

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

In the Matter of

GN Docket No. 17-199

Inquiry Concerning Deployment of Advanced  
Telecommunications Capability to All Americans  
in a Reasonable and Timely Fashion

**COMMENTS OF THE OPEN TECHNOLOGY INSTITUTE AT NEW AMERICA**

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## Executive Summary

In the current proceeding, the Commission should adopt forward-looking goals that ensure all Americans have access to robust broadband service. In these comments, the Open Technology Institute at New America explains why mobile BIAS is not a substitute for fixed BIAS and how spectrum sharing and increasing throughput benchmarks helps achieve the goal of broad, nationwide deployment of advanced telecommunications capability.

OTI strongly opposes the notion that mobile BIAS is a substitute for fixed BIAS. Mobile BIAS is typically more expensive, less reliable (especially in rural areas), slower, and subject to data caps and expensive overage fees. Moreover, mobile BIAS is typically accessed on devices with smaller screens and limited computational abilities that cannot complete the full range of functions of a desktop or laptop computer. Consumer behavior also shows that they do not view mobile BIAS as a replacement for fixed BIAS, as there is no recognizable trend showing Americans buying mobile BIAS while abandoning fixed BIAS. Mobile BIAS does not yet constitute “advanced telecommunications capability” and is, at best, a *complement* to fixed BIAS—not a replacement. As such, OTI urges the Commission to encourage deployment of Mobile BIAS in rural and other underserved areas through its proceedings on the 3.5 GHz Citizens Broadband Radio Service band and fixed wireless services in the 3700 - 4200 MHz band.

Lastly, the Commission should continue to steadily increase its speed benchmarks to reflect the changing nature of BIAS. In the last section 706 proceeding, OTI recommended a new benchmark of 50 Mbps/20 Mbps to reflect the new landscape. Since then, use of bandwidth-intensive applications has continued to grow, making robust speed benchmarks even more important. There is also extensive evidence that broadband throughput has improved rapidly. The Commission should establish benchmarks that recognize these improvements.

## I. Introduction

New America's Open Technology Institute has contributed to Section 706 Inquiry proceedings multiple times.<sup>1</sup> Those prior comments have followed similar themes. First, the phrase "advanced telecom capability" is a forward-looking concept and it would be inappropriate for the Commission merely to look backward and set the standard at what most or all consumers already access.<sup>2</sup> It is in that spirit that the Commission, as part of its National Broadband Plan in 2009, set a goal of getting 100 million households connected to broadband with a throughput of 50 Mbps download and 20mbps upload by 2015. Unfortunately, this goal continues to be unmet even for 200 Kbps connections.<sup>3</sup>

Second, the Commission should endeavor to steadily increase its benchmarks to reflect the changing nature of consumer needs. Specifically, OTI argued in the most recent 706 inquiry that the Commission should increase its fixed BIAS benchmark to 50 Mbps download and 20 Mbps upload immediately with a plan to reach a symmetrical benchmark in the near future. OTI also argued that the Commission should adopt a fixed BIAS latency threshold of 50ms that would trigger a broader investigation into other quality of service metrics like packet loss and jitter.

Third, OTI argued that the Commission should monitor mobile connections, perhaps consider adopting a 10 Mbps download and 1 Mbps upload mobile BIAS benchmark, and include data caps in assessing whether advanced telecom capability is being deployed.<sup>4</sup> OTI's prior

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<sup>1</sup> Comments of New America's Open Technology Institute, Dkt. 16-245, Sept. 6, 2016 (attached herein as Appendix A) ("2016 OTI Comments"); Reply Comments of the Open Technology Institute at New America, Dkt. 14-126, Sept. 19, 2014.

<sup>2</sup> 2016 OTI Comments at 2.

<sup>3</sup> *Internet Access Services: Status as of June 30, 2016*, Federal Communications Commission (April 2017), [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-344499A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-344499A1.pdf) at 30 (see figure 32 showing that only 55,718,000 households have access to 25mbps/3mbps, and that the 100 million household goal still remains unmet for 200 Kbps speeds).

<sup>4</sup> See *generally* 2016 OTI Comments.

comments went into great detail about why the Commission should adopt these benchmarks, and they are attached as an appendix to this set of comments as they remain relevant and true today.

This year's Section 706 Notice of Inquiry (NOI) proposes a dramatic change in how Section 706 proceedings are handled. The Commission proposes to focus this inquiry "on whether *some form* of advanced telecommunications capability, be it fixed *or* mobile, is being deployed to all Americans in a reasonable and timely fashion."<sup>5</sup> This proposed focus is inappropriate for a variety of reasons, including differences between throughput and quality of service between fixed and mobile BIAS. Further, OTI continues to support throughput benchmarks for fixed BIAS, as well as a latency metric that would trigger a larger investigation into quality of service if not met.<sup>6</sup>

## **II. Mobile and Fixed BIAS Are Complementary Services, Not Substitutes**

The questions posed by the NOI presuppose that mobile and fixed BIAS are substitutes for each other. However, as the Commission has previously found, and as most consumers understand, the two services serve distinct purposes with very different capabilities. Mobile BIAS is not an adequate substitute for fixed BIAS. First, mobile-only broadband access would be insufficient for primary home or business use. Second, consumer behavior shows that the two services are not viewed as substitutes.

Mobile BIAS is not a substitute for fixed BIAS. "Advanced telecommunications capability" requires a broadband connection that allows for users to originate and receive high-quality voice, data, graphics, and video.<sup>7</sup> But on a purely mobile connection, a business or family would not have adequate capabilities. A contrary finding by the Commission would fail to take into account

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<sup>5</sup> *Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, GN Docket No. 17-199, FCC 17-109, ¶ 9 (Aug. 8, 2017), [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2017/db0808/FCC-17-109A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0808/FCC-17-109A1.pdf) ("NOI").

<sup>6</sup> *Id.*

<sup>7</sup> 47 U.S.C. § 1302(d)(1).

the realities of how consumers and businesses view mobile BIAS compared to fixed BIAS, the differences in the capabilities of mobile and fixed BIAS networks, and the great disparity in the cost and data capacities of mobile networks versus fixed wireline networks. The Commission found in its *2016 Broadband Progress Report* that “fixed and mobile broadband are often used in conjunction with one another and, as such, are not functional substitutes.”<sup>8</sup> Access to mobile BIAS without access to a high-capacity fixed BIAS (of at least 25 Mbps download and 3 Mbps upload) does not provide adequate connectivity for Americans to work, learn, communicate with friends and family, telecommute, engage fully in civic life, or participate in the modern economy. Therefore, mobile BIAS should not be considered “advanced telecommunications capability” on its own.

