary regulatory burdens that can inhibit the deployment of, and

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[53] *See* Comments of the Free State Foundation, Use of the 5.850-5.925 GHz Band, ET Docket No. 19-138 (March 6, 2020), at: https://freestatefoundation.org/wp-content/uploads/2020/03/FSF-Comments-5.9-GHz.Final-030620.pdf.

[54] FCC, Facilitating 5G in the 3.45-3.55 GHz Band, WT Docket No. 19-348, Fact Sheet and draft Report and Order and Further Notice of Proposed Rulemaking (September 9, 2020), at: https://docs.fcc.gov/public/attachments/DOC-366780A1.pdf.

[55] *See* Comments of the Free State Foundation, Accelerating Wireline Broadband Deployment by Removing Barriers to Infrastructure Investment, WC Docket No. 17-84 (September 1, 2020), at: https://freestatefoundation.org/wp-content/uploads/2020/09/FSF-Comments-Removing-Barriers-to-Pole-Replacements-and-Attachments-to-Accelerate-Broadband-Deployment-090120.pdf.

[56] FCC, Implementation of State and Local Governments' Obligation to Approve Certain Wireless Facility Modifications Requests Under Section 6409(a) of the Spectrum Act of 2012, WT Docket No. 19-250, RM-11849, Declaratory Ruling and Notice of Proposed Rulemaking (released June 10, 2020), at: https://docs.fcc.gov/public/attachments/FCC-20-75A1.pdf.

[57] *See* Seth L. Cooper, "FCC's Proposed Update to Over-the-Air Device Rule Would Boost 5G," *The Free State Foundation Blog* (May 31, 2019), at: http://freestatefoundation.blogspot.com/2019/05/fccs-proposed-update-to-over-air-device.html.

transition to, next-generation networks.[58]

- Reinvigorate its authority under Sections 10 and 11 by adopting rebuttable presumptions of market competitiveness as procedural rules in order to eliminate legacy regulations based on old technology and outdated competitive assumptions.[59]

VI. Conclusion

For the foregoing reasons, the Commission should find that broadband is being reasonably and timely deployed to all Americans and take actions to remove barriers to infrastructure investment.

Respectfully submitted,

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[58] FCC, Modernizing Unbundling and Resale Rules in an Era of Next-Generation Networks and Services, Notice of Proposed Rulemaking, WC Docket No. 19-308, Notice of Proposed Rulemaking (released November 25, 2019), at: https://docs.fcc.gov/public/attachments/FCC-19-119A1.pdf.

[59] *See* Randolph J. May and Seth L. Cooper, "A Proposal for Improving the FCC's Regulatory Reviews," *Perspectives from FSF Scholars*, Vol. 12, No. 1 (January 3, 2017), at: http://www.freestatefoundation.org/images/A_Proposal_for_Improving_the_FCC_s_Regulatory_Reviews_010317.pdf; Reply Comments of the Free State Foundation, 2016 Biennial Review of Telecommunications Regulations, CG Docket No. 16-124, EB Docket No. 16-120, IB Docket No. 16-131, ET Docket No. 16-127, PS Docket No. 16-128, WT Docket No. 16-138, WC Docket No. 16-132 (January 3, 2017), at: https://ecfsapi.fcc.gov/file/10103299930129/FSF%20Reply%20Comments%20Sec%2011%20-%20Final_2.pdf; and Randolph J. May and Seth L. Cooper, "A Proposal for Improving the FCC's Forbearance Process," *Perspectives from FSF Scholars*, Vol. 12, No.4 (January 17, 2017), at: http://www.freestatefoundation.org/images/A_Proposal_for_Improving_the_FCC_s_Forbearance_Process_011717.pdf.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
The State of Competition in the Communications Marketplace	)	GN Docket No. 20-60
	)	
	)	

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COMMENTS OF
THE FREE STATE FOUNDATION[60]

I. Introduction and Summary

These comments are submitted in response to the Commission's Notice regarding the RAY BAUM's Act's requirement that the agency issue a biennial report that assesses the state of competition in the communications marketplace, including "the effect of intermodal competition, facilities-based competition, and competition from new and emergent communications services." These comments focus on the broadband and video services markets and show that available data supports the conclusion that these markets are characterized by effective competition, including intermodal competition. Additionally, these comments identify actions that the Commission should take to remove costly unnecessary regulatory barriers, thereby promoting even more competition and deployment.

Despite the disruptions to our daily lives, and to our nation's economy, attributable to COVID-19, the communications marketplace is vibrant and dynamic. Indeed, the current pandemic has demonstrated the capability of U.S. communications networks to handle higher than normal traffic loads and unusual traffic patterns without degradation of quality. U.S.

[1] These comments express the views of Randolph May, President of the Free State Foundation, Seth Cooper, Director of Policy Studies and Senior Fellow, and Andrew Long, Senior Fellow. The views expressed do not necessarily represent the views of others associated with the Free State Foundation. The Free State Foundation is a nonpartisan, non-profit free market-oriented think tank.

consumers continue to benefit from next-generation network technology deployments, new service offerings by cross-platform and emergent providers, and competitive pricing options. In 2018 and 2019, deployment among and across fixed, mobile, and satellite service broadband Internet service providers remained strong or even improved, and consumers benefitted from effective competition among facilities and non-facilities-based video services.

Studies indicate that at the end of 2019, nearly 95% of the U.S. population had access to wired broadband services with download speeds of at least 25 Mbps and almost 92% had access with speeds of at least 100 Mbps. As of that date, average U.S. fixed broadband download/upload speeds increased to 130.79 Mbps/49.53 Mbps and mobile speeds increased to 41 Mbps/11.79 Mbps. LTE total connections in North America grew to 483 million and 5G connections grew to 587,000, with 5G networks deployed to about 54 U.S. cities. These results followed U.S. broadband provider investments of $75 billion in 2018, and $72 billion in 2017. The wireless industry reported 2018 capital expenditures of $27,408,097, up 6.5% over 2017.

In today's communications market, different technology platforms offer consumers broadband Internet access. Consumers relying on fixed wireline services increasingly are making use of portable Wi-Fi connected devices for Internet applications and content. Mobile broadband services are now widely capable of delivering HD or better video, and consumers are demanding it.

Growing numbers of Internet users view mobile broadband as a substitute or at least a potential substitute for fixed services. Wireless-only usage trends among younger consumers also portend a future in which more consumers will view wireless and wireline as interchangeable. And nationwide launch of competing advanced 5G services further strengthens the case for wireless/wireline substitutability. The Commission should recognize such substitution and adopt

a new product market definition for "advanced telecommunications capability" that encompasses fixed, mobile, and satellite broadband services that meet the Commission's speed benchmark threshold of 25 Mbps download/3 Mbps upload. The policy implications of recognizing this broader product market can be developed through future proceedings and may vary depending upon the particular circumstances.

To ensure continued dynamism in the broadband services market beyond 2020, the Commission should proceed with dispatch to repurpose more spectrum for 5G services. It should promptly conduct its proposed auction for licensed use in the C-band. Additionally, the Commission should clarify aspects of Section 6409(a) of the Spectrum Act regarding non-substantial modifications to existing cell sites in order to clear away local administrative barriers to wireless infrastructure upgrades. And it should update its Over-the-Air Device (OTARD) rule to include hub and relay antennas for fixed wireless signals, thereby prohibiting local restrictions on use of 5G-related equipment in areas within a property user's exclusive control.

Since the Commission released its 2018 *Communications Marketplace Report*, new entry and technology have reshaped the video distribution marketplace. Traditional multichannel video programming distributors (MVPDs) such as cable, direct broadcast satellite (DBS), and local telephone companies (Telco TV) continue to shed subscribers. In 2010, cable operators served 59.8 million, and DBS operators served 33.3 million. Since then those totals have dropped to 45.8 million for cable and 25.4 million for DBS. In 2019 alone, the combined subscriber losses of twelve top MVPDs totaled nearly six million.

