VIA ECFS

May 3, 2018

Marlene H. Dortch, Secretary
Office of the Secretary
Federal Communications Commission
445 12th Street, S.W.
TW-A325
Washington D.C. 20554

Re: The Accessibility of Communications Technologies for the 2018 Biennial Report Required by the Twenty-First Century Communications and Video Accessibility Act [CG Docket No. 10-213]

Dear Ms. Dortch:

Enclosed for filing in the above referenced Public Notice are comments of the Rehabilitation Engineering Research Center for Wireless Inclusive Technologies (Wireless RERC).

Should you have any questions concerning this filing, please do not hesitate to contact me via email at helena.mitchell@cacp.gatech.edu.

Respectfully submitted,

Helena Mitchell
Principal Investigator, Wireless RERC
Center for Advanced Communications Policy
Georgia Institute of Technology

Enclosure

Before the
Federal Communications Commission
Washington, D.C., 20554

In the matter of	)	
	)	
The Accessibility of Communications	)	
Technologies for the 2018 Biennial Report	)	
Required by the Twenty-First Century	)	
Communications and Video Accessibility Act	)	CG Docket No. 10-213

COMMENTS OF THE
REHABILITATION ENGINEERING RESEARCH CENTER FOR
WIRELESS INCLUSIVE TECHNOLOGIES (WIRELESS RERC)

The Georgia Institute of Technology's Center for Advanced Communications Policy (CACP) in collaboration with the Rehabilitation Engineering Research Center for Wireless Inclusive Technologies[1] (Wireless RERC**)** hereby submits comments to the above-referenced Public Notice, released on April 5, 2018. CACP is the home the Wireless RERC, funded since 2001 by the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR), a Center within the Administration for Community Living (ACL), U.S. Department of Health and Human Services (HHS). The Wireless RERC mission is to *integrate established wireless technologies with emerging wirelessly connected devices and services for a transformative future where individuals with disabilities achieve independence, improved quality of life, and enhanced community participation.*

In anticipation of this Public Notice, the Wireless RERC conducted a 2017 Mobile Phone Accessibility Review (Accessibility Review/Review). The Review included mobile phone models available as of September 2017 from the top four wireless carriers, one prepaid carrier, and five Lifeline Carriers.[2] Researchers, using the providers' web pages as a reference, identified 214 mobile phones for evaluation. Two research analysts independently collected data on 24 accessibility features (or features that impact accessibility) available in each phone model.

[1] The Rehabilitation Engineering Research Center for Wireless Inclusive Technologies (Wireless RERC) is sponsored by the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR grant number 90RE5025-01). NIDILRR is within the Administration for Community Living (ACL), Department of Health and Human Services (HHS). The contents of this filing do not necessarily represent the policy of NIDILRR, ACL, HHS, and you should not assume endorsement by the Federal Government.

[2] A random number generator was used to select five of the 49 lifeline carriers for inclusion in the review.

Sources included the Mobile Manufacturers Forum Global Accessibility Reporting Initiative (GARI) database,[3] user manuals, and phonescoop.com. With the exception of hearing aid compatibility (HAC) rating and screen size, accessibility features were coded as either 1 = "yes," 0 = "no," or 3 = "information not available." Once the data collection phase was completed, the two databases were reconciled, and a summary analyses produced using Microsoft Excel.[4]

Study limitations. A limitation of the results of this Accessibility Review is that the 25 features included in the review are not an exhaustive list. Consumers use device features in novel ways to improve access. For example, timers and reminders can be used in an assistive manner for someone with cognitive disabilities, but that feature was not assessed in the study. With the exception of FM Radio and WEA-capable,[5] the features identified for the study include those that are used to access the phone, content displayed on the phone, or to connect to external assistive technology or other smart devices that can be controlled via the phone. Another limitation of the results is that for many of the features, information about whether it was included in the phone could not be found using the three sources listed above. Thus, we cannot conclusively state that the features *are* or *are not* present. However, the difficulty in locating information about certain features is in itself an important result, as consumers with disabilities may experience a similar problem when comparing models and selecting a phone to purchase. While people without disabilities can compare phone models based on *preferences* alone, people with disabilities may have accessibility *requirements* for the phone to be usable by them (e.g., video calling, HAC, screen reader, assistive technology (AT) connection). If information about the features required by a user with a disability is not easily found, then the consumer may purchase a phone that is not fully accessible to them, or not purchase a phone model that would have been accessible to them. Notwithstanding the limitations of this study, the results provide a snapshot of accessibility of a sample of mobile phone models commercially available in 2017. Unless otherwise noted, the comments made herein share the results of the Accessibility Review.

