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

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| In the Matter of | ) | |
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| Inquiry Concerning Deployment of Advanced | ) | GN Docket No. 17-199 |
| Telecommunications Capability to All Americans | ) | |
| In a Reasonable and Timely Fashion | ) | |
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# COMMENTS OF
# TELECOMMUNICATIONS FOR THE DEAF AND HARD OF HEARING, INC.;
# NATIONAL ASSOCIATION OF THE DEAF;
# DEAF AND HARD OF HEARING CONSUMER ADVOCACY NETWORK;
# CEREBRAL PALSY AND DEAF ORGANIZATION;
# COMMUNICATION SERVICE FOR THE DEAF, INC.;
# HEARING LOSS ASSOCIATION OF AMERICA

Dated: September 21, 2017

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## COMMENTS

Telecommunications for the Deaf and Hard of Hearing, Inc.; National Association of the Deaf; Deaf and Hard of Hearing Consumer Advocacy Network; Cerebral Palsy and Deaf Organization; Communication Service for the Deaf, Inc.; and Hearing Loss Association of America (collectively, "Consumer Groups") submit these comments in accordance with the Commission's Notice of Inquiry under Section 706 of the Telecommunications Act of 1996 (the "Act"), submit these comments on the inquiry into whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion.[1] The Rehabilitation Engineering Research Center on Technology for the Deaf and Hard of Hearing at Gallaudet University and the Rehabilitation Engineering Research Center on Universal Interface and Information Technology Access at the University of Maryland also support these Comments.

## I. INTRODUCTION

The Consumer Groups applaud the Commission for encouraging the development of advanced telecommunications services for all Americans, including those who are deaf, hard-of-hearing, late-deafened, DeafBlind, speech-disabled or deaf and mobile-disabled. Broadband access is essential for these Americans to access Internet-based Telecommunications Relay

[1] *Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, GN Docket No. 17-199, Thirteenth Section 706 Report Notice of Inquiry, FCC 17-109 (rel. Aug. 8, 2017) (*"2017 Notice of Inquiry"*).

Services ("TRS"). As a general matter, in order to achieve the goal of providing functional equivalency in telecommunications relay services, interoperable communications must be readily available and achieved with anyone, anytime, and anywhere.[2] In today's world, that requires users of Internet-based TRS services to have access to broadband.

The statute requires the Commission to measure the deployment of broadband to *all* Americans. In these comments, the Consumer Groups identify (1) what functionally equivalent access for the deaf and hard of hearing community means, (2) what components of that (*e.g.*, latency, sustained capacity, data caps) are missing from the Commission's measurement strategy and (3) recommendations to ensure that the Commission's measurement of broadband availability takes into consideration deaf, hard-of-hearing, late-deafened, DeafBlind, speech-disabled and deaf and mobile-disabled Americans.

As the Commission is aware from comments filed in other proceedings concerning broadband and the TRS program, broadband services are essential for deaf, hard-of-hearing, late-deafened, DeafBlind, speech-disabled, and deaf and mobile-disabled consumers because they enable such consumers to communicate with each other in point-to-point calls, and with hearing consumers through TRS using voice, text, and video communication. Deployment of and accessibility to broadband for these consumers is fundamental to the mandate of the Americans with Disabilities Act ("ADA")[3] that such individuals have nationwide access to the telephone system and network "in a manner that is *functionally equivalent* to the ability of an individual who does not have a hearing or speech impairment to communicate using voice communications

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[2] *See* Consumer Groups' TRS Policy Statement – Functional Equivalency of Telecommunications Relay Services: Meeting the Mandate of the Americans with Disabilities Act (Apr. 12, 2011) ("TRS Policy Statement"), https://ecfsapi.fcc.gov/file/7021748016.pdf.