Additionally, growth in both the number of, and subscribers to, online video distributors (OVDs) remains strong. By the end of 2019, 46% of U.S. broadband households subscribed to two or more OVD services. Netflix grew from 58.5 million U.S. subscribers at the end of 2018 to

60.4 million a year later. OVD subscribership has also grown for Hulu, Amazon Prime Video, and other online video services. And new entrants Disney+ and Apple TV+ have experienced rapid subscriber growth in less than a year's time.

Furthermore, "virtual MVPDs" or vMVPDs have established themselves in just the last few years as effective substitutes for existing pay-TV offerings. Notably, vMVPDs are gaining customers at the expense of traditional providers. Hulu + Live TV and Sling TV, the top two vMVPDs, added 1.7 million new subscribers – a 29% increase – in 2019. According to one report, about 40% of consumers who dropped their traditional MVPD subscription signed up for a vMVPD service. OVD and vMVPD growth reveals that control of the transmission medium increasingly is irrelevant to video marketplace success.

In recognition of the reality of facilities-based and non-facilities based video competition, including intermodal competition, the Commission should continue to remove outdated regulations that hamstring legacy video providers' ability to compete. It should eliminate network non-duplication and syndicated exclusivity rules. National broadcast TV networks, local network affiliates, and MVPDs are sophisticated entities capable of contracting for carriage rights.

The Commission also should eliminate regulatory uncertainty and the threat of future marketplace distortion by terminating old proceedings that could impose additional obligations, such as the MVPD reclassification and AllVid rulemakings. Additionally, the Commission should sunset its navigation device rules. Traditional MVPDs are subject to vigorous competition from both vMPVDs and OVDs, and device choice continues to expand. Triggering conditions for Section 629's sunset requirements have been met and the costly old rules should be repealed.

II. The 2020 *Communications Marketplace Report* Should Take Intermodal Competition Seriously

A key benefit of the RAY BAUM's Act requirement that the FCC prepare biennially a single report encompassing what have traditionally been viewed as separate communications service sectors is that it facilitates analyses that better capture increasing cross-platform rivalries in communications services enabled by IP-based network technologies. To this end, the Commission's initial *Communications Marketplace Report* (2018) provided some data and cursory insights into intermodal competition among voice and video services. However, it stopped short of making any findings that any of those services were substitutes or potential substitutes. Furthermore, although the 2018 report cited some data as evidence of the substitutability of wireless and wireline broadband Internet access services, it made "no finding with respect to whether fixed and mobile broadband services are competitive substitutes."[61]

To its credit, the Commission's Notice in this proceeding calls attention to Congress's requirement that its report includes consideration of the effects of intermodal competition. Accordingly, the following sections of these comments present data and analysis showing that the broadband Internet services and video services markets are characterized by facilities-based competition by providers using similar platform technologies as well as by intermodal competition. Since the end of 2017, progress in the deployment of 5G, Wi-Fi 6 technology, and gigabit fixed broadband technologies, as well as the sharp rise of Internet-delivered video services, have further increased intermodal competition in broadband and video service markets.

As will be discussed, the Commission should move beyond its traditional siloed approach to competition policy by making substitution findings for broadband Internet services. The

[61] Communications Marketplace Report, Docket No. 18-231, et al. (released December 26, 2018)(2018 *Communications Marketplace Report* or 2018 report), at ¶ 171.

Commission also should adopt a broader product market definition for broadband Internet services that takes into account functional similarities and intermodal competition between wireless and wireline broadband services. The implications of substitutability findings and new market definitions would be worked out in the course of future Commission actions in which they may be relevant. But the 2020 *Communications Marketplace Report* should mark a concrete step in the Commission's reorientation of its analytical outlook to comport with the dynamic realities of today's communications marketplace.

III. The Broadband Internet Access Services Market Is Characterized by Effective Facilities-Based Competition and Intermodal Competition

Research reports and available data for 2018 and 2019 show that the broadband Internet services sector is characterized by next-generation network infrastructure deployments that are benefitting consumers with new and improved service capabilities and applications as well as better pricing options. Overall competitive conditions across mobile wireless, fixed wireline, satellite, and broadband Internet services remain strong or have improved compared to 2017:

- *Improved Access to Fixed Broadband Services.* According to a report by BroadbandNow, at the end of 2019, 94.8% of the U.S. population had access to wired broadband services with download speeds of at least 25 Mbps.[62] As of that same date, 91.4% had access to wired broadband services with download speeds of at least 100 Mbps, and about 84.9% had access to broadband speeds of at least 250 Mbps. Those figures do not include satellite broadband providers ViaSat and HughesNet, which offer advertised speeds of at least 25 Mbps/3 Mbps to nearly all Americans.

- *Increased Fixed Broadband Speeds.* Ookla found that average U.S. fixed broadband upload/download speeds increased to 96.25 Mbps/32.88 Mbps by the middle of 2018.[63] And by December 2019 they further increased to 130.79 Mbps/49.53 Mbps.[64]

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[62] Julia Tanberk, "The State of Broadband in America, Q4 2019" BroadbandNow (January 29, 2020), at: https://broadbandnow.com/research/q4-broadband-report-2019.
[63] Ookla, Speedtest: Report: United States: Fixed (December 12, 2018), at https://www.speedtest.net/reports/united-states/2018/#fixed.
[64] Ookla, "Speedtest Global Index" (United States) (December 2019) at: https://www.speedtest.net/global-index/united-states#fixed (last checked January 22, 2020).

- *4G LTE Adoption and Competition.* It was reported that in June 2019, LTE market penetration in the U.S. grew to 130% (or 1.3 LTE subscriptions per person).[65] As of the second quarter of 2019, LTE total connections in North America totaled 459 million, representing 88% of all mobile connections in North America. At the end of 2019 that number increased to 483 million.[66] Additionally, surveys of mobile wireless subscribers found that 4G network availability among the four nationwide mobile service providers increased during 2019.[67] Subscribers of the four major nationwide providers experienced incrementally larger percentages of time on their providers' 4G networks than in the months or years prior. And by year-end 2019, 4G availability had increased further, with Verizon at 95.9%, T-Mobile at 95.4%, AT&T at 92.9%, and Sprint at 92.5%.[68]

- *Early 5G Deployment*. By one estimate, 5G connections in North America grew to 587,000 by the end of 2019, including a 284% connection growth rate in the fourth quarter over the third quarter.[69] And a February 2020 report found that commercial 5G networks had deployed to 54 cities in the U.S.[70]

- *Increased Mobile Broadband Speeds*. Ookla found that average U.S. mobile upload/download speeds increased to 27.33 Mbps/8.63 Mbps by the middle of 2018.[71] And mobile broadband speeds increased to 41 Mbps/11.79 Mbps as of December 2019.[72]

- *Additional Mobile Broadband Competition.* In addition to competing nationwide mobile service providers, U.S. consumers have a choice among other providers, including multi-regional providers, such as U.S. Cellular and C Spire, as well as smaller local providers. Additionally, a growing number have subscribed to mobile wireless services offered by "cable" mobile virtual network operators (MVNOs) that combine Wi-Fi network technologies with leased spectrum. At the end of 2018, Xfinity Mobile had signed up 1.2 million wireless subscribers,[73] and by the end of 2019 it had almost 2.1 million.[74] Also, at

