

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

In the Matter of	)	
	)	
International Comparison and Consumer	)	GN Docket No. 09-47
Survey Requirements in the Broadband Data	)	
Improvement Act	)	
	)	
A National Broadband Plan for our Future	)	GN Docket No. 09-51
	)	
Inquiry Concerning the Deployment of Advanced	)	GN Docket No. 09-137
Telecommunications Capability to All Americans	)	
in a Reasonable and Timely Fashion, and Possible	)	
Steps to Accelerate Such Deployment Pursuant to	)	
Section 706 of the Telecommunications Act of	)	
1996, as Amended by the Broadband Data	)	
Improvement Act	)	
	)	

**COMMENTS IN RESPONSE TO  
NBP PUBLIC NOTICE #1**

Telecommunications for the Deaf and Hard of Hearing, Inc. (“TDI”), through its undersigned counsel, Association of Late-Deafened Adults, Inc. (“ALDA”), National Association of the Deaf (“NAD”), Deaf and Hard of Hearing Consumer Advocacy Network (“DHHCAN”), California Coalition of Agencies Serving the Deaf and Hard of Hearing (“CCASDHH”), American Association of the Deaf-Blind (“AADB”), and Hearing Loss Association of America (“HLAA”) (collectively, the “Consumer Groups”), hereby respectfully submit these comments in response to the Federal Communications Commission’s (“Commission”) Public Notice (“*Notice*”) in the above-referenced proceeding.<sup>1</sup>

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<sup>1</sup> *Comment Sought on Defining “Broadband” NBP Public Notice #1, Public Notice, DA 09-1842 (August 20, 2009) (“Notice”).*

The Commission seeks comment on “how the Plan should interpret the term ‘broadband’ as used in the Recovery Act.” Specifically, the Commission seeks comments on: (1) the general form, characteristics, and performance indicators that should be included in a definition of broadband; (2) the thresholds that should be assigned to these performance indicators today; and (3) how the definition should be reevaluated over time.

**I. BROADBAND SHOULD BE DEFINED TO ENABLE COMMUNICATION AND TELECOMMUNICATIONS RELAY SERVICES**

Broadband services are essential for deaf, hard of hearing, late deafened and deaf-blind consumers as they enable such consumers to communicate with each other in point-to-point calls, and with hearing consumers through telecommunications relay services (“TRS”) using voice, text, and video communication. Thus, the term “broadband” must be defined in a manner, and with appropriate speed, latency and performance parameters, so as to enable access to all types of point-to-point communication and TRS. Internet-based services, like Video Relay Services (“VRS”) and Internet-based captioned telephone services, rely on broadband and are increasingly becoming the communications method of choice for people who are deaf, hard of hearing, late deafened, and deaf-blind.

The Americans with Disabilities Act (“ADA”) requires functionally equivalent communication services for all Americans.<sup>2</sup> VRS is one of the most functionally equivalent services for people who communicate using American Sign Language (“ASL”) because it enables deaf, hard of hearing, late deafened and deaf-blind consumers who use ASL to communicate in their preferred language. Unlike certain other TRS services, VRS provides users the ability to communicate in near real-time with greater accuracy through the use of broadband. Broadband speed and performance thresholds are important factors in enabling VRS

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<sup>2</sup> 47 U.S.C. §225.

calls in real-time. Likewise, appropriate broadband speeds and performance thresholds are needed to enable Internet-based captioned telephone services like Web CapTel® and recently developed captioned telephones that can be used with VoIP services. Web CapTel is one of the most functionally equivalent services for people who are deaf, hard of hearing, late deafened or deaf-blind who prefer to use their own voices together with residual hearing and technological aids (e.g., hearing aids, cochlear implants and assistive listening devices) to facilitate communication when using telecommunications equipment.

## **II. BROADBAND SHOULD BE DEFINED TO ENABLE FULL AND EQUAL ACCESS**

In addition to TRS applications, with proper guidance from people with disabilities and other stakeholders in the planning stages, numerous other applications using broadband technologies hold the promise of full and equal access to communication, video programming, media and information. Broadband needs to be designed to carry content in alternative formats such as captioning, video description, sign language, and other means. For example, a fast emerging trend is television video programming broadcasting or rebroadcasting on the Internet. Video websites for prime-time broadcast networks and many other independent entities now include captioning, which is also being used by search engines to locate text strings matching search queries. The inclusion of captioning, along with video description services for people who are blind, for video programming distributed over the Internet is expected to increase and become the norm. As such, broadband must be defined in a manner that enables these and other access features from the outset to ensure that people with disabilities have equal access to communication, video programming, media and information.