[3] Americans With Disabilities Act of 1990, Pub. L. No. 101-336, 104 Stat. 328 (1990), codified at 47 U.S.C. § 225 of the Communications Act of 1934, as amended ("Act").

services by wire or radio."[4] Broadband is vital for video relay services ("VRS"), which has become the preferred method of relay services for the large percentage of those who are deaf that commonly use sign language, and hearing consumers that communicate with them. Equally important, another large percentage of hard-of-hearing and late-deafened consumers who do not use sign language, can speak well enough to be understood and (1) use captioned telephone relay services or (2) use video conferencing services for lip reading. A significant percentage of Americans with disabilities are low income, and many deaf, hard-of-hearing, late-deafened, DeafBlind and mobile-disabled consumers live at, or below, the poverty level.[5] As a result, many of these consumers rely on and participate in federal programs that make access to their communications services affordable. To the extent broadband is not affordable to such consumers, it is also not *available*. For these reasons, the Consumer Groups applaud the Commission's continued efforts to ensure that broadband is deployed and available to all Americans and provide these Comments to support those efforts.

The Commission is seeking comment on an appropriate definition of "advanced telecommunications capability" for purposes of its *Thirteenth Section 706 Report Notice of Inquiry*.[6] "Advanced telecommunications capability" must have minimum standards for all forms of transmission including wired (e.g., wireline, fiber and powerline) and wireless (e.g., WiFi,

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[4] 47 U.S.C. § 225(a)(3) (emphasis added).

[5] *See* Matthew W. Brault, *Americans With Disabilities: 2010 Household Economic Studies*, Report of the U.S. Census Bureau P70-131, at 12 (2012), http://www.census.gov/prod/2012pubs/p70-131.pdf. According to this report, "[a]pproximately 28.6 percent of people aged 15 to 64 with severe disabilities were in poverty while 17.9 percent of adults with nonsevere disabilities, and 14.3 percent of people with no disability were in poverty." As the Commission has cited, "a disproportionate number of deaf American adults are unemployed, receive Social Security, live in poverty, or have household income below $20,000; broadband penetration among this community is therefore likely to be lower than the national average of approximately 65%." *Structure and Practices of the Video Relay Service Program*, Further Notice of Proposed Rulemaking, 26 FCC Rcd. 17367, 17376, ¶ 12 (2001) (citing Sorenson May 14, 2010 Comments, CG Docket No. 03-123 at 12-13 (citations omitted).

[6] *2017 Notice of Inquiry*, ¶ 7.

WLAN, Satellite, and Microwave). Broadband speed and performance thresholds are important factors in enabling VRS calls in real-time. Likewise, appropriate broadband speeds and performance thresholds are needed to enable Internet-based captioned telephone services, captioned telephones that can be used with VoIP services, and video conferencing.

Latency, throttling, and other factors, impact *the bare minimum download/upload speed required to achieve and ensure functionally equivalent and effective communication via video technologies*.[7] Other factors, such as multiple, simultaneous users of video communication at one location, also affect the minimum broadband needed.[8]

In these comments, the Consumer Groups first define the minimum broadband characteristics necessary to ensure that broadband is sufficient to support the communications needs of deaf, hard-of-hearing, late-deafened, DeafBlind, speech-disabled or deaf and mobile-disabled. The Consumer Groups next explain what measures the Commission should adopt to determine whether broadband is available to these Americans.

## II. BROADBAND CHARACTERISTICS NECESSARY TO ACHIEVE FUNCTIONAL EQUIVALENT COMMUNICATIONS FOR INTERNET-BASED TRS SERVICES

### A. SPEED (minimum of 25 Mbps/3 Mbps for wired and wireless)

The Commission proposes to "maintain the current speed benchmark of 25 Mbps download and 3 Mbps upload (25 Mbps/3 Mbps) for fixed broadband"[9] and asks whether (and how) a benchmark should be set for mobile broadband.[10] Though bandwidth requirements vary

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[7] Comments of the Rehabilitation Engineering Research Center on Telecommunications Access, CG Docket Nos. 10-51, 03-123, Figure 2 (filed Mar. 9, 2012); *see also* Consumer Groups Comments In Response to NBP Public Notice #1, GN Docket Nos. 09-47, 09-51, 09-137 at 4 (filed Aug. 31, 2009).