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[65] 5G Americas, "5G Network Rollouts Accelerate as LTE's Long Tail Extends" (September 19, 2019), at: https://www.5gamericas.org/5g-network-rollouts-accelerate-as-ltes-long-tail-extends/.
[66] 5G Americas, "5G's Year One: Fast Start and Health Growth" (March 23, 2020), at: http://www.globenewswire.com/news-release/2020/03/23/2005090/0/en/5G-s-Year-One-Fast-Start-and-Healthy-Growth.html.
[67] *See* Opensignal, "USA Mobile Network Experience Report January 2020" (January 2020), at: https://www.opensignal.com/reports/2020/01/usa/mobile-network-experience; Opensignal, "USA Mobile Network Experience Report July 2019," (July 2019), at: https://www.opensignal.com/reports/2019/07/usa/mobile-network-experience.
[68] "USA Mobile Network Experience Report January 2020."
[69] 5G Americas, "5G's Year One: Fast Start and Health Growth."
[70] Viavi Solutions, "The State of 5G Deployments" (February 2020), at: https://www.viavisolutions.com/en-us/literature/state-5g-deployments-2020-poster-chart-en.pdf.
[71] Ookla, Speedtest: Report: United States: Mobile (July 18, 2018), at https://www.speedtest.net/reports/united-states/2018/#mobile.
[72] Ookla, "Speedtest Global Index" (United States) (December 2019) at: https://www.speedtest.net/global-index/united-states#mobile (last checked January 22, 2020).
[73] Comcast, Press Release: "Comcast Reports 4th Quarter and Full Year 2018 Results" (January 23, 2019), at: https://www.cmcsa.com/news-releases/news-release-details/comcast-reports-4th-quarter-and-full-year-2018-results.
[74] Comcast, Press Release: "Comcast Reports 4th Quarter and Full Year 2019 Results" (January 2020), at: https://www.cmcsa.com/news-releases/news-release-details/comcast-reports-4th-quarter-and-full-year-2019-results.

the end of 2018, Charter's Spectrum Mobile had 134,000 subscribers,[75] and as of the end of 2019 it had 1.1 million subscribers.[76] Furthermore, MVNO Tracfone had 21.2 million subscribers at the end of the third quarter of 2019.[77]

- *Mobile Demand Rose Sharply*. The wireless industry reported that U.S. mobile data traffic increased from 15.7 trillion megabits (MB) in 2017 to 28.58 trillion MB in 2018, an annual increase of 82.2%.[78] Between 2017 and 2018, the number of smartphones in use rose from 273.2 million to 284.7 million.[79] According to a 2019 survey by Leichtman Research Group (LRG), 81% of adults access the Internet on a smartphone, up from 63% in 2014.[80] Also, interest in media and text messaging remains strong, as combined messaging traffic increased from 1.8 trillion in 2017 to 2 trillion messages in 2018.[81]

- *Strong Indicators of Declining Mobile Prices.* According to the Bureau of Labor Statistics, while the Consumer Price Index (CPI) for all items went up 1.9% in 2018 and up 2.3% in 2019,[82] the CPI for wireless telephone services declined about 3.2% from December 2017 to December 2018.[83] From December 2018 to December 2019, the CPI for wireless telephone services declined about 0.3%.[84] Additionally, the wireless industry reported declining average revenue per user in 2018, down about 2.1% from 2017.[85]

- *Growing Percentage of Smartphone-Only Households.* According to an early 2019 survey by Pew Research Center, 17% of U.S. adults are "smartphone-only Internet users," a share that has doubled since 2013.[86] About one fourth of lower-income adults are "smartphone-only" Internet users.

- *Continued Wireless Infrastructure Deployment.* CTIA reported that the number of cell sites in operation increased from 323,448 in 2017 to 349,344 in 2018, or about 8%.[87]

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[75] Charter Communications, Press Release: "Charter Announces Fourth Quarter 2018 Results (January 31, 2019), at: https://ir.charter.com/news-releases/news-release-details/charter-announces-fourth-quarter-2018-results.
[76] Charter Communications, "Spectrum Mobile Milestone: 1.1M Subscriber Lines and Counting" (March 9, 2020), at: https://corporate.charter.com/newsroom/spectrum-mobile-mileston-1.1m-subscriber-lines-and-counting.
[77] America Movil, "America Movil's third quarter of 2019 financial and operating report" (October 15, 2019), at: https://s22.q4cdn.com/604986553/files/doc_financials/quarterly/2019/Q3/3Q19.pdf.
[78] CTIA, 2019 Annual Survey Highlights (June 2019), available at: https://api.ctia.org/wp-content/uploads/2019/06/2019-Annual-Survey-Highlights-FINAL.pdf.
[79] CTIA, 2019 Annual Survey Highlights.
[80] Leichtman Research Group, Inc. (LRG), Press Release: "85% of U.S. Households Get an Internet Service at Home" (December 23, 2019), at https://www.leichtmanresearch.com/85-of-u-s-households-get-an-internet-service-at-home/.
[81] CTIA, 2019 Annual Survey Highlights.
[82] All CPI figures were taken from BLS databases: Bureau of Labor Statistics, http://www.bls.gov.
[83] *Id.*
[84] *Id.*
[85] CTIA, 2019 Annual Survey Highlights.
[86] Monica Anderson, "Mobile Technology and Home Broadband 2019" Pew Research Center (June 13, 2019), at: https://www.pewresearch.org/internet/2019/06/13/mobile-technology-and-home-broadband-2019/.
[87] CTIA, 2019 Annual Survey Highlights.

- *Increased Broadband Investment.* According to USTelecom, U.S. broadband providers invested about $75 billion in 2018, up from about $72 billion the year before.[88] Those annual increases in investment followed an overall broadband investment increase of $1.5 billion, or 2%, in 2017 compared to 2016.[89] The wireless industry reported that capital expenditures for 2018 rose to $27,408,097, a 6.5% increase over the year before.[90]

Looking to 2020 and beyond, ongoing and projected developments provide even more indicators of further competitiveness and innovation in the broadband Internet services market. For instance, industry reports identify fiber build-outs across the nation that will continue to expand access to broadband services.[91] Fiber enables gigabit speeds, and it is reported that 23% of Americans can access gigabit service and over 67% can access 500 Mbps services as of the third quarter 2019.[92] Meanwhile, the cable broadband operators' 10G project to upgrade fixed connections with DOCSIS® 4.0 will increasingly deliver gigabit and multi-gigabit speed services in 2021 and 2022.[93] Also, the anticipated launch of next-generation satellites, including by HughesNet and ViaSat, is expected to enable dramatically improved satellite broadband service.[94] Wi-Fi 6 technology is in the initial stages of what will become widespread deployment.

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[88] USTelecom, "Preliminary Data Show Continued Upward Momentum for Broadband Investment," (June 10, 2019), at: https://www.ustelecom.org/preliminary-data-show-continued-upward-momentum-for-broadband-investment/.

[89] *See* Patrick Brogan, Vice President for Industry Analysis, USTelecom, U.S. Broadband Investment Rebounded in 2017 (2018), at: https://www.ustelecom.org/ustelecom-broadband-capital-expenditures-once-again-on-upward-trajectory.

[90] CTIA, 2019 Annual Survey Highlights.

[91] *See, e.g.*, Carl Weinschenk, "C Spire Expanding Fiber Broadband Footprint," Telecompetitor (October 31, 2019), at: https://www.telecompetitor.com/c-spire-expanding-fiber-broadband-footprint/; Bernie Arnason, "Verizon Exec Reveals 5G PON-on-a-Stick Proof of Concept at Calix Connextions," Telecompetitor (October 28, 2019) (reporting Verizon has been building approximately 1,400 route miles of fiber per month, across 60 markets), at: https://www.telecompetitor.com/verizon-exec-reveals-5g-pon-on-a-stick-proof-of-concept-at-calix-connexions/; Mike Robuck, "CenturyLink extends fiber reach in U.S., Europe," FierceTelecom (July 23, 2019), at https://www.fiercetelecom.com/telecom/centurylink-goes-deep-fiber-expansion-u-s-and-europe.

[92] BroadbandNow Research, "The State of Broadband in America, Q3, 2019" (October 23, 2019), at: https://broadbandnow.com/research/q3-broadband-report-2019.

[93] *See, e.g.*, Daniel Frankel, "CableLabs Publishes DOCSIS 4.0 Spec" Multichannel.com (March 26, 2020), at: https://www.multichannel.com/news/cablelabs-publishes-docsis-4dot0-spec. *See also* NCTA, "10G" at: https://www.10gplatform.com (last checked April 13, 2020).

[94] Seth L. Cooper, "Satellite Broadband Services Will Enhance Competition and Reach New Consumers," *The Free State Foundation Blog* (March 14, 2018), at: http://freestatefoundation.blogspot.com/2018/03/satellite-broadband-services-will.html.