The characteristics, performance indicators, and thresholds for broadband should be defined for any network where the traffic is transmitted natively using Internet Protocol.

This includes all forms of transmission including but not limited to wired (e.g., wireline and powerline), wireless (e.g., WiFi, WLAN, Satellite, and Microwave), and optical (e.g., fiber). People with disabilities should not be limited in their ability to achieve equal access to broadband because broadband characteristics, performance indicators, and thresholds are defined differently for different forms of transmission. For example, consumers with disabilities may reside in locations where choices of broadband services are limited. Such limitations should not result in limiting access to broadband by consumers with disabilities. Similarly, consumers with disabilities who reside in locations where choices of broadband services exist should not be limited to choosing only that broadband service that provides equal access.

The Consumer Groups understand that performance indicators and thresholds for broadband to ensure equal access need to be defined to achieve certain quality of service (“QoS”) levels sufficient for effective communication using video technologies. QoS refers to the ability to have data flow evenly and without delay, rather than in fits and spurts. Such QoS levels are critical to effective communication.<sup>3</sup>The Consumer Groups further understand that video communication can be achieved at download and, most importantly, upload speeds of 256kbps. However, because 256kbps speeds are difficult to maintain consistently (e.g., due to latency, throttling, and other factors and issues), the Consumer Groups understand that *more than a minimum of 256kbps download and upload speed is required to achieve and ensure effective communication for consumers with disabilities who rely on video technologies for communication.*

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<sup>3</sup> See “Disability Access and Broadband Needs”, TRACE Center Response to Undertaking of CCD/ARCH in PN2008-19, July 20, 2009, attached hereto. The Consumer Groups take no position with respect to these attached comments, but provide it as an example of a discussion about QoS and speed.

How much more than 256kbps should be required (e.g., 384, 512, 768 or higher kbps) within the definition of broadband is subject to further consideration. Other factors, such as multiple, simultaneous users of video communication at one location, must also be included in that consideration. As such, the Consumer Groups look forward to reviewing comments from TRS providers and others to provide more specific information on speed requirements, latency parameters and performance thresholds applicable to their services. The Consumer Groups note that these entities have intimate familiarity with the necessary technical broadband parameters required to provide effective communication services to deaf, hard of hearing, late deafened and deaf-blind consumers.

### **III. CONCLUSION**

The Consumer Groups respectfully encourage the Commission to consider the points discussed herein when developing its definition of “broadband.” The needs of people with disabilities, including people who are deaf, hard of hearing, late deafened, and deaf-blind, must be a factor in developing the definition because broadband provides an essential platform for these individuals to communicate with the world.

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Respectfully submitted,

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Dated: August 31, 2009

**ATTACHMENT**



July 20, 2009 – Response to Undertaking of CCD/ARCH in PN2008-19

## **Disability Access and Broadband Needs**

The purpose of this brief on behalf of CCD/ARCH is to follow up on a request for information from Vice-Chairman Katz (Transcript Paragraph 2457, 2009-07-08 Volume 3) with respect to the amount of extra bandwidth needed by people with disabilities in order to accommodate their disabilities.

### **Brief**

People with disabilities will need more bandwidth than others and their pattern of usage of this bandwidth will have a greater variety. However, except for phone calls and their equivalents, the amount of extra bandwidth needed is not large compared to the amount needed for downloading of full-length movies or the transmission of HDTV. Moreover the amount needed for disability access as a percent of general Internet traffic will steadily decline in comparison to general broadband needs. This is because the amount needed for captioning, description, and other access information is small compared to things like HD movies or television.

For telecommunication the situation is currently different where video is required. Although the need for additional bandwidth for text communication will be negligible, the bandwidth for those using video (e.g. sign language) for communication will be significantly larger than those who only use audio. Similarly, the bandwidth needed for video capable of transmitting sign language clearly or allowing lip reading is significantly more than that needed for slow frame rate video. If looking at telecommunication alone therefore – there is a significant difference between the bandwidth needed by people using sign language-capable video, gesture recognition or gesture and visual signs for their communication and those just using voice. (This additional need however will be greatly surpassed by the downstream bandwidth needs of HDTV or Movies streamed over the Internet if telecommunication and these activities are viewed together.)