#### **A. Mobile BIAS is Inadequate For Primary Home or Business Use**

The Commission makes many assumptions when it proposes to focus its Section 706 inquiry on whether Americans have access to fixed *or* mobile BIAS. The Commission’s assumptions fail because mobile BIAS, unlike fixed BIAS, is inadequate for primary home or business use for several reasons: (1) consumers use significantly more data over fixed BIAS than mobile BIAS allows given data caps or thresholds (“soft caps”); (2) consumers would likely incur significant overage costs if they were to use as much data over mobile as they do fixed BIAS; (3) there are significant differences between mobile and fixed BIAS average throughput; and (4) mobile BIAS tends to be much less reliable and resilient than fixed BIAS.

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<sup>8</sup> 2016 *Broadband Progress Report*, 31 FCC Rcd 699, ¶ 24 (Jan. 28, 2016), [https://apps.fcc.gov/edocs\\_public/attachmatch/FCC-16-6A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-6A1.pdf) (“2016 *Broadband Progress Report*”).

## **1. Consumers on Average Consume Far More Broadband Data over Fixed BIAS Than they Do Over Mobile BIAS**

One significant reason mobile BIAS is an insufficient substitute for fixed BIAS is the substantial amount of data used per household over fixed broadband connections on average and the relatively restrictive data caps or thresholds that mobile carriers impose on their customers. One would expect that if the services were substitutes, a household could make the same or substantially similar uses of the internet over both platforms. Consumers, however, are unable to make similar uses of these services.

Households consume vast amounts of data over their fixed broadband connections. In 2016, U.S. households averaged 190 Gigabytes per month over fixed BIAS. That number is rising steadily since “average monthly broadband usage [will] increase substantially moving forward.”<sup>9</sup> Given the growth of high-bandwidth online services,<sup>10</sup> as well as home broadband uses such as running an online business, or even accessing everyday financial, health, information, education, and government services that are increasingly online, this upward trend is expected.

Mobile BIAS connections almost always come with data caps or thresholds. The nation’s top two mobile carriers, AT&T and Verizon, both offer customers 22 Gigabytes of data per month

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<sup>9</sup> Joan Engebretson, *iGR: Average Monthly Broadband Usage is 190 Gigabytes Monthly Per Household*, Telecompetitor (Sept. 26, 2016), <http://www.telecompetitor.com/igr-average-monthly-broadband-usage-is-190-gigabytes-monthly-per-household> (citing to a subscription-only report from iGR Research, [https://igr-inc.com/advisory-subscription-services/wireless-mobile-landscape/us\\_home\\_broadband\\_wifi\\_forecast\\_2020.asp](https://igr-inc.com/advisory-subscription-services/wireless-mobile-landscape/us_home_broadband_wifi_forecast_2020.asp)); James K. Wilcox, *How Easy Is It to Burn Through a 1TB Data Cap?*, Consumer Reports (Oct. 19, 2016), <https://www.consumerreports.org/telecom-services/how-easy-to-burn-through-1TB-data-cap> (“Of course, a downside to even a generous data cap is that while it might be sufficient for current usage, all evidence points to U.S. consumers using more broadband data every year. What seems like a huge amount of data now could feel restrictive a few years down the line. One reason broadband usage is accelerating is the proliferation of devices inside the home that all want access to the Internet.”).

<sup>10</sup> See Appendix A and Section III below.

(as part of their “unlimited data” packages) before throttling their connections.<sup>11</sup> In other words, even allegedly “unlimited” mobile service plans are not truly unlimited and in fact constitute only a small fraction of the amount of data consumers expect and consume over fixed BIAS. For instance, AT&T’s caps for fixed BIAS (ranging from 300 Gigabytes to 1 Terabyte depending on throughput speed) are roughly 13 to 45 times more than the 22 GB limit AT&T and Verizon’s mobile data services provide consumers.<sup>12</sup>

Consumers expecting to substitute mobile BIAS for fixed BIAS may confront difficult choices. Once the customer hits their provider’s “soft” data cap, they either must endure their service slowing to a crawl, thus making it difficult to use various online applications or services, or they must absorb a far more expensive bill. Many families and individuals are forced to ration their use of mobile apps during the waning days of a billing cycle (potentially only being able to use their service for email, but not video streaming), but at least most can achieve that functionality when they get home if they subscribe to a fixed BIAS connection. However, the “13 percent of Americans across all demographic groups [that] are relying solely on smartphones” for internet access referred to in the NOI are not able to rely on a fixed BIAS connection at home in the final days of their billing cycle.<sup>13</sup>

Consumers who rely on mobile BIAS as their sole means of connectivity are at a major disadvantage when it comes to telecommuting, accessing education and information services, and providing the connection necessary for entertainment and government-related information due to

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<sup>11</sup> *AT&T Shop Unlimited Data Plans*, AT&T (2017), <https://www.att.com/plans/unlimited-data-plans.html>; *The new Verizon Plan*, Verizon Website (2017), <https://www.verizonwireless.com/support/new-verizon-plan-unlimited-faqs/>

<sup>12</sup> Jon Brodtkin, *AT&T boosts data caps for home Internet and steps up enforcement*, *Ars Technica* (March 29, 2016), <https://arstechnica.com/information-technology/2016/03/att-boosts-data-caps-for-home-internet-and-steps-up-enforcement/>; see also XFINITY Terabyte Internet Data Usage Plan Frequently Asked Questions, <https://dataplan.xfinity.com/faq>.

<sup>13</sup> NOI at ¶ 19.

the restrictions of carriers' data plans detailed above. In its *2016 Broadband Progress Report*, the Commission recognized the limitations that mobile data caps impose on consumers who must rely on the service for their work, noting that “data-intensive activities such as telecommuting or the highest-quality multimedia experiences are generally inappropriate for mobile devices.”<sup>14</sup>

## **2. Data Costs Significantly More over Mobile BIAS than over Fixed BIAS**

The cost of mobile broadband data is prohibitively high compared to fixed broadband connections for the average family or small business. Mobile broadband costs 37 times more per month than fixed broadband on a data allotment basis in 2017 and costs 14 times more than fixed broadband on a usage basis.<sup>15</sup> Research from Point Topic shows the median residential broadband price in the U.S. was \$80 per month during the second quarter of 2017.<sup>16</sup> Meanwhile, the limited amount of data (22 GB) advertised as “unlimited” by AT&T and Verizon cost \$60 and \$75 a month, respectively, per line.<sup>17</sup>

It would be unreasonable to expect mobile broadband offerings to satisfy a user relying on their home broadband for an average 190 GB monthly for work, basic online services, and entertainment. For such a user, depending on mobile BIAS would likely bring massive overage charges and/or extremely slow services once the customer goes over their cap and the carrier slows their service.<sup>18</sup> In a dramatic example of this phenomenon, Verizon recently and suddenly

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<sup>14</sup> *2016 Broadband Progress Report* at ¶ 29.