[3] The Global Accessibility Reporting Initiative (GARI) is a project of the Mobile & Wireless Forum (MWF). Some of the data referred to in this paper was sourced from the information available from the GARI website www.gari.info and used with permission of the MWF, although all views and conclusions are the authors alone.

[4] The Accessibility Review data collection was completed in March 2018. Hence, at this time, only a preliminary summary analyses is available. Full analyses and reporting are anticipated to be completed by August 2018.

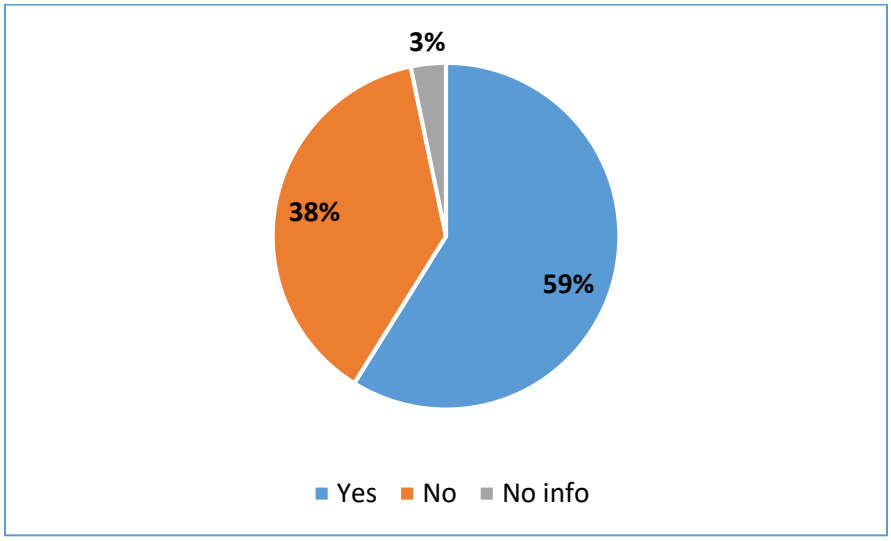
[5] Data were collected on the presence of an FM Radio feature and WEA capability to inform ongoing mobile emergency communications research initiatives.

Section III: Compliance with Sections 255, 716, and 718

¶5 - *Accessibility. Specifically, we seek input on the state of accessibility of "mobile" or wireless services, including basic phones and feature phones (collectively referred to herein as non-smartphones), as well as smartphones.*

The Accessibility Review included both smart and non-smartphones. Figure 1 shows that the majority of phones in the sample were smartphones (59%, n = 126), and 38% (n = 81) were basic or feature phones. Smartphones include a broad range of features that can be used in an accessible or assistive manner for a variety of disability types. Further, mobile applications (apps) can be downloaded to the device for very specific access functions. Non-smartphones have fewer options, but in some cases may offer greater accessibility. However, with non-smartphones, there tends to be a tradeoff in functionality. Consumers vary in their preferences for smart versus non-smartphones. In focus groups of people with traumatic brain injury, participants mentioned keeping their clamshell style phones because of their durability.[6]