And 5G network deployments continue, as total 5G connections in North America will climb to a projected 13.9 million by the end of 2020.[95]

A. Evidence Supports a Finding That Wireless and Wireline Are Reasonable Substitutes for Broadband Internet Service Offerings

When analyzing the substitutability of wireless and wireline, emphasis should be placed on functional similarities from the consumer's perspective rather than differences in technology. In the case of wireless and wireline services, both offer consumers broadband Internet access, and that common capability should prompt the Commission to recognize wireless/wireline substitutability for broadband Internet services.

The differences between mobile and fixed wireless service offerings, while still significant for network providers, are less pronounced for consumers due to IP-centric network convergence. About 60% of global mobile data traffic is expected to be offloaded onto fixed networks by 2022.[96] By that time, a projected 71% of 5G mobile traffic will be offloaded onto fixed networks.[97] Consumers relying on fixed wireline services increasingly are making use of portable, Wi-Fi connected smartphones, tablets, and other devices for access to Internet applications and content. And it is projected that by 2023 approximately 75% of networked devices in North America will be Wi-Fi connected.[98] Proliferation of connected devices and capabilities enabled by cable and fixed wireline networks combined with Wi-Fi 6 will further blur any distinctions perceived by consumers between wireless and wireline.

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[95] 5G Americas, "5G's Year One: Fast Start and Health Growth."
[96] Cisco Systems, Cisco's Visual Networking Index (VNI) (June 6, 2017), at: https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/mobile-white-paper-c11-520862.html.
[97] *Id.*
[98] Cisco, Annual Internet Report (February 18, 2020), at 3, at: https://www.cisco.com/c/en/us/solutions/executive-perspectives/annual-internet-report/index.html.

Importantly, mobile broadband Internet services are now widely capable of providing access to HD or better video content, and consumers are increasingly demanding that capability. A February 2020 report by Sandvine found that video constituted about 65% of downstream global mobile traffic in 2019.[99] A Cisco report forecasted that global mobile video traffic will account for 79% of all mobile data traffic by 2022.[100] And an Ericsson report from June 2019 found that 60% of global mobile traffic in 2018 was for video applications.[101]

The evidence indicates that growing numbers of Internet users view wireless broadband as a substitute or at least as a potential substitute for wireline broadband. A June 2018 survey found 43% of U.S. consumer respondents preferred mobile access or had no technology preference while 47% preferred fixed broadband preference.[102] And an early 2019 survey by Pew Research Center found that 17% of U.S. adults are "smartphone-only Internet users," a share that has doubled since 2013.[103] As previously noted, one fourth of lower-income adults are "smartphone-only" Internet users. Also, 37% of U.S. adults say they mostly use a smartphone when accessing the Internet. Furthermore, demographic factors portend increasing numbers of consumers who rely on mobile broadband as their only subscription service for accessing the Internet. According to a 2017 report by Deloitte Global: "Younger people are roughly twice as likely to rely on cellular for all of their at-home data. In fact, the single biggest demographic

[99] Sandvine, "The Mobile Internet Phenomena Report" (February 2020), at: https://www.sandvine.com/hubfs/Sandvine_Redesign_2019/Downloads/2020/Phenomena/Mobile%20Phenomena%20Report%201H%202020%2020200219.pdf.
[100] Cisco, Visual Networking Index.
[101] Ericsson Mobility Report (June 2019), at: https://www.ericsson.com/49d1d9/assets/local/mobility-report/documents/2019/ericsson-mobility-report-june-2019.pdf.
[102] Internet Innovation Alliance (IIA), “Evolving Preferences: Consumer Preferences Tilting Toward Mobile Broadband” (July 17, 2018), at 4, at: https://internetinnovation.org/wp-content/uploads/IIA_ConsumerPreferences_Whitepaper.pdf.
[103] Monica Anderson, "Mobile Technology and Home Broadband 2019" Pew Research Center (June 13, 2019), at: https://www.pewresearch.org/internet/2019/06/13/mobile-technology-and-home-broadband-2019/.

factor pointing to whether someone will be mobile-only is age."[104] This wireless-only subscribership trend among younger consumers of broadband Internet services echoes the wireless-only trend among younger consumers for voice services observed in Center for Disease Control surveys going back a decade. And Deloitte predicted those same trends would increase as networks transition from 4G LTE to 5G: "Faster speeds and higher caps make wireless-only internet an option for more people. This will only increase as we move to next-generation technologies and networks."[105]

In addition to smartphone-only survey trends indicating a growing number of consumers view wireless and wireline broadband services as substitutes, broadband service providers have recommended the Commission include both fixed and mobile broadband services in the agency's competitive analysis.[106] Commissioner Michael O'Rielly recognized wireless/wireline substitution for broadband services in his statement accompanying the 2018 report and recommended that "[r]eports in future years should recognize increasing competition between mobile and fixed broadband providers, given their substitutability."[107] Commissioner Brendan Carr made a similar acknowledgment in his statement accompanying the *T-Mobile/Sprint Order* (2019): "As the connections become increasingly fast and mobile, all of the connection companies begin competing against each other, injecting competitive pressure into services that increasingly look substitutable."[108]

Comcast's Xfinity Mobile and Charter's Spectrum Mobile offerings are additional cases

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[104] Deloitte Global, "Mobile only: wireless home internet is bigger than you think" (2017), at: https://www2.deloitte.com/content/dam/Deloitte/global/Images/infographics/technologymediatelecommunications/gx-deloitte-tmt-2018-mobile-home-internet-report.pdf.
[105] Deloitte Global, "Mobile only."
[106] *See* Comments cited in 2018 *Communications Marketplace Report* ¶ 171, n. 515.
[107] 2018 *Communications Marketplace Report*, at 180 (Statement of Commissioner Michael O'Rielly).
[108] *T-Mobile/Sprint Order* (2019), at 277 (Statement of Commissioner Brendan Carr).

in point. Both services use hybrid Wi-Fi/cellular mobile networks. Their offerings are likely indistinguishable from the perspective of most mobile broadband Internet service customers.

The nationwide launch of competing advanced 5G services,[109] in particular, should compel the Commission to acknowledge mobile and fixed broadband substitution. According to a 2017 report released by Accenture Strategy, 5G networks promise average speeds of about ten times that of LTE networks, with peak speeds exceeding LTE by perhaps 100 times.[110] The capacity of 5G networks will far exceed minimum speed requirements typically needed for most applications. Popular online video services like Netflix, Hulu, and Amazon Prime require download speeds of not more than 25 Mbps for 4K Ultra HD streaming video, 10 Mbps for HD, and 5 Mbps or less for standard definition.[111] Many video gaming services and other popular Internet applications such as Zoom similarly recommend download minimum speeds of not more than 10 Mbps.[112]

Additionally, due to its significantly enhanced network capacity and speeds, 5G will offer an alternative delivery platform for residential high-speed fixed wireless broadband Internet access services. Aside from Verizon's 5G Home offering, other providers, including AT&T and T-Mobile, have announced plans to provide home broadband via 5G networks.[113]

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[109] *See* Tim Fisher, "When is 5G Coming to the US? (Updated for 2020)," Lifewire (April 1, 2020), at: https://www.lifewire.com/5g-availability-us-4155914.

[110] Sanjay Dhar, Tejas Rao, and Majed Al Amine, "Smart Cities: How 5G Can Help Municipalities Become Vibrant Smart Cities," Accenture Strategy (February 27, 2017), at: https://www.accenture.com/_acnmedia/PDF-43/Accenture-5G-Municipalities-Become-Smart-Cities.pdf#zoom=50.

[111] *See, e.g.*, FCC, Notice of Inquiry, GN Docket No. 19-285, (Statement of Commissioner Jessica Rosenworcel, Dissenting). *See also* Randolph J. May, "A Summer Reading Recommendation for FCC Commissioner Rosenworcel," The Free State Foundation Blog (August 24, 2019), at: http://freestatefoundation.blogspot.com/2019/08/a-summer-reading-recommendation-for-fcc.html.