[8] *Id.* at 5.

[9] *2017 Notice of Inquiry*, ¶ 12.

[10] *Id.* ¶¶ 17-18. There is currently no Section 706 benchmark for evaluating the availability of mobile broadband services.

by application, equipment and other factors, video calling at a sufficient level of quality for ASL communication generally requires a bare minimum of 256 kilobits per second (kbps) in each direction, and preferably 512 kbps in each direction over a wireless connection or as much as 2.5 Mbps in each direction over a wired connection with fixed equipment. Even more bandwidth is required for multiparty calls [11] or when multiple people are utilizing the same broadband connection (e.g., a fixed broadband connection accessed over WiFi, tethering from a mobile hotspot, etc). As Consumer Groups explained in the Lifeline proceeding:

> In a hypothetical scenario, let us suppose that a deaf family of three live in one household and are on the Lifeline plan. The mother is struggling to find work and is on the videophone in a relay call for a job interview. At the same time, the father engages in a three-party video conference call for his current job and the child uses the Internet for homework. Using experimental data from DHH-RERC, the mother's videophone call would require 1 Megabit per second, the father's video conference call would require 3 Megabits per second, and the child watching a YouTube educational video or news clip for homework at an upper bound of 1080p would require 2.4 Megabits per second. Thus, such a scenario would require a total of 6.4 Megabits per second to further this small family's educational and employment opportunities. That number is likely to increase for bigger families or more roommates.[12]

Even a single user may be utilizing a broadband connection over two or more devices to participate in a video call while simultaneously engaging in other activities online. In addition, users have little ability to control the bandwidth consumption of the applications they use. Any speed benchmark used to assess the adequacy of broadband deployment must account for these fundamental realities of the broadband marketplace and how Americans utilize bandwidth.

Furthermore, although download speeds may eventually pass the point of diminishing returns (i.e., where consumers find little value in subscribing to download speeds above a certain threshold), many service offerings with generous download speeds come with significantly constrained upload speeds that inhibit the ability for deaf and hard-of-hearing users

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[11] *See, e.g.*, Comments of National Association of the Deaf, et al., WC Docket Nos. 11-42, 09-197, 10-90, at 6-7 (filed Aug. 31, 2015), https://ecfsapi.fcc.gov/file/60001223116.pdf.

[12] *Id.* at 6.

to engage in two-way video communications. Although a 10 Mbps/1 Mbps wireless service may enable several users to stream video or download online content simultaneously, a 1 Mbps upload speed is insufficient to enable simultaneous use of the same broadband connection for transmission of real-time conversational video content, particularly for VRS users.

Finally, permitting wireless services of significantly lower speeds than fixed connections to count as "broadband" for the purposes of determining whether broadband is available would not serve the needs of the deaf and hard-of-hearing community. Counting wireless or satellite services that are insufficient to meet the needs of deaf and hard-of-hearing consumers as "broadband" would inaccurately suggest that areas are in fact served. Assessing availability through such an "either wireline or wireless" approach would obfuscate the true state of broadband deployment and leave consumers who lack access to adequate fixed services, including deaf and hard-of-hearing consumers, further behind.

Accordingly, Consumer Groups urge the Commission to maintain at least its 25 Mbps/3 Mbps benchmark for fixed broadband services to ensure its benchmark(s) reflect both the download and upload needs of all Americans, including deaf and hard-of-hearing consumers. Consumer Groups recommend that the Commission establish the same 25 Mbps/3 Mbps benchmark for mobile broadband services. Should the Commission establish a consistent framework for conducting its annual Section 706 inquiry, however, it must include a means to update the minimum broadband speeds. The Consumer Groups recommend 5 to 10 Mbps upload speed as the appropriate minimum now or in the near future. Such speeds are consistent with Comcast offering 5 to 10 Megabits per second for its low-income broadband program.[13]

[13] *See* Brian Fung, *Comcast is doubling the speed of its low-cost Internet plans*, WASH. POST (Aug. 4, 2015), https://www.washingtonpost.com/news/the-switch/wp/2015/08/04/comcast-is-doubling-the-speed-of-its-low-cost-internet-plans/?utm_term=.c66d4dc22eb0 (last visited Sept. 20, 2017).