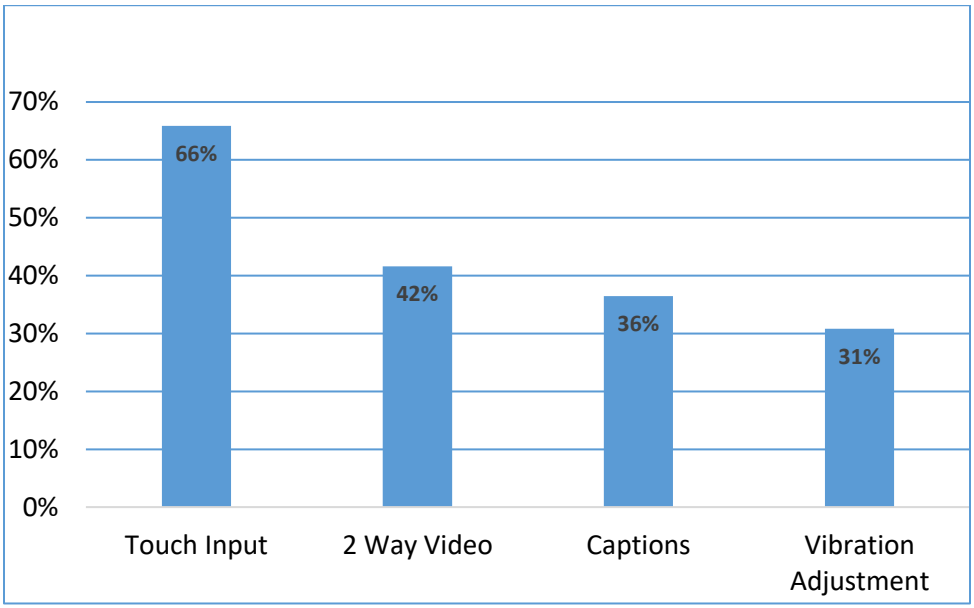
Figure 1: Phone Type



[6] CACP Collaborative (2015). Investigate Experiences with Technologies Used for Emergency Alerting and Behavioral Response [Focus Groups Notes]. *DHS S&T Project: Optimizing Ability of Message Receipt* [Contract No. HSHQDC–14–C – Booo4].

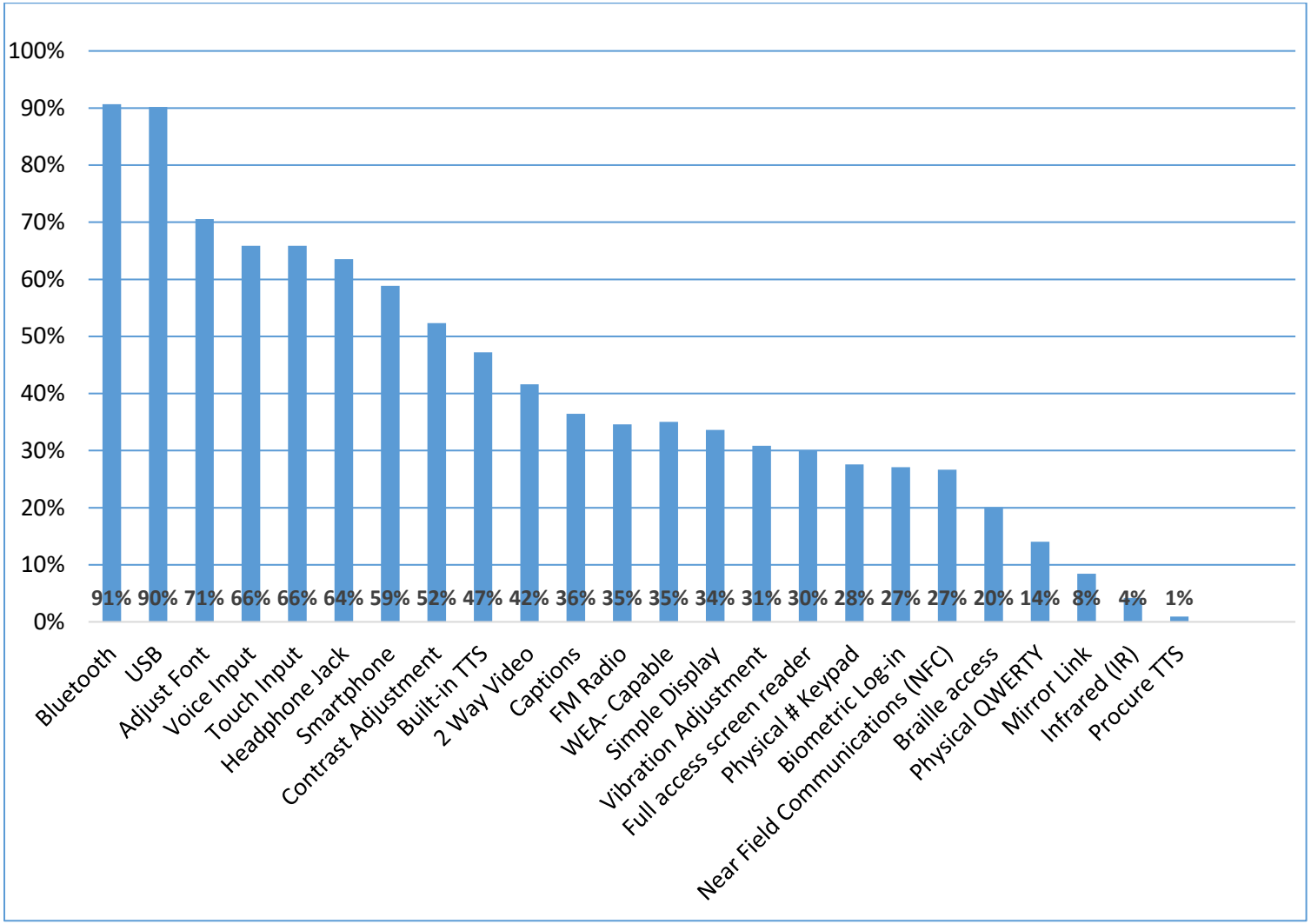
Of the 214 phones, 0% of devices had full, out-of-the-box accessibility. This level of access may require the user to enable accessibility features, but all of the accessibility features evaluated would be built into the device's OS. The benefit of full, out-of-the-box accessibility is that it simplifies phone selection for people with varying capabilities and functional levels. If all phones were fully accessible, then people with disabilities could select from all available models. As it stands now, people with disabilities have a more limited selection, and more research is required on the part of the consumer prior to purchase. By example (Figure 2), approximately 42% of the devices have accessibility features that would allow people who are deaf to place a video call and communicate in American Sign Language (ASL). For certain populations, this feature is required to make the device usable. Thus 58% of the device sample may be excluded as device options for people that are deaf who primarily communicate via ASL.