[112] *See* Zoom, "System Requirements for PC, Mac, and Linux – Zoom Help Center," at: https://support.zoom.us/hc/en-us/articles/201362023-System-Requirements-for-PC-Mac-and-Linux.

[113] *See*, Verizon, "Verizon 5G Home Internet," at: https://www.verizon.com/5g/home/; John Legere, "New T-Mobile: Creating a True Alternative to Fixed Broadband," T-Mobile Blog (March 7, 2019), at: https://www.t-mobile.com/news/new-t-mobile-fixed-broadband-alternative; Tim Fisher, "AT&T 5G: When and Where You Can Get It (Updated for 2020)," Lifewire (March 16, 2020), at: https://www.lifewire.com/att-5g-4178303.

In its *2019 Broadband Deployment Report*, the Commission stated:

> [W]e anticipate that, in the future, mobile services will continue to expand and become more versatile, with technological advances such as 5G potentially allowing mobile services to provide performance characteristics such as speed and service quality that are similar to fixed services.[114]

The Commission should take the further step of recognizing that wireless and wireline are reasonable substitutes for delivery of retail mass market broadband Internet access services.

B. The Commission Should Adopt a Product Market Definition Encompassing Different Technologies That Provide Broadband Internet Services

Commissioner O'Rielly has expressed valid concerns about the Commission's continued reliance on outdated market definitions when assessing today's dynamic market:

> I would posit that the entire foundation of how the government currently views the "communications" market – be it voice, video, or data – is outdated and misguided. . .The problem with such an approach, of course, is that when you narrowly define a marketplace and narrowly recognize competition – far devoid from market realities – the result typically leads to the application of additional regulations or limitations beyond what is necessary to protect consumers.[115]

As Commissioner Carr pointed out, the agency's "mobile telephony/broadband services" product market definition is more than a decade old:

> By sticking with a pre-4G market definition, we miss an essential feature of 5G: the blurring of wired and wireless networks and the enhanced competition that results. While our legacy market definition may track FCCs and antitrust authorities past, it prevents the expert agency Congress created to regulate telecommunications from helping our sister agencies modernize their approach to this technology.[116]

Given widespread and continuing deployment of gigabit-speed fiber, Wi-Fi 6, 5G, and next-generation satellites, traditional market definitions such as the "mobile telephony/broadband

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[114] *2019 Broadband Deployment Report*, at ¶ 11.
[115] Michael O'Rielly, "Remarks of FCC Commissioner Michael O'Rielly Before the Mackinac Center for Public Policy: Smart Regs for Smart Tech: How Government Can Allow Next Gen Internet Networks to Flourish," (June 20, 2018), at: https://docs.fcc.gov/public/attachments/DOC-351816A1.pdf.
[116] *T-Mobile/Sprint Order* (2019), at 276 (Statement of Commissioner Brendan Carr).

services" product market or the "wireline broadband Internet access services" product market are overly narrow and fail to capture the pressures faced by cross-platform providers of broadband Internet services and the effects of those pressures on consumer welfare.

It is likely that wireless and wireline broadband services properly are part of an overall broadband communications market – a broader broadband Internet services product market, if you will. This product market for competitive broadband Internet services should encompass fixed, mobile, and satellite broadband services that can meet the Commission's speed benchmark threshold of 25 Mbps download/3 Mbps upload for "advanced telecommunications capability." The policy implications of recognizing this broader and more realistic product market could be developed over the course of future Commission proceedings.

C. The Commission Should Take Additional Actions to Remove Regulatory Barriers to Broadband Infrastructure Investment and Deployment

In order to build on the pro-investment and pro-adoption momentum that now exists, the Commission should follow through on the following initiatives to remove barriers to investment in next-generation broadband infrastructure and encourage rapid deployment:

- Conduct a timely auction of C-Band spectrum according to the Commission's proposed schedule, including incentives for incumbent satellite operators to make way for terrestrial commercial mobile broadband usage.[117]

- Shore up the *Restoring Internet Freedom Order* by addressing the benefits to public safety communications of Title I reclassification, the statutory basis for Lifeline support of broadband services, and pole attachment issues on remand in *Mozilla v. FCC*.[118]

[117] *See* Expanding Flexible Use of the 3.7 to 4.2 GHz Band, GN Docket No. 18-122, Report and Order and Order of Proposed Rulemaking (released March 3, 2020). *See also* Randolph J. May and Andrew Long, The FCC's C-Band Plan Will Accelerate and Expand 5G Benefits, Perspectives from FSF Scholars, Vol. 15, No. 9 (February 19, 2020), at: https://freestatefoundation.org/wp-content/uploads/2020/02/The-FCCs-C-Band-Plan-Will-Accelerate-and-Expand-5G-Benefits-021920.pdf.

[118] *See* Wireline Competition Bureau Seeks to Refresh Record in Restoring Internet Freedom and Lifeline Proceedings in Light of the D.C. Circuit's *Mozilla* Decision, WC Docket Nos. 17-108, 17-287, 11-42 (released February 19, 2020). *See also* Comments of the Free State Foundation, Restoring Internet Freedom, WC Docket No. 17-108, et al. (April 17, 2020), at: https://freestatefoundation.org/wp-content/uploads/2020/04/FSF-Mozilla-Remand-Comments-Final-041720.pdf.

- Issue a ruling that clarifies aspects of Section 6409(a) of the Spectrum Act regarding non-substantial modifications to towers and base stations to clear away local administrative barriers to wireless infrastructure upgrades.[119]

- Adopt its proposal to update its Over-the-Air Device (OTARD) rule to include hub and relay antennas for fixed wireless signals, thereby prohibiting local restrictions on use of such equipment in areas within a property user's exclusive control.[120]

- Adopt its proposal to pare back legacy "unbundling" regulation "to reflect [competitive] marketplace realities and to remove unnecessary regulatory burdens that can inhibit the deployment of, and transition to, next-generation networks."[121]

IV. The Video Services Market Is Characterized by Effective Facilities-Based Competition and Intermodal Competition From Over-the-Top Providers

The Free State Foundation submitted comments in October 2017 urging the Commission at long last to embrace the fact that "[t]here is clear and convincing evidence that today's nationwide video market is fully and effectively competitive."[122] Developments over the past two and a half years further demonstrate the veracity of that conclusion. New entrants and technology have transformed and expanded the ways that consumers access video content. Four ongoing developments described below tell the story. Two add confirming data points to existing trend lines, and the remaining two provide new evidence that competition – including intermodal

[119] *See* Comments of the Free State Foundation, Implementation of State and Local Governments' Obligation to Approve Certain Wireless Facility Modification Requests Under Section 6409(a) of the Spectrum Act of 2012; WT Docket No. 19-250, et al. (October 29, 2019), at: https://freestatefoundation.org/wp-content/uploads/2019/10/FSF-Comments-–-Obligation-to-Approve-Modification-Requests-Under-Section-6409a-102919.pdf.

[120] Seth L. Cooper, "FCC's Proposed Update to Over-the-Air Device Rule Would Boost 5G," *The Free State Foundation Blog* (May 31, 2019), at: http://freestatefoundation.blogspot.com/2019/05/fccs-proposed-update-to-over-air-device.html.

[121] FCC, Fact Sheet: Modernizing Unbundling and Resale Rules in an Era of Next-Generation Networks and Services, Notice of Proposed Rulemaking – WC Docket No. 19-308 (October 29, 2019), at: https://docs.fcc.gov/public/attachments/DOC-360518A1.pdf.

[122] Comments of the Free State Foundation (filed October 10, 2017), at 1, at: https://freestatefoundation.org//wp-content/uploads/2019/08/FSF-Comments-–-Assessment-of-the-Status-of-Video-Competition-101017.pdf, at 1, Public Notice: "Media Bureau Seeks Comment on the Status of Competition in the Market for the Delivery of Video Programming," DA 17-797, MB Docket No. 17-214 (released August 24, 2017).

competition – abounds. These data points support elimination of old rules that hamstring legacy providers' competitiveness and closure of proceedings that would add new burdens.