Comcast established such numbers as being "fast enough" for supporting "multiple video streams simultaneously."[14]

### B. DATA ALLOWANCE (minimum 15 GB per month wireless, 68 GB wired)

The relevance of examining data allowances associated with fixed and mobile broadband services increases as more bandwidth-intensive applications pervade the online ecosystem. Indeed, bandwidth use by applications has increased over time as more bandwidth has become available for use. Over the past two decades, people with disabilities have come to enjoy the same robust ecosystem of internet-enabled applications developed by competitive edge providers riding atop the internet as all other consumers of broadband internet access services (BIAS) have.[15] For example, people with sensory disabilities have increasingly been able to enjoy internet accessible streaming video services with captions and video description, in significant part thanks to the Commission's efforts to guarantee equal access to video under the Twenty-First Century Communications and Video Accessibility. This ecosystem has also come to foster a wave of high-performance, dynamic applications specifically designed to help people with disabilities not just experience the entertainment, cultural, and educational value of video, but to *communicate and navigate the world* on equal terms.[16]

The imposition of data allowance or "data caps" causes fundamental challenges for deaf or hard of hearing consumers who tend to be more reliant on bandwidth-intensive applications for everyday communications than other consumers. For someone who is deaf or hard-of-hearing, video communication is *equivalent* to voice communication to someone who is not. A

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[14] *Id*.

[15] Comments of Telecommunications for the Deaf and Hard of Hearing, Inc. et al., Docket No. GN 14-28, Docket No. WC 17-108, at 2 (filed July 17, 2017) ("TDI Comments"), https://ecfsapi.fcc.gov/file/1071783345674/2017.07.17%20Consumer%20Groups%20%2B%20Researchers%20Open%20Internet%20Comments%20%28final%29.pdf.

[16] *Id.*

one-hour call might consume 450 MB over a wireless connection or 2.25 GB over a wired connection.[17] Using the 450 MB per hour figure and assuming that the use is seldom over 1 hour per day, you need 15 GB per month for video calls using wireless devices. For a consumer without an unlimited data plan, this can cause financial problems. Even for those with unlimited data, the experience can be significantly degraded above 22 GB – like AT&T's "unlimited" plans that "may slow speeds" for the deaf customer's video calls after 22 GB per month to an unspecified level that may not support the necessary bandwidth requirements[18] – and once that threshold is reached, congestion can force constraining capacity on the data providing lower quality visuals and audio.

Similarly, if a one-hour video call over wired networks consumes 2.25 GB, assuming that use is seldom over one hour per day, you need 68 GB per month for video calls using wired broadband. Thus, in order for broadband to be available to VRS users, wired broadband plans must include at least 68 GB of usage per month just for VRS. This means a VRS user consumes more data than the average Comcast broadband user, who uses 60 GB of data per month.[19] If the VRS consumer uses 68 GB for video calling and 60 GB for surfing, downloads, and other Internet activity, that consumer would come close to AT&T's monthly cap of 150 GB for DSL users.[20] Because deaf and hard-of-hearing consumers who face inadequate data allowances lack availability of adequate broadband service that meets their basic communications needs, the FCC should include data caps in its evaluation of whether broadband is available.

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[17] *Id.* at 5.

[18] AT&T, AT&T Unlimited Plus, https://www.att.com/plans/unlimited-data-plans.html.

[19] Klint Finley, *"SORRY, IT'S TIME TO START COUNTING GIGABITS AT HOME, TOO,"* Wired (June 1, 2016), https://www.wired.com/2016/06/sorry-time-start-counting-gigabytes-home/.