<sup>15</sup> Kyung Mun, *Industry Voices—Mun: Mobile pricing drops from \$9/GB to \$1.80/GB in just 1 year*, Fierce Wireless (Aug. 15, 2017), <http://www.fiercewireless.com/wireless/industry-voices-mun-mobile-pricing-drops-from-9-gb-to-1-80-gb-just-1-year> (comparing on a dollar-per-gigabyte basis fixed and mobile BIAS, Fierce Wireless calculated that it costs 5 cents per gigabyte of data for fixed broadband, compared to \$1.80 per gigabyte of data for mobile broadband based on data allotment).

<sup>16</sup> Carl Weinschenk, *Report: U.S. Median Broadband Price is \$80 Monthly*, Telecompetitor (Aug. 8, 2017), <http://www.telecompetitor.com/report-u-s-median-broadband-price-is-80-monthly/>

<sup>17</sup> AT&T and Verizon websites.

<sup>18</sup> *FCC Broadband Progress Report* ¶ 41 (“Consumers that are dependent solely on mobile broadband are significantly more likely to exceed their monthly data allowances, causing them to incur additional fees or forego use of the Internet.”).

cut off mobile internet access to roughly 8,500 rural users in 13 states because the customers used too much data. In one instance, a family of four had never used more than 50 GB per month.<sup>19</sup> With carriers cutting off customers for using significantly less than 190 GB per month of data, mobile BIAS would not adequately substitute for fixed BIAS.

Telecommunications industry analyst Craig Moffett has found that consumers cannot reasonably depend on mobile BIAS largely because of data constraints in mobile carriers' offerings and the cost mobile users incur as a result. "It's not hard to understand why" just 6 to 7 percent of consumers are wireless-only, "[c]ellular broadband typically offers lower speeds and weaker reliability than its wireline counterparts."<sup>20</sup> He also noted that wireless customers are on metered data plans that penalize overages with heavy fees or that dramatically slow data speeds.

While AT&T, Verizon, Sprint, and T-Mobile all offer hotspot functionality for laptops or other devices, tethering comes with significant constraints. For one, some providers charge an additional fee for tethering.<sup>21</sup> Further, AT&T, Sprint, and Verizon allow up to only 10 GB of LTE data per line before slowing speeds to 2G or 3G speeds, and T-Mobile offers a similar limit.<sup>22</sup> The limitations to hotspots' ability to offer reliable internet access are even more of a hindrance to adequate internet access and usage than the already-strained mobile BIAS.

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<sup>19</sup> Jon Brodtkin, *8,500 Verizon customers disconnected because of "substantial" data use*, Ars Technica (Sep. 15, 2017), <https://arstechnica.com/information-technology/2017/09/verizon-kicks-8500-rural-customers-off-network-for-using-roaming-data>.

<sup>20</sup> Karl Bode, *Unlimited Wireless No Threat to Fixed ISPs (Yet), Analyst Says*, DSL Reports (April 17, 2017), <http://www.dslreports.com/shownews/Unlimited-Wireless-No-Threat-to-Fixed-ISPs-Yet-Analyst-Says-139362>.

<sup>21</sup> See T-Mobile Internet and E-Mail offers, [https://www.t-mobile.com/shop/addons/Services/information.aspx?PAsset=InternetEmail&tp=Svc\\_Tab\\_HotSpot&tsp](https://www.t-mobile.com/shop/addons/Services/information.aspx?PAsset=InternetEmail&tp=Svc_Tab_HotSpot&tsp), ("Turn your phone into a Mobile HotSpot: \$14.99 per month Turn your smartphone into a mobile hotspot with the Smartphone Mobile HotSpot service. Share your phone's high-speed internet connection on the go with up to five Wi-Fi devices (tablet, e-reader, laptop, portable gaming device, and more) all at the same time—no coffee shop or hotel Wi-Fi needed.").

<sup>22</sup> MoffettNathanson Research, *U.S. Cable and U.S. Telecom: Could Unlimited Wireless Plans Pose A Threat to Wired Broadband?* (April 12, 2017) at 10 ("MoffettNathanson Report").

Americans living in sparsely-populated parts of the country also have fewer—if any—choices for 4G/LTE mobile BIAS, as the Commission’s own data shows. The limited number of providers in large portions of the country also hinder deployment of mobile BIAS, which could strengthen the service toward becoming an adequate substitute for fixed BIAS in the future. The Commission should use its Section 706 authority to create policies that help competitors deploy infrastructure and offer more choices for mobile broadband services in high market concentration areas. If the Commission were to catalyze greater competition in markets that currently have few choices for providers, it would work toward the Commission’s mandated goal of encouraging advanced telecommunications capability.

Currently, the mobile BIAS marketplace in rural and less densely populated areas are far more concentrated than urban and more densely populated markets, according to the Commission’s draft of its *Twentieth Mobile Wireless Competition Report*.<sup>23</sup> The Commission determined that the mobile BIAS markets in low-density population areas rank as very highly concentrated based on the Herfindahl-Hirschman Index (HHI) used by the Antitrust Division of the Justice Department to measure market concentration.<sup>24</sup> Further, the mobile BIAS markets across *all* population areas were deemed by the Commission to be highly concentrated. The weighted average HHI for mobile BIAS was 3,101 as of the end of 2016, much higher than 2,500, which indicates high concentration in a specific market (1,500 to 2,500 indicates moderate concentration).<sup>25</sup> This concentration in the mobile BIAS market has increased since 2013, when the