Figure 2: Accessibility Features for Hearing Disability



Individually, the top three most frequently incorporated accessibility features/features that impact accessibility were Bluetooth (BLE) connection (91%), USB connection (90%), and font adjustment (71%) (Figure 3). Different connectivity options such as BLE allow for external assistive technologies to connect to the mobile phone, while features such as font adjustment are particularly useful for people with low vision and dyslexia/dyscalculia.

Figure 3: Accessibility Features (all)



- **Font Adjustment**

  The majority of phones (n=151 or 71%) were found to include the ability to adjust the font size on the phone. This feature allows for changing the size, and sometimes color or type of font. It is useful for people with low vision, dyslexia, and dyscalculia, among others.

Table 1: Font Adjustment

	Frequency (N)	Percentage
No	5	2%
Yes	151	71%
No info	58	27%
Total	214	100%

- **Contrast Adjustment**

  Fifty-two percent (52%, n = 112) of all phones examined offered the ability to adjust the contrast on the phone. While all phones seem to allow users to adjust the brightness of the screen, the ability to adjust screen brightness was not considered the same as adjusting the contrast of the screen. Phones in the GARI database had information regarding the ability to adjust the screen contrast. For phones not in the GARI database, the manual was searched specifically for the ability to adjust the screen contrast, not brightness. For some phones, the manuals noted the ability to adjust the contrast of the browser screen when utilizing an internet application on the phone. Having the capability to adjust the browser screen contrast, but not to adjust the screen contrast for other features such as contacts, calendar, text messages, etc., does not give full access to the phone for people who require contrast adjustment as an accommodation.

Table 2: Contrast Adjustment

	Frequency	Percentage
No	3	1%
Yes	112	52%
No info	99	46%
Total	214	100%

- **Built-in Text-to-Speech (TTS)**

  Approximately 47% (n = 101) of phones included a TTS feature built-into the phone. The phone manuals refer to the TTS feature in a variety of ways, including:

  - Text-to-speech/Text to speech
  - Voice Guide
  - Talk Back/Talkback
  - Voice Notification
  - Voice Output
  - Voiced Menus
  - Voice Reader

  The range of keywords referencing TTS capabilities on a phone may have a negative impact on users identifying phones with this feature, as they may be unaware of the alternative names.

Table 3: Built-in TTS

	Frequency	Percentage
No	4	2%
Yes	101	47%
No info	109	51%
Total	214	100%

- **Voice Input Features**

  Voice access to features was among the most incorporated accessibility feature, with 66% (n = 141) of phones found to have this feature. Phones may have had voice dialing capabilities included under the umbrella of voice access for phone features and not specifically list the voice dialing capability in the phone manual. Like the TTS feature, voice input was referred to in a variety of ways.

Table 4: Voice Input

	Frequency	Percentage
No	3	1%
Yes	141	66%
No info	70	33%
Total	214	100%

- **Full Access Screen Reader**

  Thirty percent (30%, n = 64) of the phones explicitly indicated they included a full access screen reader.

Table 5: Full Access Screen Reader

	Frequency	Percentage
No	1	0%*
Yes	64	30%
No info	149	70%
Total	214	100%

***Percentages were rounded. In the sample, an n = 1, was less than 1%.**

- **Simplified Display**

Approximately one-third (34%, n = 72) of devices in the sample allowed users to simplify the display of the phone. For phones not included in the GARI database, the manual was consulted to determine if the phone provided users with an alternative simplified screen display. In some cases, smartphones offered a limited access/simplified display for users less comfortable with the smartphone interface.