It should be noted that people with disabilities will need more upstream capability than usual. For many mainstream users, the downstream speed is what is most important – for downloading and TV viewing. For disability telecommunication and for server-based alternative input systems (requiring delay-free feedback) however, the bandwidth requirements are symmetrical. In the short run (with lower upstream bit rates) this can cause a problem and additional upstream bandwidth is needed by some. There is also a

problem when ISPs identify any prolonged upstream traffic as peer-to-peer and throttle it or reduce the QoS.<sup>1</sup>

The upstream bit rate problem should not be a long-term issue (10-20 years). When upstream speeds are all above 2 Gbit/s with QoS (and not throttling for prolonged use) there should be sufficient bandwidth for all of the supplemental video needed for intelligible video communication and uploading of video, audio, server-based user interfaces or other accommodation information to supplement mainstream content or telecommunications. However, upstream bandwidth has always been lower than downstream and companies that increase downstream to allow HDTV may not provision upstream at the same rate. And in order to control peer-to-peer this asymmetry may continue in service offerings or throttling behavior. So it may be awhile before the upstream grows past 1 or 2 Gbit/s with QoS and this problem goes away.

Note that under no circumstances should the upstream (or downstream) bandwidth be throttled back below 500 kbit/s with QoS (or, to be safe, 1 mbit/s) since this could interfere with the ability to make an emergency call using video or video relay service and sign language.

Monthly capacity limitations (caps) also are a problem if (and only if) they are not high enough by default. A single sign-language capable video call for example could use 3.7Mbytes/min (500 kbits/sec\*60sec/8bits). An hour and a half per day by one caller would equal 10 Gbyte/month. A family with multiple deaf teenagers could run up a significant monthly usage doing nothing more than normal teenage phone calling. Again however, as our capacity continually increases and the Internet is used routinely for HDTV and HD Movies, this disability access traffic will be negligible compared to ordinary traffic for HD video of all sorts (including eventually HD phone calls by all as bandwidth costs continue to drop).

The amount of bandwidth to add captions, audio descriptions or sign language interpretation will always be a small part of the bandwidth needed for the Movies or TV they supplement. They do have to be given the same QoS however even if they come from other sources than the Movie or TV they supplement. (See our filed comments in this regard.)

Conclusion: Although there may be a short term need for additional bandwidth (particularly upstream), as the minimum broadband speeds offered by carriers (upstream and downstream) eventually all exceed 4 Mbit/s, the need for extra broadband consideration for disability access will likely not need to be provided. And, as noted, widespread use of the broadband for HDTV (often multiple streams simultaneously) will result in monthly caps that will far exceed the total bandwidth needed for video (or other media or data) additions to telecommunication or content to make it accessible. If telecommunication is treated separately however, there will always be the need for additional bandwidth to accommodate sign language and other gesture and visual

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<sup>1</sup> QoS refers to Quality of Service and means the ability for the content to flow smoothly and without being delayed or having gaps in delivery.

communication until the time that all telecommunication includes relatively high definition, high QoS video.

## Basis for the above assessments

- Adding captions to a video does not significantly increase the bandwidth needed to transport the video. The text can be transmitted with much less bandwidth than the video.
- Sign language can be sent (one direction) reliably using 500 kbit/s or less using H.263 codec and 300 kbit/s or less using H.264 or comparable codec. A connection with 500kbit/s (downstream and upstream) with QoS should transport one video call without any difficulty. These numbers are also valid to facilitate lip reading, the bitrate upstream required for server-based interfaces, and gesture communication systems. Two calls from the same house would together require double the bandwidth.<sup>2</sup> These bandwidths are of course, much less than streaming HDTV or multiple streaming HDTV shows to a home.
- Adding a separate sign language stream for a movie would add less than 500 kbit/s. This would require some additional bandwidth but would be greatly surpassed by the bandwidth of the streaming movie itself. There should be no problem with bandwidth to support the sign language **if the sign language stream is afforded the same QoS as the movie.**
- Captioning (if transmitted separately as is sometimes required for movies without built in captions.) would require much less than 100kbit/s (even with redundancy).
- For people who are blind – a separate audio stream may be needed for each video stream to provide a description of the visual information. This audio information would be less than 100 kbit/s per audio stream and would be a small portion of the bandwidth for the video stream. Again it would however need the same QoS as the video so it could be synchronized.

NOTE: If there are more than two calls with bidirectional sign-language quality video then additional bandwidth would be required proportionate to the number of calls. So for locations with many people using sign-language and not using HDTV or other high

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<sup>2</sup> WLAN Trials for sign language conversation. EU IST FP5 project IST-2000-27512 WISDOM, Deliverable D.8. Omnitor and Orebro Interpreter Centre, Sweden. 2003. <http://www.ist-world.org/ProjectDetails.aspx?ProjectId=05d5054616034f20afea3f732f8edcaf&SourceDatabaseId=9cd97ac2e51045e39c2ad6b86dce1ac2>

bandwidth activities, there could be a significant increase in bandwidth needed over say an equal number of audio only calls or light Internet use.

Respectfully submitted

A handwritten signature in cursive script, appearing to read "Gregg C. Vanderheiden", followed by a horizontal line.

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