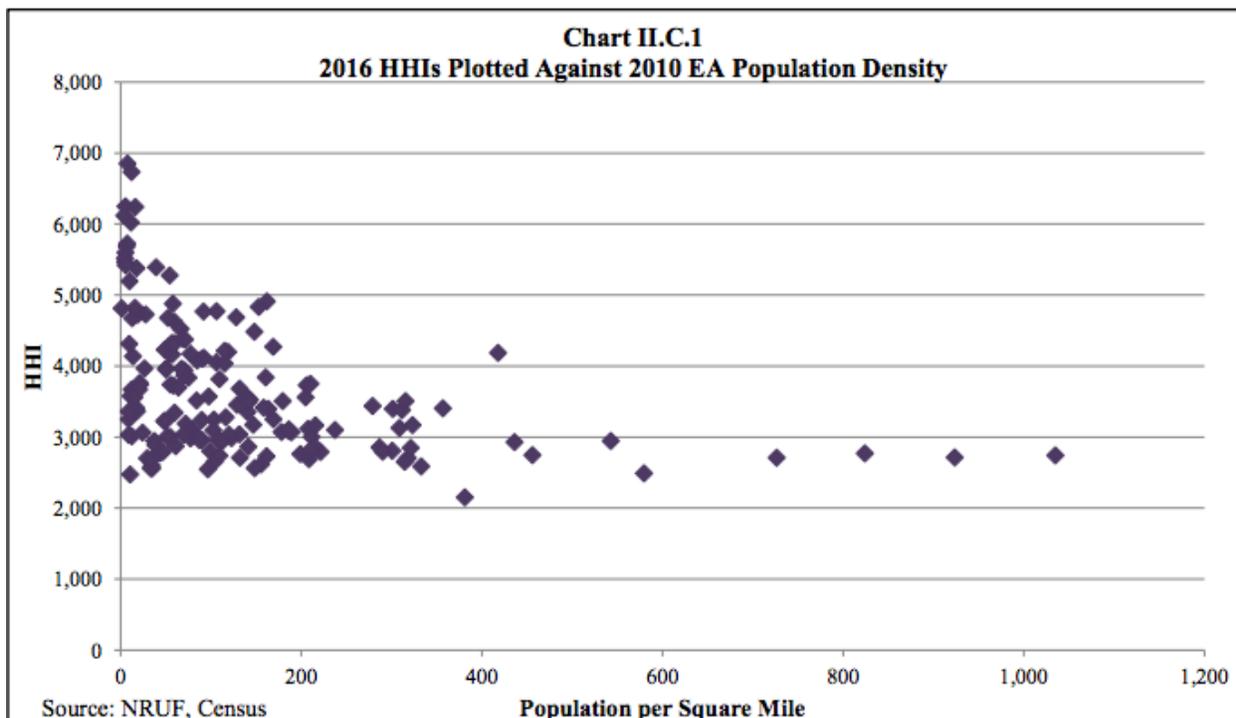
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<sup>23</sup> *Twentieth Mobile Wireless Competition Report, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services* (Sept. 7, 2017), ¶¶ 31-32; Chart II.C.1, [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2017/db0907/DOC-346595A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0907/DOC-346595A1.pdf) (“This chart indicates that HHI values tend to decline as the population density increases. The most concentrated EAs tend to be more rural, while major metropolitan areas lie in the least concentrated EAs.”).

<sup>24</sup> *Id.*

<sup>25</sup> *Id.*

weighted average HHI was 3,027.<sup>26</sup> The mobile BIAS market is already excessively concentrated as a general matter. However, as the Commission’s chart below shows, rural areas have market concentration that ranks as effectively off the charts.



### 3. Mobile BIAS Throughput is Inadequate for most Consumers

There is a drastic difference in throughput and related capabilities between mobile and fixed BIAS. Fixed BIAS offers much faster throughput than mobile BIAS, in part because mobile BIAS does not have the same capability as fixed BIAS to process high levels of data. Consumers increasingly are accustomed to high throughput levels on fixed BIAS that they would not receive over mobile BIAS.<sup>27</sup>

The Commission itself suggests a lower throughput benchmark for mobile BIAS, amounting to a concession that the services are not substitutes. In asking what mobile BIAS throughput benchmark to adopt, the Commission stated in the NOI “[w]e anticipate that any speed

<sup>26</sup> *Id.*

<sup>27</sup> MoffettNathanson Report at 9.

benchmark we set would be lower than the 25 Mbps/3 Mbps benchmark adopted for fixed broadband services, given differing capabilities of mobile broadband.”<sup>28</sup> The Commission then seeks comment on a potential mobile BIAS throughput benchmark of 10 Mbps download and 1 Mbps upload.<sup>29</sup> The Commission thus has acknowledged the inferior data rate capability of mobile BIAS compared to fixed BIAS.

For example, a recent report found that the United States ranked 36th in a list of the fastest mobile internet throughput worldwide with an average throughput of 12.5 Mbps, which was substantially slower than the global average LTE speed<sup>30</sup> of 17.4 Mbps and the benchmark of 25 Mbps for high-speed fixed broadband.<sup>31</sup> Ookla documented the United States’ low ranking among other nations when comparing mobile BIAS throughput, noting the country has “lost footing in the global race for fastest mobile internet speeds with a rank slip from 42nd to 44th in the world based on data from Q1-Q2 2017” in a recent report.<sup>32</sup> The Commission’s data shows rural areas on average have an even lower percentage of wireless connections that meet the 25 Mbps download and 3 Mbps upload throughput benchmark. Currently only 6 to 7 percent of consumers are mobile BIAS users only due to slower speeds, less reliability, and higher costs from usage caps than what fixed BIAS offers users.<sup>33</sup>

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<sup>28</sup> NOI at ¶ 18.

<sup>29</sup> NOI at ¶ 19.

<sup>30</sup> Verizon, *What is 4G LTE and why it matters*, (May 1, 2012), <http://www.verizon.com/about/news/vzw/2012/05/what-is-4GLTE-and-why-it-matters>.

<sup>31</sup> Joon Ian Wong, *The countries with the world’s fastest mobile internet*, Quartz (Feb. 22, 2017), <https://qz.com/915726/the-countries-with-the-worlds-fastest-mobile-internet> (“Roughly in the middle of our chart sits the U.S., which was one of the first countries to launch LTE and has one of the highest rates of 4G penetration in the world. But U.S. LTE networks are on the slow side, which brings down the country’s overall score.”).

<sup>32</sup> *Speedtest United States Report*, Ookla (Sep. 7, 2017), <http://www.speedtest.net/reports/united-states>.

<sup>33</sup> Karl Bode, *Unlimited Wireless No Threat to Fixed ISPs (Yet)*, Analyst Says, DSL Reports (April 17, 2017), <http://www.dslreports.com/shownews/Unlimited-Wireless-No-Threat-to-Fixed-ISPs-Yet-Analyst-Says-139362> (“Moffett claims that just 6 to 7% of consumers are currently only wireless broadband only, and that number hasn’t changed in several years. Why? Slower speeds, less reliability, and higher costs

While mobile BIAS provides a crucial service to millions of Americans to access the internet away from their primary internet connection at home or at work, the limitations of the throughput and data capacity of mobile BIAS demonstrates its distinct characteristics from fixed BIAS at this time. The Commission should consider these limitations and find that mobile BIAS is not yet advanced telecommunications capability on its own.

#### **4. Mobile BIAS Is Not as Reliable as Fixed BIAS**

Mobile BIAS does not have the capacity or consistency of service to support many of the services that consumers come to expect from their internet connections. Mobile BIAS also has inconsistent signal strengths, particularly when it comes to building penetration, and connection strength is even weaker in rural areas.

Mobile BIAS is ill-equipped to handle most bandwidth-intensive uses, including video conferencing applications used by telehealth, telework, and education platforms, as well as full-screen HD video streaming and online gaming.<sup>34</sup> The importance of having a strong home broadband connection is increasing as the majority of adults (61 percent) aged 18-29 are primarily watching television using an online streaming service instead of a cable or satellite subscription or a digital antenna.<sup>35</sup> The inconsistency and data limits of a mobile BIAS would make it difficult for individuals to stream all of their television and news as well as using that connection for work, education, communication, shopping, and many other day-to-day uses.