A. Traditional MVPDs Continue to Lose Customers

Traditional MVPDs are experiencing ongoing and significant subscriber defections. As Parks Associates pointed out, "Pay-TV's long-reigning dominance has dwindled as the OVD video service market booms."[123] In 2010, cable operators served 59.8 million customers, DBS operators DISH and DIRECTV 33.3 million.[124] According to a recent Leichtman Research Group (LRG) report, in the last ten years those totals have dropped substantially, to 45.8 million for cable and 25.4 million for DBS.[125] In just the last year, the combined subscriber losses of the top seven cable operators, the two DBS operators, and the top three Telco TV providers totaled nearly six million subscribers.[126] The top seven cable operators alone lost 1.56 million subscribers in 2019, compared to 920,000 in 2018. DISH and DIRECTV, meanwhile, lost 3.7 million subscribers in 2019, compared to 2.36 million in 2018. And the top three Telco TV providers lost 665,000 subscribers in 2019, compared to 245,000 in 2018.

B. The Number of OVDs and OVD Subscribers Continues to Grow

While traditional MVPDs shed customers, OVDs' takeover of the viewing experience only gathers steam.[127] Existing providers like Netflix and Hulu are adding more customers,

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[123] Parks Associates, "OTT video services continue to gain ground following success at industry awards" (March 9, 2020), at: https://www.parksassociates.com/blog/article/pr-03092020.

[124] *See Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, MB Docket No. 07-269, Fourteenth Report, FCC 12-81 (2012), "Table 5: MVPD Video Subscribers (in millions)," p. 60.

[125] LRG, Press Release: "Major Pay-TV Providers Lost About 4,915,000 Subscribers in 2019," (March 3, 2020), at: https://www.leichtmanresearch.com/wp-content/uploads/2020/03/LRG-Press-Release-03-03-2020.pdf.

[126] *Id*. The top seven cable operators are Comcast, Charter, Cox, Altice, Mediacom, Cable One, and Atlantic Broadband. The top three Telco TV providers are Verizon FiOS, AT&T U-verse, and Frontier.

[127] *See, e.g.*, Todd Spangler, "Streaming Accounts for 19% of Total TV Viewing With Netflix Leading the Pack, Nielsen Says," Variety (February 11, 2020), at: https://variety.com/2020/digital/news/streaming-video-netflix-total-tv-viewing-nielsen-1203500634/ (reporting that, according to a recent Nielsen study, the amount of time consumers with Internet-connected video devices spent viewing streaming content nearly doubled, from 10 to 19 percent, from the beginning of 2018 to the end of 2019). As consumers spend more time indoors in response to Coronavirus-

recent entrants from major players like Disney+ and Apple TV+ have established major footholds at a record pace, and upcoming launches such as HBO Max on May 27 and NBC's Peacock nationwide on July 15 will further reshape the video landscape.[128] Keeping in mind Parks Associates' report that, as of 2019, "forty-six percent of US broadband households subscribe to two or more OVD services,"[129] available data shows unmistakable OVD subscriber increases:

- Netflix had 58.5 million subscribers in the U.S. at the end of 2018[130] and 60.4 million a year later.[131]
- Hulu, which had 25 million U.S. subscribers in 2018,[132] surpassed the 30 million-subscriber mark in February 2020.[133]
- Although Amazon does not regularly provide video subscriber numbers, it was reported that Amazon Prime Video had 50.23 million video subscribers in the U.S. at the end of 2018, up from 44.99 million the year before.[134]
- Disney+ launched on November 12, 2019. By the end of its first day it had 10 million U.S. subscribers.[135] By the end of that month, 24 million.[136] As of April 2020, that total is 50 million.[137]

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related stay-at-home orders, streaming metrics have increased dramatically. *See, e.g.*, Jess Barnes, "Roku Estimates 39.8M Active Accounts, 49% Increase in Streaming for Q1," Cord Cutters News (April 13, 2020), at: https://www.cordcuttersnews.com/roku-estimates-39-8-active-accounts-49-increase-in-streaming-for-q1/ (reporting that Roku "is … estimating 13.2 billion streaming hours for the first quarter").

[128] *See* Erik Kain, "What's The Difference Between HBO And HBO Max?," Forbes (April 22, 2020), at: https://www.forbes.com/sites/erikkain/2020/04/22/hbo-max-release-date-content-and-so-much-more-revealed-in-two-new-trailers/#441684f42253.

[129] Broadband TV News, "Sharp increase in number of OTT subscribers in the US" (October 4, 2019), at: https://www.broadbandtvnews.com/2019/10/04/sharp-increase-in-number-of-ott-subscribers-in-the-us/.

[130] Michael Liedtke, "Netflix's solid 4Q eclipsed by projected slowing US growth," ABC News (January 17, 2019), at: https://abcnews.go.com/Business/wireStory/netflixs-solid-4q-eclipsed-projected-slowing-us-growth-60453971.

[131] Matthew Heller, "Netflix Subscriber Growth in U.S. Misses Forecast," CFO (January 22, 2020), at: https://www.cfo.com/financial-performance/2020/01/netflix-subscriber-growth-in-u-s-misses-forecast/.

[132] Hulu, Press Release: "Hulu Tops 25 Million Total Subscribers in 2018" (January 8, 2019), at: https://www.hulu.com/press/hulu-tops-25-million-total-subscribers-in-2018/.

[133] *See* Arik Jenkins, "Disney+ reaches 50 million subscribers within 5 months," Fortune (April 8, 2020), at https://fortune.com/2020/04/08/disney-plus-subscribers/.

[134] Stephen Lovely, "The Streaming Services With the Most Subscribers – and How They Got Here," The Motley Fool (November 9, 2018), at: https://www.fool.com/investing/2018/11/09/the-streaming-services-with-the-most-subscribers-a.aspx.

[135] Natalie Jarvey, "Disney+ Hits 28.6 Million Paid Subscribers Since Launch," The Hollywood Reporter (February 4, 2020), at: https://www.hollywoodreporter.com/news/disney-hits-265-million-paid-subscribers-launch-1276320.

[136] Todd Spangler, "Disney Plus Signed Up 24 Million U.S. Subscribers in November and Took Bite Out of Netflix, Analysts Estimate," Variety (December 18, 2019), at: https://variety.com/2019/tv/news/disney-plus-24-million-us-subscribers-netflix-q4-churn-1203447210/.

[137] *See* Arik Jenkins, "Disney+ reaches 50 million subscribers within 5 months," Fortune (April 8, 2020), at https://fortune.com/2020/04/08/disney-plus-subscribers/.

- Apple TV+ launched on November 1, 2019, and by the end of the year had amassed 33.6 million subscribers.[138]
- CBS All Access and Showtime's streaming services reached 10 million subscribers combined by the end of 2019.[139]

In addition, we are witnessing the emergence of innovative products that disrupt further the ways by which content is consumed. A good example is Quibi, which launched on April 6. Quibi "tells stories in 'chapters,' no longer than 10 minutes each, and is available only on mobile devices."[140] Access to video on smartphones is increasing rapidly,[141] and Quibi is targeting that growing segment. The Quibi app was downloaded 300,000 times the day it was released, a total second only to that of Disney+.[142] By the end of its first week, downloads reached 1.7 million.[143]

Furthermore, as the 2018 report observed, some OVD subscribers also view over-the-air broadcast TV for additional content choices.[144] Indeed, Parks Associates found that 25% of U.S. broadband households watched local broadcast TV channels in 2019, up from 18% in 2018.[145]