[20] See AT&T Home Internet Data Usage FAQs, https://www.att.com/esupport/article.html#!/u-verse-high-speed-internet/KM1010099.

The Commission has established minimum data allowance standards in other contexts and there is no compelling reason not to adopt similar – or more robust – standards in evaluating deployment and availability of advanced telecommunications services.[21] At a minimum, the Commission should examine data allowances for both wireless and wired broadband to determine whether allowances are sufficient to meet the broadband needs of all Americans, including deaf and hard-of-hearing consumers who rely on bandwidth-intensive applications for their basic communications needs.

### C. LATENCY (400 milliseconds with a packet loss less than 0.5%)

In addition to seeking comment on the appropriate speed benchmark to be used to evaluate broadband deployment, the Commission seeks comment on whether it should incorporate latency into its Section 706 benchmarks.[22] Consumer Groups unequivocally believe that incorporating latency is necessary to evaluate the deployment of advanced telecommunications capability with respect to both fixed and mobile broadband services.[23]

Latency is the time it takes for a data packet to travel across a network from one point on the network to another. High latencies may affect the perceived quality of some interactive services such as phone calls over the Internet, video chat, or online multiplayer games.[24] For

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[21] *See Connect America Fund, et al.*, WC Docket No. 10-90, Report and Order, Order and Order on Reconsideration, and Further Notice of Proposed Rulemaking, 31 FCC Rcd. 3087, 3099, ¶ 27 (2016) (adopting a minimum data usage allowance that rate-of-return carriers must meet to satisfy broadband deployment obligations); *Lifeline and Link Up Reform and Modernization, et al.*, WC Docket Nos. 11-42, 09-197, and 10-90, Third Report and Order, Further Report and Order, and Order on Reconsideration, 31 FCC Rcd. 3962, 3989, ¶ 74 (2016) (establishing a minimum data usage allowance that must be offered to fixed and mobile Lifeline customers).

[22] *2017 Notice of Inquiry*, ¶ 15.

[23] *Id.*

[24] Federal Communications Commission Office of Engineering and Technology and Office of Strategic Planning & Policy Analysis, 2016 Measuring Broadband America Fixed Broadband Report, A Report on Consumer Fixed Broadband Performance in the United States

purposes of this NOI, we focus on the latency time for relay services that are relevant to the flow of language on the call once it has already started. This includes the time it takes a deaf or hard-of-hearing caller to sign a sign until the communications assistant sees it, the time it takes a caller to say a word until the other party hears it, and the time it takes from typing a character in real-text-time until it appears on the screen of the other party. For example, if a consumer who is deaf makes a video call to a colleague, signs a phrase to the other party, and the latency time is too long, the consumer will start to wonder if the other party has received it, will repeat the signing, and then the response that was already on its way appears and creates confusion. For this reason, we recommend that the latency for end-to-end communication of real-time text, audio and visual be less than 400 milliseconds with a packet loss less than 0.5%. Note that this figure includes capture and presentation time and usually includes many hops for the packets in the network. The time allowance for each hop in the network is much lower. This requirement can be contrasted with streamed usage and text messaging, which can have higher latencies, up to a few seconds.

Consumer Groups recognize that some types of broadband (*e.g.* satellite) may not currently or consistently achieve these latency targets. While Consumer Groups agree that broadband not meeting these latency targets may be sufficient for some applications, it is not sufficient for video calling applications that are critically necessary to meeting the telecommunications needs of the deaf and hard-of-hearing community. The failure to include this latency measure would mean broadband enabling functionally equivalent services is not available to "all" Americans, which includes Internet-based TRS consumers that rely on VRS for their communications needs. Services that do not provide the performance characteristics

(rel. Dec. 2016), https://www.fcc.gov/reports-research/reports/measuring-broadband-america/measuring-fixed-broadband-report-2016.

that are necessary for everyday communications applications should not be counted as broadband for purposes of determining if advanced telecommunications capability is available to all Americans.