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from usage caps. ‘It’s not hard to understand why,’ said Moffett. ‘Cellular broadband typically offers lower speeds and weaker reliability than its wireline counterparts.’”)

<sup>34</sup> *2016 Broadband Progress Report* at ¶ 41 (“And, as several commenters note, mobile broadband networks lack the capacity or consistency of service to support most bandwidth intensive uses such as full-screen HD video streaming, online gaming, and video conferencing applications including telehealth and education platforms.”).

<sup>35</sup> Lee Rainie, *About 6 in 10 young adults in U.S. primarily use online streaming to watch TV*, Pew Research Center (Sept. 13, 2017), <http://www.pewresearch.org/fact-tank/2017/09/13/about-6-in-10-young-adults-in-u-s-primarily-use-online-streaming-to-watch-tv>.

Mobile signal strengths are uneven and often inadequate, particularly in rural and other low-population density areas where mobile broadband would be most necessary to act as a substitute for fixed broadband. Mobile broadband is subject to environmental obstacles that fixed broadband transmissions are not, which limits mobile broadband from achieving a similar level of signal strength consistency as fixed services with current technology.<sup>36</sup> Mobile broadband throughput and quality can also fluctuate widely depending on congestion caused by additional users sharing the same access point. Moreover, while both mobile and fixed BIAS tend to experience reduced speeds during peak periods of usage, mobile connections have a far greater disparity between peak and off-peak periods of congestion than fixed. Mobile network congestion can lead to substantially reduced data rates during peak usage, which would in turn negate consumers' ability to use mobile broadband as a reliable and consistent source of internet connection for important work, education, information, health care, and other purposes. Video conferencing applications, for example, require consistent throughput and latency to operate without interruption.

The weakness of mobile broadband indoors is similarly well documented.<sup>37</sup> The lackluster connection to a mobile network indoors served as major impetus for some participants, like T-Mobile, to buy up low-band spectrum in the Commission's recent incentive auction.<sup>38</sup> The

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<sup>36</sup> *2016 Broadband Progress Report*, at ¶ 29 ("Mobile transmissions are subject to environmental factors that fixed line transmissions do not encounter and, thus, cannot achieve the same kinds of consistent speeds at the current level of technology.").

<sup>37</sup> Remarks of Steve Sharkey, Vice President of Technology and Engineering Policy at T-Mobile, at New America Event, *Auctioning America's Wireless Future: Will 5G be Restricted to Big Mobile Carriers?* (Sept. 20, 2017) ("We struggle to get into buildings, a lot of the times we're expected to pay very high fees to get into those buildings.").

<sup>38</sup> Marguerite Reardon, *For T-Mobile's wireless ambitions, a make-or-break moment looms*, CNET (June 23, 2015), <https://www.cnet.com/news/why-t-mobile-is-crusading-for-a-leg-up-in-the-wireless-wars/> ("But if it wants to surpass AT&T and Verizon, T-Mobile needs better coverage in key suburban markets and even some rural regions... Filling in those dead zones will go a long way to legitimizing T-Mobile's service. That's where next year's spectrum auction comes in. The so-called incentive auction -- named because the FCC is incentivizing TV broadcasters to sell off their unused spectrum -- is valuable because

shortcomings of mobile BIAS—even the newest technology such as 4G LTE—is reflected in the offerings of some mobile carriers, such as T-Mobile and Sprint, to include “signal boosters” for indoors to boost LTE coverage.<sup>39</sup> While these devices can certainly improve LTE coverage into a user’s home, they still bring the same issues with using mobile BIAS as a primary form of internet access such as cost, data capacity, and throughput. The extra hardware would do nothing to alleviate these concerns and could add additional costs to the consumer.

Additionally, the problem of building penetration is unlikely to improve with the upcoming 5G revolution, as carriers are looking to rely on high-frequency spectrum (above 24 GHz) to fuel the high-speed and low-latency connections that define “5G”.<sup>40</sup> Due to the characteristics of high-band spectrum, 5G signals relying on high-capacity millimeter wave spectrum will not penetrate into buildings or cover large areas from a single access point, making it difficult to see mobile broadband in 5G successfully replacing home broadband as a feasible internet connection for consumers and business owners.<sup>41</sup>

If the Commission declared that mobile BIAS is an adequate substitute for fixed BIAS, it would cause substantial and disproportionate harm to Americans who live in rural, tribal, and low-income communities that do not yet have the same signal reliability or mobile broadband capability as urban areas. A dozen U.S. senators recently explained: “The lack of service for high-

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the wireless licenses that are up for grab run at a lower frequency or band, which means they're able to travel longer distances and penetrate obstacles like buildings.”)

<sup>39</sup> Edward C. Baig, *T-Mobile offers free LTE mini-tower to boost indoor cell coverage*, USA Today (Nov. 2, 2015), <https://www.usatoday.com/story/tech/columnist/baig/2015/11/02/t-mobile-offers-free-lte-mini-tower-bolster-cell-coverage-indoors/75039098/>; Marguerite Reardon, *Sprint's Magic Box boosts your 4G LTE at home for free*, CNET (May 3, 2017), <https://www.cnet.com/news/sprint-to-offer-free-wireless-signal-booster-magic-box-small-cell>.

<sup>40</sup> *5G Spectrum: Public Policy Position*, GSM Association (Nov. 2016), <https://www.gsma.com/spectrum/wp-content/uploads/2016/06/GSMA-5G-Spectrum-PPP.pdf>; Statement of Chairman Tom Wheeler, GN Docket No. 14-177, July 14, 2016, [https://apps.fcc.gov/edocs\\_public/attachmatch/FCC-16-89A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-89A1.pdf).

<sup>41</sup> GSM Association, *5G Spectrum: Public Policy Position* (Nov. 2016), <https://www.gsma.com/spectrum/wp-content/uploads/2016/06/GSMA-5G-Spectrum-PPP.pdf>.

speed internet is preventing individuals in these communities from applying for jobs; their children from doing their homework; and many small business owners from running businesses out of their homes.”<sup>42</sup> Americans in these areas depend on reliable broadband connections as much as urban Americans—and perhaps more so—but they are still awaiting the same broadband connection opportunities. The Commission should not redefine “advanced telecommunications capability” by lowering the standard for broadband connectivity, but should instead continue to push to extend high-capacity and high-speed fixed BIAS to these underserved communities. Members of these communities cannot afford to rely on expensive and slower mobile BIAS packages that would likely be insufficient to help fuel small businesses, participation in the internet economy, and other needs.