C. vMVPDs Effectively Compete With Traditional MVPDs

[138] Todd Spangler, "Apple TV Plus May Have More Than 33 Million Users But 'Vast Majority' Aren't Paying for It, Researcher Says," Variety (January 24, 2020), at: https://variety.com/2020/digital/news/apple-tv-plus-33-million-users-free-year-subscribers-1203478683/.
[139] Elaine Low, "CBS All Access, Showtime OTT Reach 10 Million Collective Subscribers," Variety (January 12, 2020), at: https://variety.com/2020/tv/news/cbs-all-access-showtime-10-million-subscribers-tca-1203464443/.
[140] Kelly Gilblom, "Quibi Launch Is Dwarfed by Disney+ Rollout, But Tops All Others," Bloomberg (April 7, 2020), at: https://www.bloomberg.com/news/articles/2020-04-07/quibi-launch-is-dwarfed-by-disney-rollout-but-tops-all-others.
[141] *See, e.g.*, David Bauder, "Study shows explosive growth in time spent streaming TV," ABC News (February 12, 2020), at: https://abcnews.go.com/Lifestyle/wireStory/study-shows-explosive-growth-time-spent-streaming-tv-68940265 (noting that, according to a recent Nielsen study, consumer interaction with media in the past year increased by nearly an hour and a half – and that "[s]martphone usage accounts for virtually all of the increase").
[142] *Id*.
[143] Lauren Feiner, "Meg Whitman says Quibi reached 1.7 million downloads in first week," CNBC (April 13, 2020), at: https://www.cnbc.com/2020/04/13/meg-whitman-says-quibi-reached-1point7-million-downloads-in-first-week.html.
[144] 2018 Report, at ¶ 114.
[145] Parks Associates, Press Release: "TV antenna usage in US broadband households jumped to 25% in 2019 and is expected to grow more as COVID-19 keeps users at home" (March 26, 2020), at: http://www.parksassociates.com/blog/article/pr-03262020.

The current pay-TV marketplace looks nothing like that which existed when the FCC adopted the bulk of its legacy regulations. Back then, consumers had only one option: cable. Today that is not at all the case. Nearly all U.S. consumers long have been able to choose between three traditional MVPDs: their local cable provider and two nationwide DBS operators, DISH and DIRECTV. And in many areas, local telephone companies provide a fourth option. As a result, the traditional MVPD marketplace has been competitive for many years. More recently, the rapid entry and growth of vMVPDs has transformed radically the pay-TV landscape.

"Virtual MVPDs" (vMVPDs), which include YouTube TV, Sling TV, Hulu + Live TV, AT&T TV and AT&T TV Now, fuboTV, Layer3 TV, philo, and Pluto TV, provide a comprehensive substitute to cable, DBS, and Telco TV packages. Their offerings include on-demand and live content, linear channels, and local broadcast TV stations, as well as cloud-based DVR capabilities and other comparable features. However, vMPVDs are different in two key respects: one, they don't necessarily control the underlying transmission medium, and two, they don't face similar FCC regulation.

Free from the deployment and maintenance costs, FCC regulation, as well as permitting, administrative requirements, and other burdens that go hand-in-hand with the ownership of facilities, vMVPDs can offer services nationwide with relative ease. As the above list demonstrates, a large number already do, significantly expanding the number of pay-TV options available to consumers. Additional entry undoubtedly will continue.

As a result, vMVPDs are enjoying significant and rapid subscriber growth. Data on just the top two vMVPDs (Hulu + Live TV and Sling TV) reveal nearly 1.7 million new subscribers

– a 29% increase – in 2019 alone.[146] Sling TV, which launched in 2015, had nearly 2.6 million subscribers at the end of 2019.[147] Hulu + Live TV joined the fray in 2017. It had 3.2 million subscribers by the end of 2019.[148] YouTube TV also debuted in 2017. As of February 2020, it had over 2 million subscribers.[149] Notably, vMVPDs are gaining customers at the expense of traditional providers: according to one report, "about 40% of consumers who dropped their subscription [to a traditional MVPD] signed up for a vMVPD service."[150] At the end of last year, vMVPDs served 7.8% of pay-TV customers – up from 4.5% only three months earlier.[151]

D. Video Marketplace Trends Increasingly Favor vMVPD Offerings Over Traditional, Facilities-Based MVPD Services

Once upon a time, a viable video distribution operation needed to control the underlying facilities, whether hybrid fiber-coaxial networks, satellites, or fiber and/or twisted-pair copper loops. Based on the perception that transmission media constituted a finite, essential facility, Congress and the FCC imposed regulatory safeguards on facilities-based MVPDs. But the landscape has changed radically. Recent developments suggest that facility ownership does not provide a significant competitive advantage, as more vMVPDs successfully go "over the top."

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[146] LRG, Press Release: "Major Pay-TV Providers Lost About 4,915,000 Subscribers in 2019," (March 3, 2020), at: https://www.leichtmanresearch.com/wp-content/uploads/2020/03/LRG-Press-Release-03-03-2020.pdf.

[147] *Id*. Sling TV's numbers were up 400,000 from 2.2 million as of year end 2018, which was the first time DISH separately reported Sling TV subscribers. *See* Robert Briel, "DISH Network announces Sling TV subscriber numbers," Broadband TV News (February 21, 2018), at: https://www.broadbandtvnews.com/2018/02/21/dish-network-announces-sling-tv-subscriber-numbers/.

[148] Cynthia Littleton, "Disney Plus Reaches 28.6 Million Subscribers, Hulu Hits 30.4 Million," Variety (February 4, 2020), at: https://variety.com/2020/tv/news/disney-plus-reaches-26-5-million-subscribers-1203492187/ (noting that "that number has nearly doubled in the past year from 1.7 million").

[149] Ben Munson, "Google says YouTube TV has over 2M paid subscribers," Fierce Video (February 4, 2020), at: https://www.fiercevideo.com/video/google-says-youtube-tv-now-has-over-2m-paid-subscribers.

[150] *See, e.g.*, Brad Adgate, "Virtual MVPD Subscriber Growth Is Slowing," Forbes (December 9, 2019), at: https://www.forbes.com/sites/bradadgate/2019/12/09/virtual-mvpd-subscriber-growth-is-slowing/#7a08674f7016.

[151] *See* LRG, Press Release: "Major Pay-TV Providers Lost About 4,915,000 Subscribers in 2019," (March 3, 2020), at: https://www.leichtmanresearch.com/wp-content/uploads/2020/03/LRG-Press-Release-03-03-2020.pdf, LRG, Press Release: "Major Pay-TV Providers Lost About 1,740,000 Subscribers in 3Q 2019," (November 13, 2019), at: https://www.leichtmanresearch.com/major-pay-tv-providers-lost-about-1740000-subscribers-in-3q-2019/. LRG reports subscriber data for three vMVPDS: Hulu + Live TV, Sling TV, and AT&T TV Now.

Indeed, in a growing number of instances, factors such as improving technology, evolving consumer preferences, and decreasing margins appear to be driving facilities-based providers away from their legacy offerings in favor of vMVPD services.[152] In some instances the facility owner controls the vMVPD, but in others it partners with a third-party provider. The most high-profile examples involve AT&T's DIRECTV and U-verse. AT&T has announced that it (1) will no longer sell the latter to new customers,[153] and (2) intends to offer the former only "'where it has a rightful place,'" that is, "in rural and less-dense suburban markets."[154] Instead, it is focusing on AT&T TV NOW, its existing vMPVD offering, and on AT&T TV, its new vMVPD service. According to John Stankey, President and COO of AT&T and CEO of WarnerMedia, "'in terms of terms of our marketing muscle and momentum in the market it will be about software-driven pay-TV packages.'"[155]

Google Fiber is embracing a similar strategy. Having declared that it "is ready to challenge the status quo, to finally come right out and say it: customers today just don't need traditional TV,"[156] Google Fiber has stopped signing up new customers for its linear TV product.