Table 6: Simple Display

	Frequency	Percentage
No	1	0%*
Yes	72	34%
No info	141	66%
Total	214	100%

***Percentages were rounded. In the sample, an n = 1, was less than 1%.**

- **Hearing Aid Compatibility (HAC)**

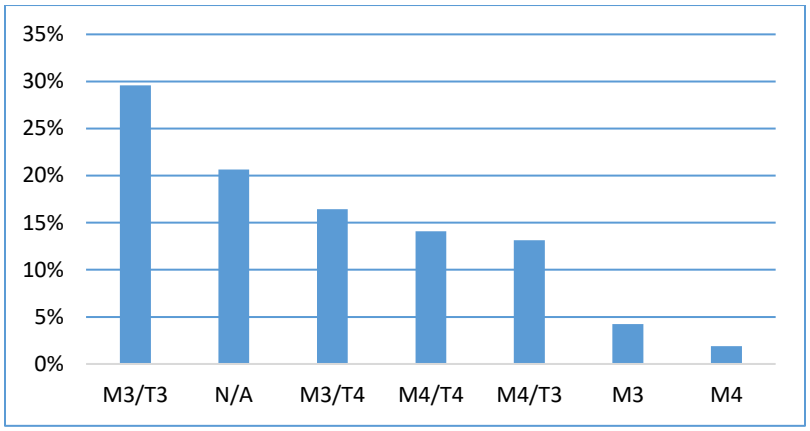
Researchers found HAC ratings for ~79% of the sample. Without a HAC compliant device, a user with a hearing aid or cochlear implant would experience interference; typically a buzzing, humming, or whining noise. Out of 171 devices,[7] all of them had at least a HAC rating of M3 or T3, on a scale of 1 to 4, with four being considered excellent.[8] M3/T3 ratings account for 30%

[7] Researchers were able to identify HAC ratings for 171 of the 214 phones in the sample.

[8] The M and T in the HAC ratings stand for microphone and telecoil. M3 or T3 is considered good and M4 or T4 is considered excellent.

of the devices in the sample, M3/T4 (16%), M4/T4 (14%), M4/T3 (13%), M3 (4%), and M4 account for 2%. When M and T ratings are available for the same device, theoretically, consumers are more likely to find the appropriate device for their needs. As is shown in Figure 4, a majority of the sample consisted of phones with combined ratings.

Figure 4: HAC Percent Breakdown



- **Input**

Input type can raise barriers that people with various types of disabilities may encounter when attempting to use mobile phone devices both smart and non-smartphones. Lack of multiple ways to interface with the phone could constrain accessibility. For example, basic phones without a voice interface would pose a problem for someone with limited or no use of their hands. Many smartphones require a degree of sight and dexterity that can be a limiting factor to users. Smartphones require gesture input such as “tap and hold” or swiping that have no real workarounds that we are aware of. For example, the speech features require gestures to select text to be read aloud or swipe down to read a page. Further, to enable the accessibility features in a smartphone one has to use tactile and dexterity movements. Perhaps having voice commands with voiced directions on the “settings” menus would lower the barrier of entry to the device for people with vision disabilities, or older adults that might not identify as having a disability. Others with functional limitations would also benefit from these accessibility features, including people with certain types of cognitive disabilities, and those with limited dexterity.

Fortunately, for people who prefer smartphones, the trend is to allow for multiple modes of interaction including touch/gesture-based access, voice access, and access through an external

device. Touchscreen was the most significant input method with 66% (n = 141) of devices in the sample indicating touchscreen input. Fourteen percent (14%, n = 30) had a physical QWERTY keyboard, and 28% (n = 59) had a physical numerical keypad. Notwithstanding the issues with accessing settings, the incorporation of voice input and output features for the touchscreen interface addresses access by people with vision disabilities. However, the touchscreen interface is only partially accessible to those with physical disabilities that prohibit their use of the touchscreen (e.g., amputee). For these individuals to control the phone without the use of touch, an external AT device would be required, such as switch access. Depending on the screen size and severity of dexterity limitations, the icons and in-app controls may be difficult to manipulate for some users. In a 2015 focus group, a participant comment illustrated this point: "I use the old fashion phone because with the iPhone I have problems with the scroll and the touch features…so I prefer old fashion phones, they did not demonstrate the ring before I bought it, I just got it because it's easy to hit the buttons.[9]"