The NOI would also have a disproportionate and damaging impact on communities of color and low-income Americans, who are much more likely to be reliant on mobile BIAS alone, despite it being an imperfect solution to bridging the digital divide.<sup>43</sup> Twenty percent of Americans who make \$30,000 a year or less rely on smartphones to access the internet, compared to just 4 percent of those who make \$100,000 or more annually.<sup>44</sup> That divide exists between different ethnic groups in the U.S as well. While only 65 percent of Black Americans and 58 percent of Hispanic Americans say they have home broadband, 72 percent of Black Americans and 75 percent

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<sup>42</sup> Letter to FCC Commissioners Pai, Clyburn, O’Rielly, Carr, and Rosenworcel from Senators Al Franken, Sherrod Brown, Tammy Baldwin, Richard Blumenthal, Heidi Heitkamp, Amy Klobuchar, Elizabeth Warren, Brian Schatz, Edward Markey, Tom Udall, Kirsten Gillibrand and Ron Wyden, GN Docket No. 17-199, dated August 31, 2017, <https://ecfsapi.fcc.gov/file/10831295624214/Senate%20Letter%20re%20GN%20Docket%20No.%2017-199.pdf> (“Letter from Senator Franken, et al.”).

<sup>43</sup> Voices For Internet Freedom Coalition Comments at 68, WC Docket No. 17-108, July 19, 2017, <https://ecfsapi.fcc.gov/file/107202424413478/Voices%20Coalition%20NN%20Comments%20-%20WC%20Docket%2017-108%20-%2007.19.2017.pdf>.

<sup>44</sup> Monica Anderson, *Digital divide persists even as lower-income Americans make gains in tech adoption*, Pew Research Center (March 22, 2017), <http://www.pewresearch.org/fact-tank/2017/03/22/digital-divide-persists-even-as-lower-income-americans-make-gains-in-tech-adoption>.

of Hispanic Americans report owning smartphones.<sup>45</sup> As long as these communities lack strong and reliable broadband connections, they will not be able to realize the economic and personal prosperity such connections bring.<sup>46</sup> As detailed in the section prior, the mobile BIAS market is also substantially weaker than the already-highly concentrated urban markets in lower population density and rural areas.

### **B. Mobile BIAS Is Not Viewed by Consumers As A Substitute To Fixed BIAS**

The Commission seeks comment on whether it should evaluate the deployment of broadband “based on the presence of both fixed *and* mobile services.”<sup>47</sup> While mobile BIAS provides an important service for consumers nationwide, consumers do not view mobile BIAS as a substitute for fixed BIAS, in large part for the reasons discussed above. The way mobile BIAS is sold and marketed is strikingly different from fixed BIAS, particularly due to the allocation of a limited amount of data before carriers charge overage fees or drastically slow users’ speeds.<sup>48</sup> The data caps, limited bandwidth capacity, and unique pricing models provided by mobile BIAS compared to fixed BIAS reflect the fact that the two services meet distinct consumer needs. These unique needs and differing pricing models act as proof that mobile broadband is not a sufficient substitute for fixed broadband.<sup>49</sup> The Commission acknowledges in the NOI that “[m]obile and fixed broadband have different technical characteristics and limitations.”<sup>50</sup> The Commission’s

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<sup>45</sup> Andrew Perrin, *Smartphones help blacks, Hispanics bridge some – but not all – digital gaps with whites*, Pew Research Center (Aug. 31, 2017), <http://www.pewresearch.org/fact-tank/2017/08/31/smartphones-help-blacks-hispanics-bridge-some-but-not-all-digital-gaps-with-whites>.

<sup>46</sup> Letter from Sen. Franken, et al., *supra* note 44.

<sup>47</sup> NOI at ¶ 10 (emphasis in the original).

<sup>48</sup> *2016 Broadband Progress Report* at ¶¶ 33-34.

<sup>49</sup> *Id.* at ¶ 31.

<sup>50</sup> *Id.*

proposal to adopt radically different throughput benchmarks for mobile BIAS versus fixed BIAS shows it recognizes the functional differences between the two as well.<sup>51</sup>

The differences between fixed and mobile BIAS networks are not merely technical; the two services are marketed to consumers differently. Fixed and mobile BIAS serve different needs for consumers. Fixed BIAS provides high-speed internet access at home for work, education, and other needs, while mobile BIAS enables consumers to access the internet away from their homes, typically for more immediate and lower-bandwidth needs such as email, search, maps, and low-definition video streaming. The Commission noted this in its *2016 Broadband Progress Report*, where it found that mobile and fixed BIAS are not adequate substitutes for one another. As the Commission stated in the report: “This finding is also strongly supported by the preferences and purchasing decisions of American consumers, who overwhelmingly adopt both services when they have the means.”<sup>52</sup>

Consumers also use the services in much different ways. Mobile devices are smaller than devices that use fixed BIAS, as part of the very nature of “mobile” broadband. The portability of mobile devices restricts their screen size and computational abilities, making it more difficult for consumers to use mobile devices for all the same functions as a desktop or laptop for work, education, and other crucial services.<sup>53</sup> The Pew Research Center found that nearly half of the Americans they surveyed who had used a smartphone as part of a job search had problems accessing content that did not display properly on the phone and reading non-mobile optimized job content.<sup>54</sup> The smaller screens and keyboards combined with an incompatibility with some

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<sup>51</sup> *Id.* at ¶ 19.

<sup>52</sup> *Id.* at ¶ 31.

<sup>53</sup> *Id.* at ¶ 29.

<sup>54</sup> Monica Anderson and John B. Horrigan, *Smartphones help those without broadband get online, but don't necessarily bridge the digital divide*, Pew Research Center (Oct. 3, 2016)

online platforms lead to degraded functionality for work, communication, and entertainment on mobile broadband devices compared to fixed.<sup>55</sup>

Most consumers adopt both fixed and mobile BIAS, rather than one or the other. In a 2015 report, Pew found that 55 percent of adults reported having both a home broadband connection and a smartphone, marking an increase from 47 percent in 2013.<sup>56</sup> Further, 73 percent of U.S. adults were home broadband users in 2016. And despite the improved capabilities of 4G/LTE mobile services, the number of home broadband users has not experienced any noticeable decline that would reflect consumers moving to mobile broadband instead of fixed, according to the “Home broadband use over time” chart in the Pew report.<sup>57</sup> If consumers *did* view mobile BIAS as a viable substitute for fixed BIAS, one would expect widespread broadband “cord cutting” as users canceled fixed BIAS subscriptions, much as a majority of people have now abandoned wireline telephone service because mobile telephony has essentially the same functionality as a home telephone “land line” *and* is mobile. That has not happened.<sup>58</sup>

Moreover, consumers themselves report they would not replace their fixed broadband connections with only mobile internet access. A survey conducted on behalf of Public Knowledge found that 92 percent of those surveyed said they were “very” or “somewhat” unlikely to cancel

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<http://www.pewresearch.org/fact-tank/2016/10/03/smartphones-help-those-without-broadband-get-online-but-dont-necessarily-bridge-the-digital-divide/> (37 percent of respondents said they had trouble submitting required files or supporting documents as part of their job application process over their smartphone).