### D. CONSISTENCY OF SERVICE

In addition to including latency, Consumer Groups urge the Commission to include consistency of service as a factor in determining whether advanced telecommunications capability is available.[25] Providers often advertise speeds well above what a consumer experiences at any given time when they access the network. Although some variance in throughput may occur due to network congestion, services with throughput that varies significantly from advertised speeds at times that are unknowable by consumers renders such services inadequate, particularly for users who need speeds suitable for real-time video applications. In such circumstances, it may be impossible for a consumer to know whether he/she will be able to use the desired application due to the lack of prolonged consistency in service speeds. Consumers lack assurance that the broadband service to which they subscribe will be adequate to meet their routine communications needs when they seek to utilize the service lack adequate broadband availability. As a practical matter, there are very few consumer broadband services that offer symmetrical upload and download speeds or provide guarantees that consumers will experience advertised broadband speeds. Plans that facilitate consistent 1 Mbps symmetrical bandwidth for video calling are likely to be provisioned at much higher capacities. Rather than attempting to measure sustained speeds that providers do not offer today, the Commission should base its speed measurement on the higher but asymmetrical offerings that are actually offered on the market today—i.e., 25/5 or 50/5, 100/10, etc.

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[25] *2017 Notice of Inquiry*, ¶ 15.

## III. BROADBAND IS NOT AVAILABLE TO CONSUMERS THAT RELY ON INTERNET-BASED TRS SERVICES UNLESS IT MEETS THESE MINIMUM TECHNICAL SPECIFICATIONS

If the FCC sets a benchmark based on what is needed to provide full functionality for the leading voice, data, graphics and video telecommunications services,[26] Internet-based relay services must be included in that evaluation. Video communication to someone who is hard-of-hearing or deaf is *equivalent* to voice communication to someone who is not. Consumers with disabilities have significant bandwidth needs that "often exceed the needs of consumers without disabilities engaged in similar activities, or add bandwidth needs for tasks that consumers with disabilities are able to undertake without the help of applications."[27] Whereas hearing Americans often enjoy unlimited local and long distance calling, consumers that rely on Internet-based TRS services to communicate will not enjoy functionally equivalent communications because of data caps or data throttling. Therefore, unless broadband provides Internet-based TRS consumers with unlimited data for video calls, broadband is effectively not available to these consumers. Consumer Groups thus recommend that the Commission define and measure whether broadband is available to all Americans using, at a minimum, the technical characteristics explained in Section II of these comments: (1) broadband speeds of at least 25 Mbps up and 3 Mbps down for both wired and wireless broadband; (2) a minimum data allowance of 15 GB per month wireless and 68 GB per month wired and (3) latency of 400 milliseconds with a packet loss less than 0.5%.

A second best alternative would be to measure where disparities exist in terms of the availability of services meeting such technical characteristics to deaf and hard-of-hearing

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[26] *Id.* ¶ 25 (asking whether the FCC should "set the benchmark at a speed that would allow Americans to use, with full functionality, the leading voice, data, graphics, and video telecommunications services" and, if so, "which services to include in the evaluation").

[27] TDI Comments at 4.

consumers as compared to hearing consumers. To be clear, this is not the Consumer Groups' preferred measurement. To the extent, however, the Commission declines to adopt the technical specifications necessary for broadband to meet the needs of Internet-based TRS users, it should at least measure where broadband sufficient to meet those needs is available.

## IV. CONCLUSION

The Consumer Groups respectfully encourage the Commission to consider the points discussed herein when developing its policies promoting deployment and accessibility of broadband to all Americans. The needs of deaf, hard-of-hearing, late-deafened, DeafBlind, speech-disabled or deaf and mobile-disabled consumers must be a factor in developing these policies because broadband provides an essential platform for these individuals to communicate with the world and achieve the functional equivalency that the ADA requires.

Respectfully submitted,

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