Table 7: Input Types

Touchscreen	n	%
No	3	1%
Yes	141	66%
No info	70	33%
Total	214	100%

Physical QWERTY	n	%
No	176	82%
Yes	30	14%
No info	8	4%
Total	214	100%

Physical # Keypad	n	%
No	150	70%
Yes	59	28%
No info	5	2%
Total	214	100%

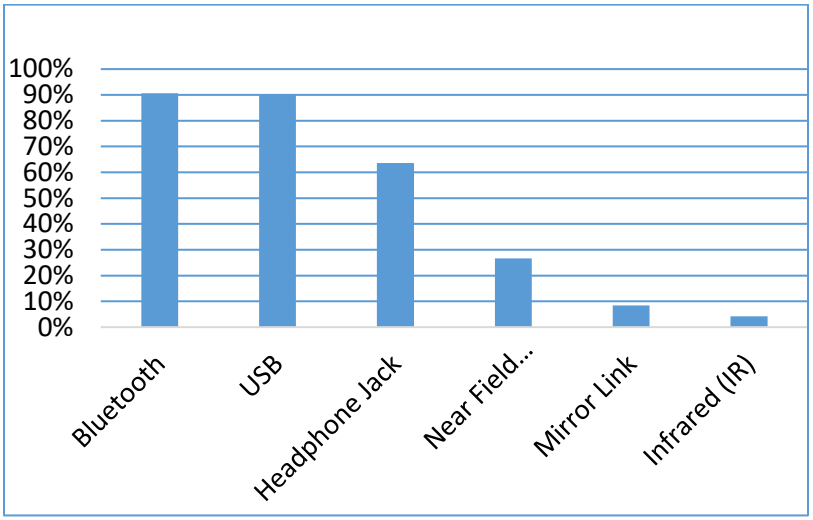
- **Assistive Technology Connection Capabilities**

The two most frequently available options for external connectivity were Bluetooth (91%, n = 194) and USB (90%, n = 193). Other options were Headphone Jack (64%, n = 136), Near Field Communications (NFC) (27%, n = 57), Mirror Link (8%, n = 18), and Infrared (4%, n = 9). Having multiple ways to connect the device to external assistive technology is critical for some people with disabilities' and their ability to use a smartphone. This was particularly true for particularly those that are blind who use refreshable Braille displays, or those with quadriplegia, who use switch access, a feature designed to allow for hands-free navigation of a device. Also,

[9] CACP Collaborative (2015). Investigate Experiences with Technologies Used for Emergency Alerting and Behavioral Response [Focus Groups Notes]. *DHS S&T Project: Optimizing Ability of Message Receipt* [Contract No. HSHQDC–14–C – Booo4].

connectivity options such as Mirror Link, NFC, and Infrared allow users to connect to their vehicles, perform cashless transactions, and utilize their smartphone as a universal remote.

Figure 5: Assistive Technology and General Connectivity Options



¶11 - *Information, Documentation, and Training. A product or service is "usable" if individuals with disabilities have access to the full functionality and documentation for the product or service, including instructions, product or service information (including accessible feature information), documentation and technical support functionally equivalent to that provided to individuals without disabilities*.

As discussed in the section above, phone setup and enabling accessibility features is not easily or independently done for some people with disabilities. Additional efforts should be undertaken to improve the accessibility of phone setup, particularly focusing on the input and output modes available for setting up the device. Also, as pointed out earlier, when collecting data for the Accessibility Review, the researchers encountered difficulty in locating information about certain features. Consumers with disabilities may experience a similar problem when comparing models and selecting a phone to purchase. While people without disabilities can compare phone models based on *preferences* alone, people with disabilities may have accessibility *requirements* for the phone to be usable by them (e.g., video calling, HAC, screen reader, AT connection). If information about the features required by a user with a disability is not easily found, then the consumer may purchase a phone that is not fully accessible to them, or not purchase a phone model that would have been accessible to them. In either scenario, the user experience may be negatively impacted, as their expectation for the device functionality would not have been met. To improve the ease by which consumers can identify phones with the features that they want and need, the Wireless RERC

recommends that the device manufacturers report accessibility features of phone models to the GARI-Global Accessibility Reporting Initiative database (GARI database). The GARI database is a collaborative effort between the Mobile Manufacturers Forum (MMF) and CTIA-The Wireless Association®. It is a consumer-facing searchable mobile phone database that will populate phone models for consideration based on the accessibility features selected or type of disability selected.

Section IV. Accessibility Barriers to New Communications Technologies

¶1. …we seek comment on accessibility barriers with respect to "new communications technologies" that are both within and outside the scope of the Act.[10] …To what extent have new types of communications services, hardware, software, applications, or plug-ins been deployed to the general public since the *2016 CVAA Biennial Report*? What accessibility barriers still exist with respect to these or other relatively new communications technologies?