<sup>55</sup> MoffettNathanson Report at 10.

<sup>56</sup> John B. Horrigan and Maeve Duggan, *Home Broadband 2015*, Pew Research Center (Dec. 21, 2015), <http://www.pewinternet.org/2015/12/21/home-broadband-2015>.

<sup>57</sup> *Internet/Broadband Fact Sheet*, Pew Research Center (Jan. 12, 2017), <http://www.pewinternet.org/fact-sheet/internet-broadband>.

<sup>58</sup> MoffettNathanson Report at 4-5; *NOI* at ¶ 9 (Even though 13 percent of broadband subscribers are mobile-only, there are likely other reasons for that, including cost or availability of fixed BIAS); See John B. Horrigan and Maeve Duggan, *Barriers to broadband adoption: Cost is now a substantial challenge for many non-users*, Pew Research Center (Dec. 21, 2015), <http://www.pewinternet.org/2015/12/21/3-barriers-to-broadband-adoption-cost-is-now-a-substantial-challenge-for-many-non-users/>.

their home broadband service in favor of a “purely mobile experience.”<sup>59</sup> T-Mobile noted in a 2015 filing with the Commission that millions of Americans subscribe to both fixed and mobile BIAS and that number is increasing.<sup>60</sup>

### **C. The Commission Should Encourage Spectrum Sharing Frameworks Such As CBRS To Encourage Deployment of Fixed Wireless Broadband**

The Commission seeks comment on whether additional actions from the agency “might encourage more expansive and rapid deployment of networks that provide advanced telecommunications capability.”<sup>61</sup> If the Commission were to add mobile-only service as an “advanced telecommunications service,” it would severely downplay the digital divide because the Commission would count as served areas of the country that have access to only mobile BIAS, which, as described above, is a complement to—and not a substitute for—fixed BIAS. OTI strongly urges the Commission to consider the damaging effects for low-income and rural consumers if mobile-only service were to be added as an “advanced telecommunications service” and reject this proposal.

An example of the complementary nature of fixed and mobile BIAS -- and how the two in tandem can improve connectivity in underserved or rural areas -- is the potential of fixed wireless providers and spectrum sharing frameworks such as the Citizens Broadband Radio Service in bringing service to unserved users. Under the rules adopted by the Commission in 2016, the CBRS 3.5 GHz band will enable a broad and diverse set of users and use cases to use targeted bands of spectrum to bring connectivity to areas in need of service. The set of users and use cases include rural Wireless ISPs (WISPs), utilities, enterprise broadband providers, private LTE networks

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<sup>59</sup> John B. Horrigan, PhD, *Smartphones and Broadband*, Public Knowledge (Nov. 2014), [https://www.publicknowledge.org/assets/uploads/blog/Smartphones\\_and\\_Broadband.pdf](https://www.publicknowledge.org/assets/uploads/blog/Smartphones_and_Broadband.pdf)

<sup>60</sup> T-Mobile Comments, GN Docket No. 15-191 (Sep. 30, 2015), <https://ecfsapi.fcc.gov/file/60001325985.pdf>, at 3

<sup>61</sup> NOI at ¶ 48.

(including neutral host networks in high-traffic venues), government agencies, schools, and libraries.<sup>62</sup> The Commission should expedite the implementation of the current CBRS framework to facilitate the “wide deployment of wireless broadband in industrial applications,” as the Commission expected when passing the rules.<sup>63</sup> OTI also urges the Commission to reject proposals from the mobile industry to change the CBRS licensing rules.<sup>64</sup> Most critical to the goals of Section 706 - and to the goal of closing the rural broadband gap in particular -- is to maintain Priority Access license areas that are small and affordable enough for WISPs and other small and rural ISPs.

OTI also strongly urges the Commission to authorize a new, licensed, point-to-multipoint (P2MP) fixed wireless service in the 3700 – 4200 MHz spectrum band used primarily by fixed satellite services, but that are woefully underutilized. This spectrum has the capability to accelerate the deployment of very high-capacity fixed wireless broadband services in areas lacking sufficient consumer choice and where fiber-to-the-home deployments are not cost-effective. Deploying these fixed wireless services could improve connectivity in rural, suburban, and tribal areas and would provide more affordable high-speed internet connections to small businesses, libraries, and other community anchor institutions.<sup>65</sup> As OTI has previously described to the Commission, there is strong interest among fixed wireless broadband service providers to gain access to additional mid-band spectrum to allow them to improve and expand service, and several providers have filed comments with the Commission arguing they “urgently” or “desperately”

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<sup>62</sup> See OTI and Public Knowledge Reply Comments at 2, GN Docket No. 12-354.

<sup>63</sup> John Leibovitz, *Breaking Down Barriers to Innovation in the 3.5 GHz Band*, Federal Communications Commission blog (April 21, 2015), <https://www.fcc.gov/news-events/blog/2015/04/21/breaking-down-barriers-innovation-35-ghz-band>.

<sup>64</sup> See *generally* OTI and Public Knowledge Reply Comments GN Docket No. 12-354.

<sup>65</sup> See *generally* Broadband Access Coalition Petition For Rulemaking, [https://na-production.s3.amazonaws.com/documents/3.7\\_GHz\\_Band\\_Petition\\_for\\_Rulemaking-FINAL\\_with\\_Exhibits-06.21.17.pdf](https://na-production.s3.amazonaws.com/documents/3.7_GHz_Band_Petition_for_Rulemaking-FINAL_with_Exhibits-06.21.17.pdf).

need more spectrum to address the digital divide problem for rural areas.<sup>66</sup> The record in that docket supports the assertion that fixed wireless broadband service could be deployed expeditiously and in a cost-effective manner in the 3700 – 4200 MHz band, and also without foreclosing future mobile broadband uses of the band as that becomes feasible.<sup>67</sup>

The Commission taking action in these spectrum sharing initiatives can improve deployment of advanced telecommunications services in rural and other underserved areas in the country in a way consistent with the fact that mobile and fixed broadband services are currently complements to one another. OTI strongly recommends the Commission examine these avenues for improving connectivity rather than accepting mobile BIAS as a substitute for fixed BIAS and potentially exacerbating the digital divide for millions of Americans.