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[152] *See, e.g.*, Alex Sherman, "The future of cable may be no TV at all, as one small company from Arizona shows," CNBC (March 3, 2019), at: https://www.cnbc.com/2019/03/03/cable-future-may-not-include-tv-as-cable-one-shows.html (reporting that Cable One CEO Julie Laulis said the following: "we don't put time and resources into pretty much anything having to do with video because of what it nets us and our shareholders in the long run").
[153] *See* Jeff Baumgartner, "AT&T halts sale of U-verse TV," Light Reading (April 3, 2020), at: https://www.lightreading.com/cable-video/atandt-halts-sale-of-u-verse-tv-/d/d-id/758688. *See also* AT&T U-verse Official Site, at: https://www.att.com/u-verse-tv/ ("Important U-verse TV update: Current U-verse TV customers will continue to experience the same great service, however new U-verse TV packages can no longer be purchased.").
[154] Jeff Baumgartner, "AT&T aims to keep selling DirecTV 'where it has a rightful place,'" Light Reading (March 3, 2020), at: https://www.lightreading.com/cable-video/atandt-aims-to-keep-selling-directv-where-it-has-a-rightful-place-/d/d-id/757959.
[155] *Id*.
[156] Google Fiber Product News, "Great Internet = Great TV" (February 4, 2020), at: https://fiber.google.com/blog/2020/great-internet-great-tv/.

Instead, it has partnered with two vMVPDs, YouTube TV (which, like Google Fiber, is a subsidiary of Alphabet) and fuboTV.[157]

This trend reveals the decreasing significance of facility ownership to success in the market. It also likely will further expand vMVPDs' share of total MVPD subscribers.

E. The Commission Should Remove Outdated and Costly Legacy Video Regulations and Close Proceedings That Would Impose Added Burdens

The predicates for legacy, one-sided regulations no longer exist. In order to establish a level playing field and unleash the potential of all players in the video market, including traditional MVPDs,[158] the Commission must embrace the logical conclusion that competitive forces can, and should be allowed to, guide behavior efficiently.

The Commission's regulations that apply only to traditional MVPDs ought to be removed – and not extended to new entrants. Effective competition calls for less government oversight, not more. It follows, then, that the time is ripe for the Commission to accelerate its deregulatory agenda. Accordingly, and in connection with its "Modernization of Media Regulation" initiative,[159] the Commission should continue to remove – or at least relax – its legacy video rules. For example, it is time to eliminate the network non-duplication and syndicated exclusivity regulations. National broadcast TV networks, local network affiliates, and MVPDs all are

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[157] *Id*. CenturyLink is another example. In early 2018 it stopped signing up new customers for its linear Prism TV offering. *See* Daniel Frankel, "CenturyLink no longer working to expand Prism TV service," Fierce Video (April 10, 2018), at: https://www.fiercevideo.com/cable/centurylink-no-longer-working-to-expand-prism-tv-service ("'Due to emerging market trends in video content and delivery, we do not plan to expand our Prism TV service offering,' CenturyLink spokesperson Francie Dudrey told Fierce, in a statement delivered at the NAB Show yesterday.").

[158] *See* Remarks of FCC Commissioner Michael O'Rielly before the Massachusetts Broadcasters Association's Sound Bites 2019 Event (November 14, 2019), at: https://docs.fcc.gov/public/attachments/DOC-360832A1.pdf, at 4 ("The goal is not simply to deregulate for the sake of deregulating an overburdened industry, although that would be reason enough and wholly appropriate. This is about removing unnecessary barriers imposed on traditional, regulated industries so they can better compete with new high-tech entrants to the video and audio marketplace.").

[159] Public Notice, "Commission Launches Modernization of Media Regulation Initiative," FCC 17-58, MB Docket No. 17-105 (released May 18, 2017), at: https://www.fcc.gov/document/commission-adopts-public-notice-modernize-media-rules.

sophisticated business entities capable of contracting for carriage rights. That fact is highlighted by the proven ability of vMVPDs to enter broadcast carriage deals outside the scope of these rules. Traditional MVPDs should be afforded that same opportunity.

The Commission also should eliminate regulatory uncertainty and prevent further marketplace distortion by terminating open proceedings that could impose additional obligations. In a November 2019 speech, Commissioner O'Rielly urged that "Zombie Proceedings," such as the MVPD reclassification and AllVid rulemakings, be "'killed off.'"[160] We agree.

Section 629 requires that the FCC sunset its navigation device rules when it determines: (1) the market for MVPDs is "fully competitive"; (2) the market for converter boxes, and interactive equipment used for MVPDs services is "fully competitive"; and (3) "elimination of the regulations would promote competition and the public interest."[161] As described in detail above, traditional MVPDs are subject to effective competition from both vMPVDS and OVDs. Device choice, meanwhile, continues to expand. Cable companies, which are subject to the bulk of regulation under Section 629,[162] support retail CableCARD equipment and make their services available on an increasing universe of customer-owned devices: Apple iOS and Android mobile devices,[163] Smart TVs (Samsung, LG),[164] streaming devices (Amazon Fire[165] and Roku[166]), and

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[160] Remarks of FCC Commissioner Michael O'Rielly before the Massachusetts Broadcasters Association's Sound Bites 2019 Event, at 4.
[161] 47 U.S.C. § 549(e).
[162] *See, e.g.*, 47 CFR § 76.1204 (requiring cable operators to support separated security), 47 CFR § 76.1205 (specifying how cable operators are to support CableCARDs).
[163] *See* Comcast, "Xfinity Stream App Minimum System Requirements," at https://www.xfinity.com/support/articles/xfinity-tv-app-requirements.
[164] *See* Comcast, "Xfinity Stream App on Xfinity TV Partner Devices FAQs," at: https://www.xfinity.com/support/articles/xfinity-stream-beta-app-faqs ("Comcast is working with equipment manufacturers to bring the Xfinity Stream app to compatible Roku devices, Samsung Smart TVs, LG Smart TVs and other Partner Devices.").
[165] *See* Comcast, "Amazon Device Requirements," at: https://www.xfinity.com/support/#Amazon.
[166] *See* Spectrum, "Explore Spectrum TV for Roku," at: https://www.spectrum.net/support/tv/explore-new-spectrum-tv-app-roku ("The Spectrum TV channel for Roku players and Roku TVs allows you to watch live TV, browse TV Guide listings and choose from hundreds of On Demand titles."). The Spectrum TV app also is available for use on

gaming consoles.[167] Both vMVPDs and OVDs can be accessed on many of those same devices, as well as others.[168] In fact, many OVD services do not offer their own branded devices, instead relying exclusively on third-party equipment. The triggering conditions for Section 629's sunset requirement have been met. The Commission should eliminate unnecessary, one-sided burdens that result in higher costs for consumers.[169]

V. Conclusion

For the foregoing reasons, the Commission should act in accordance with the views expressed herein.

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compatible Apple iOS, Android, Amazon Fire, Samsung Smart TV, and Microsoft Xbox devices. *See* Spectrum, "Spectrum TV App: Download and Get Started," at: https://www.spectrum.net/page/spectrum-tv-app.

[167] *See* Optimum, "Altice One App," at: https://www.optimum.net/pages/alticeone/app.html (noting that the Altice One App is "[a]vailable for iPad iPhone, iPod Touch, Android, and Kindle Fire").

[168] *See, e.g.*, YouTube TV, "Supported Devices," at: https://tv.youtube.com/learn/devices/ ("YouTube TV works with streaming media players including Google Chromecast, Apple TV, and Roku players & TVs. There are also YouTube TV apps for smart TVs and game consoles."); Netflix, "What devices can I use to stream Netflix?," at: https://help.netflix.com/en/node/14361 ("You can stream Netflix from any Internet-connected device that offers a Netflix app, such as gaming consoles, DVD and Blu-ray players, Smart TVs, set-top boxes, home theater systems and mobile phones and tablets.").

[169] *See, e.g.* Jeff Baumgartner, "Bill Seeks To End 'Unnecessary and Costly' Set-Top Security Ban," Multichannel News (Sep. 26, 2013), at: https://www.multichannel.com/news/bill-seeks-end-unnecessary-and-costly-set-top-security-ban-357418 ("Rep. Robert Latta (R-Ohio) and Rep. Gene Green (D-TX) on Thursday introduced legislation that aims to "remove the unnecessary and costly" set-top security integration ban that took effect more than six years ago, presenting an estimate that the FCC mandate has cost cable operators and consumers more than $1 billion.").