The Wireless RERC noted in a research brief[11] that an increasingly visible set of technologies – the Internet of Things (IoT), can more robustly, and in a context-sensitive way, connect people with disabilities with their work, home, and other environments to support employment, community participation, and health and function. The design of these devices/services currently remains largely open and unfixed. While some consumers with disabilities currently experience the lack of uniformity as an access barrier, this emerging state of the technology presents opportunities for the active involvement of people with disabilities, alongside designers, developers, and manufacturers, to address unmet social, cultural, and technical needs.[12] Such an inclusive design process can address technology abandonment or discontinuance while enhancing reception of these technologies as socially acceptable and appropriate.[13,14]

[10] In the *2012 CVAA Biennial Report*, the Bureau rejected assertions that we should only consider "new communications technologies" that are not covered by the Communications Act and only those accessibility barriers that could not be eliminated with reasonable effort and expense. *See 2012 CVAA Biennial Report*, 27 FCC Rcd at 12222, para. 45. Here, too, we seek comment on the full spectrum of new communications technologies.

[11] Accessibility, Usability, and the Design of Wearables and Wirelessly Connected Devices Volume 2017, Number 17-01 – September 2017. Wireless RERC. http://wirelessrercdev.gatech.edu/sites/default/files/publications/research_brief_accessibility_usability_and_the_design_of_wearables_and_wirelessly_connected_devices_0.pdf

[12] Baker, P., Gandy, M., & Zeagler, C. (2015). Innovation and wearable computing: A proposed collaborative policy design framework. IEEE Internet Computing, 19(5), 18-25.

[13] Parette, H., Huer, M., & Scherer, M. (2004). Effects of acculturation on assistive technology service delivery. Journal of Special Education Technology, 19(2), 31-41.

[14] Scherer, M., Adya, M., Samant, D., & Killeen, M. (2011). Workplace Provision of AT/RT: Excerpt with preliminary findings from the FICCDAT/ RESNA 2011 Presentation: Effective RT/AT Service Delivery –State of Practice, Quality

At the 2018 CSUN Assistive Technology Conference, Amazon had a series of presentations all of which were well attended by conference goers, including people that are Deaf and primarily communicate via ASL. At nearly every session, ASL signers questioned how and when the Alexa would be able to understand gesture-based input. They commented that the Amazon Echo Spot now includes a display from which ASL signers could access the output from the gesture-based input.

The Tools for Life AT Lab at Georgia Institute of Technology provides an opportunity for consumers with disabilities to try out specialized AT equipment and current and emerging advanced communications technologies. Over the course of these technology demonstrations and training sessions, the following observations were made. Smart speakers such as the Google Home and Amazon Echo offer a whole new world of independence to individuals with disabilities. This is especially the case when these smart speakers are paired with smart home technologies. However, there exists a major barrier that prohibits many individuals from accessing and enjoying the numerous benefits these devices provide. The installation and setup of these devices are often very complex. Additionally, there is no standard protocol that these devices function upon, nor is there a standard setup procedure. As it stands now, to get the full benefit of a smart home setup, one would be required to cobble together a network of devices from various brands operating on different protocols, and each with a different mode of setup. Some may require that the user presses a button on a device to pair with the network and then also pair it with a smart speaker. Others may require the user to enter the device serial number into a smartphone app. Navigating the setup of these devices is no small task. Even setting up the smart speaker itself requires that the person be able to have full access to a smartphone and as explained in previous sections, full access is not a given.

In accordance with the Tools For Life observations, focus group participants noted that installation and set-up of these devices frequently are inaccessible.[15] For example, smart thermostats that may allow people that are blind to monitor and control their home environments without the need for graphical displays and controls still require vision to set up. As one user noted of a smart thermostat: “The problem is that you still have to have a sighted person to set it up.” Also, users

Indicators and ROI in the Workplace. Retrieved from http://www.workrerc.gatech.edu/Presentations/2011/BBI-resna2011.pdf

[15] Wireless RERC. Focus groups on next-generation wirelessly connected devices. Atlanta, Georgia (Center for the Visually Impaired (CVI); Shepherd Center Rehabilitation Hospital; AMAC Accessibility Solutions; and Georgia Center of the Deaf and Hard of Hearing); 28 November 2017-28 March 2018.

noted that if such devices encounter problems, ranging from power outages, Internet connectivity issues, or otherwise have failures or errors, that they often are unable to troubleshoot or restart the devices on their own. Such challenges render otherwise accessible, usable, and useful devices inaccessible for these consumers. Theoretically, this is a scenario where setup could be accomplished through a series of voice prompts. The Wireless RERC recommends that to improve total access to the systems and devices; companies should explore and develop solutions for how one who is blind would be able to independently set-up the technology.