### **III. OTI supports increasing throughput benchmarks for fixed BIAS**

OTI has helped build the record in past Section 706 inquiry proceedings that the Commission should continue to increase its throughput benchmarks (particularly the upload benchmark), as well as include a latency metric that would trigger an investigation into other quality of service metrics, including packet loss and jitter, if not met by a particular service.<sup>68</sup> OTI reiterates these arguments and supplements them with additional evidence below.

Since last year, online innovation has continued to grow, making increased benchmarks for “advanced telecom capability” even more important. Consumers continue to have more options for 4K streaming.<sup>69</sup> Online video game distribution has grown.<sup>70</sup> The number of consumers

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<sup>66</sup> Reply Comments of the Broadband Access Coalition, RM- 11791, at 5 nn.9, 10.

<sup>67</sup> *Id.* at 7

<sup>68</sup> See Appendix A.

<sup>69</sup> David Katzmaier, *4K content guide: What to watch in 4K and HDR today*, CNET (Mar. 28, 2017), <https://www.cnet.com/how-to/4k-content-guide-what-to-watch-in-4k-today>.

<sup>70</sup> Nate Hohl, *Gemly is a new PC game distribution platform from techland*, GameCrate (July 27, 2017), <https://www.gamecrate.com/gemly-new-pc-game-distribution-platform-techland/16800>; *Is Amazon taking on Steam?*, Autconomy (Jan. 29, 2017), <https://autconomy.com/2017/01/29/is-amazon-taking-on-steam>.

playing video games online is also increasing.<sup>71</sup> The number of eSports viewers (streaming high-quality video game programming) is also increasing.<sup>72</sup> Content that was traditionally reserved for cable television is moving online, particularly live sports coverage.<sup>73</sup> The cloud storage market is predicted to grow at nearly 30% every year through 2022.<sup>74</sup> New cloud storage companies are emerging such as Stripe, which processes billions of transactions per year.<sup>75</sup>

Upload throughput matters as well. The internet is a two-way communications medium, but many ISPs still emphasize download over upload throughput, as the Commission does. But the Commission should move toward a symmetrical throughput benchmark for download and upload. Popular mobile apps are implementing video upload features, and video streaming and uploading are also growing.<sup>76</sup> Upload throughput matters for healthcare too as consumers continue to adopt health wearables.<sup>77</sup>

Upload throughput is also vitally important because uploading is the mechanism through which people exercise free speech and create content. Without uploading, the internet is just cable television. With uploading, individual users from any corner of the internet can speak online in a variety of ways, and create and share content with other users. Of particular importance has been videos of police brutality, political demonstrations, and other recordings that gained notoriety and

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<sup>71</sup> See Mary Meeker, *Internet Trends 2017 - Code Conference*, Kleiner Perkins (May 31, 2017), <http://www.kpcb.com/internet-trends> (slide 98, 136) (“Meeker Presentation”).

<sup>72</sup> Meeker Presentation, slides 141-42.

<sup>73</sup> Kevin Tran, *Facebook is becoming a go-to platform for live streaming sports*, Business Insider (June 29, 2017), <http://www.businessinsider.com/facebook-becoming-go-to-platform-live-streaming-sports-2017-6>

<sup>74</sup> *Cloud Storage Market - Forecasts from 2017 to 2022*, Reports and Markets (Sept. 6, 2017), <https://www.reportsandmarkets.com/reports/cloud-storage-market-forecasts-from-2017-to-2022-1570806>.

<sup>75</sup> Meeker Presentation, slide 185.

<sup>76</sup> Many services require upload capability, particularly for video or streaming, such as Twitch, Youtube, Facebook Live, Instagram, and Snapchat.

<sup>77</sup> Meeker Presentation, slide 309.

attention.<sup>78</sup> Further, upload is particularly important for historically marginalized communities who often find themselves left out of the popular media narrative and thus have to tell their own stories.<sup>79</sup> Continuing to downplay the importance of upload throughput exacerbates barriers to these communities' rights to speak up and out and to ensure their stories are told and heard.

Even if the Commission were to look at currently available throughput (rather than looking toward future consumer needs as OTI has argued the Commission should), there is extensive evidence that fixed BIAS throughput has increased rapidly, and the Commission's 706 inquiry should recognize that improvement. As OTI argued in its 2017 Open Internet comments,

[w]hen Measurement Lab (M-Lab) analyzed the 5.6 million tests performed by users against the M-Lab platform over the past 6 years, it found that from 2012 to 2014, internet speeds in the US improved at a rate of .23 Mbps every year. That is, every four years, the median rate should improve by around a megabit. From 2015 to 2017, it found that Internet speeds in the US improved at a rate of 1.9 Mbps per year. . . . The Internet Association similarly reported that cable broadband speeds have doubled from 2014 to 2016.<sup>80</sup>

Not only is fixed BIAS throughput improving, it is improving more quickly than it has in previous years. Thus, it is time the Commission increased its benchmarks for advanced telecom capability.

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<sup>78</sup> See, e.g., Rose Hackman, *New app aims to help citizens record police brutality using cellphones*, Guardian (May 7, 2015), <https://www.theguardian.com/us-news/2015/may/07/new-app-citizens-record-police-brutality-cellphones>.

<sup>79</sup> See *Digital Culture Shift*, Center for Media Justice (Aug. 2015), [http://centerformediajustice.org/wp-content/uploads/2015/08/digital\\_culture\\_shift\\_report.pdf](http://centerformediajustice.org/wp-content/uploads/2015/08/digital_culture_shift_report.pdf) at 7.

<sup>80</sup> Reply Comments of the Open Technology Institute at New America at 38, Dkt. No. 17-108 (Aug. 30, 2017) (citations removed). Further, according to Ookla (speedtest.net), average fixed download throughput in the United States is already 64.17 Mbps, with average upload throughput at 22.79 Mbps (improved from 47.1 Mbps download and 15.4 Mbps upload last year). That report also stated that this year has seen "the introduction of 300 Mbps, 400 Mbps and 1 Gbps speed tiers delivered over the DOCSIS 3.1 cable standard and a widespread deployment of 1 Gbps fiber service from Verizon Fios." *Fixed Speed Report in United States*, Speedtest.net (Sept. 7, 2017), <http://www.speedtest.net/reports/united-states/#fixed>; see also *New report says fixed broadband in the U.S. is fast and getting faster*, NCTA (Sept. 12, 2017), [https://www.ncta.com/whats-new?share\\_redirect=/whats-new#colorbox=node-2974](https://www.ncta.com/whats-new?share_redirect=/whats-new#colorbox=node-2974) (citing Ookla/Speedtest.net report as proof that throughput is increasing).

#### **IV. Conclusion**

The Commission should not consider mobile-only to be “advanced telecom capability” because mobile service is not a substitute for fixed service. The Commission should, instead, focus on and increase the benchmarks for fixed service to recognize the growing bandwidth needs of Americans.