Wireless RERC researchers are currently investigating social and cultural design factors for wearable display, sensor, and input/output (I/O) technologies. Wearables devices can offer contextually aware information and support for primary tasks ranging from using public transportation and working on an assembly line to meeting friends at a restaurant. The Wireless RERC recently conducted a series of nine focus groups on the use of "new communications technologies" by people with disabilities.[16] Preliminary results indicate that IoT-enhanced smart environments are perceived as being able to adapt to the needs of the associated users, and therefore, enhance the security and independence of people with disabilities. This includes more broadly, other intelligent devices—smart headsets, glasses, watches, bracelets, and more—which are finding their way into our daily employment and community contexts. While a more rigorous content analysis of the Wireless RERC focus groups is in progress, a few key themes may be noted:

- Various disability groups are increasingly adopting smart speakers with intelligent agents, particularly the Amazon Echo and Amazon Dot with Alexa. Consumers who are blind or who have low vision, for whom graphical interfaces may not be accessible, as well as people with dexterity or mobility-related disabilities, for whom button or touchscreen control may pose a barrier to use, have cited the voice control features of these devices as useful. More importantly, they have discussed the use of these devices as controllers for "smart home" appliances such as wirelessly connected lightbulbs, thermostats, and televisions. In addition to smart speakers, users with vision and dexterity disabilities also related the increasing importance of cable and satellite provider "smart" voice remotes for accessing television and video programming.

[16] Ibid.

- Another issue is the apparent cognitive load required for using different skills within intelligent agents. Despite advances in natural language processing, skills often have different commands. “[Amazon] Alexa can do a lot, such as a skill to let me make appointments on my calendar,” one user noted. However, “if you add ten commands, you’ve got [sic] ten things to memorize.”
- Regarding wearables devices, such as the Fitbit and Apple Watch, users noted the ability of these devices to provide information in a number of formats, such as audio tones or vibration cadences for specific information streams (phone calls, text messages, e-mails, social media notifications) or from specific individuals or groups. However, users have related that they are unable to manage their preferences for push notifications and alerts to the extent they would like, such as the ability select or even create specific vibration cadences. Device manufacturers may wish to consider making documentation regarding these options more available and accessible for blind and Deaf consumers in particular.
- Consumers with limited dexterity or impaired hand function, such as people with spinal cord injury or multiple sclerosis, have indicated the potential usefulness of wearables in their own lives. For example, the ability to use near-field communication (NFC) for payments often simplifies what is a complex task for many users who find handling cash or cards to be difficult. Participants also related that use of wearables-enabled payment apps also make them feel safer and more secure. However, they also have noted that complex gestures, such as multi-finger swipes, complicate their use of the devices. The issue is further complicated by small screens and controls for the devices, which offer very low tolerance for error: “Even with good finger function, touching that small display would be hard,” one focus group participant noted of a smartwatch.
- Consumers with disabilities who use wearables such as the Apple Watch discussed in great detail the effect that operating system updates may have on otherwise accessible or usable apps and menu structures for these devices. In a manner similar to smartphone system updates, users of these devices have expressed a desire to understand the effect of operating system updates on app accessibility through some means other than “trial and error.” As a result, a majority of blind and low vision focus group participants related that they deliberately avoid making system updates for as long as possible.

- Regarding the role of "new communications technologies" more generally, users from all disability groups reiterated the tension between the accessibility and usability they afford versus the potential for growing dependence upon these technologies.

In closing, we commend the FCC's efforts to measure the impact of provisions of the *Twenty-First Century Communications and Video Accessibility Act of 2010* (CVAA); specifically, in these procedures, efforts to identify gaps in accessibility and to ensure that future technologies maintain accessibility advancements while innovating. The accessibility of advanced communications technologies is improving. More accessibility features are available, and many of these features are customizable (e.g., the rate of speech for voice output, vibration adjustment, font adjustment, and more). These are much-appreciated gains. However, a perennial barrier to access, device setup, which quite literally allows the user to gain entry to the device, requires addressing to move the needle forward on people with disabilities' independently accessing advanced communications technologies and services.

Respectfully submitted,

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Dated this 3rd day of May 2018