

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

In the Matter of)
)
Accessible Mobile Phone Options for People) CG Docket No. 10-145
who are Blind, Deaf-blind, or Have Low)
Vision

To: The Commission

**COMMENTS OF THE
TELECOMMUNICATIONS INDUSTRY ASSOCIATION**

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INTRODUCTION

TIA commends the Commission for seeking to gather more information about the mobile phone market for all consumers, including those who are blind, deaf-blind, or have low vision, as part of your broadband accessibility efforts. TIA seeks to provide an overview of the mobile device market by outlining the process by which handsets are brought to market and the technical obstacles associated with incorporating accessibility into wireless products and services. Despite these challenges, TIA members offer a wide range of mobile devices that provide accessibility to users with vision impairment. TIA has continually engaged in dialogue with the FCC on these matters and hopes these comments provide further guidance to determine appropriate next steps to achieve communications access for all populations.

I. THE CURRENT MOBILE HANDSET MARKET GENERALLY HAS THREE CATEGORIES OF HANDSETS – FEATURE PHONES, MESSAGING PHONES, AND SMARTPHONES.

a. The categories can be distinguished by the characteristics of the handsets.

In order to address the issues raised in this *Public Notice* and to aid the Commission in determining the appropriate next steps, TIA seeks to provide the Commission with a better understanding of the mobile phone market and the way devices are brought to market. The current mobile phone market generally has three categories of handsets – feature phones, messaging phones, and smartphones, as distinguished by primary research firms, such as the NPD Group.¹ These categories can be distinguished by the characteristics of the handsets.

A feature phone is the most basic mobile phone. It is used primarily for voice and very basic text functions and is designed with a numeric keypad. It may include a basic mobile browser, such as a Wireless Application Protocol (WAP) browser, which is suitable for use across limited bandwidth. Feature phones have limited processing power and memory. They are offered at a very low price. Feature phones comprise 43 percent of the market share and include devices such as the Samsung Haven, Nokia 6350, and the Motorola Karma.

A messaging phone is essentially a feature phone with a changed form factor and a keyboard in place of a keypad.² The primary purpose of this device is to simplify

¹ THE NPD GROUP, http://www.npd.com/corpServlet?nextpage=corp_welcome.html (last visited Sept. 10, 2010) (a global provider of consumer and retail market research information). See also INTERNATIONAL DATA CORPORATION (IDC), <http://www.idc.com/> (last visited Sept. 10, 2010) (a global provider of market intelligence for information technology, telecommunications, and consumer technology markets).

² “Form factor” refers to the shape and size (width, depth, height) of a mobile device. NEWTON’S TELECOM DICTIONARY 410 (25th ed. 2009).

messaging through proprietary Instant Messaging (IM), Short Messaging Service (SMS), and email applications. A messaging phone offers some extra processing power and memory that enable basic social network capabilities. Messaging phones comprise 25.2 percent market-share and examples include the Samsung Intensity, Nokia E73, and the Motorola Hint.

A smartphone is a mobile device that offers the most advanced computing ability and connectivity available today. These devices have intelligence similar to personal computers while offering the capabilities of a mobile phone. Smartphones generally run robust operating systems (OS) software that provide platforms for application developers and support for downloadable third party applications. The advanced OS allows for integration of productivity services such as email, calendar, and messaging with web-based counterparts and user downloadable third party applications for social networking, gaming, and entertainment. Smartphones have considerably more processing power and memory that allow for full web-browsing, multiple connections, such as Wi-Fi and Bluetooth, multimedia applications, such as photos, music, and video, and GPS functions. These devices, which are the most costly, comprise 31.9% of the market-share and include devices such as BlackBerry Bold and Curve, Motorola Droid2, and the Apple iPhone 4.

b. Each category of phone satisfies different user needs in a marketplace comprised of unique consumer needs.

TIA members offer phones in each category that provide accessibility functions to users with vision impairment, and each category of mobile phone satisfies different user needs based on their capabilities and price points. Feature phones are ideal for users who

want a phone with basic features at a very low cost. Messaging phones, similar to feature phones with the addition of a keyboard, offer advantages for consumers that use their phones primarily for text messaging. Smartphones appeal to consumers looking for more advanced computing ability and connectivity than basic feature phones or messaging phones. Appendix A indicates features on phones in each category which aid in accessibility for users with vision impairments.

Manufacturers and service providers work together to determine which features are ultimately offered on a device. Typically, a service provider will issue a request for information to a manufacturer to determine which models are available and the feature possibilities so that they can build their portfolio accordingly. Next, both parties will participate in negotiations, which will eventually culminate in an agreement setting requirements for the features that will be on the specific model(s) offered by the specific service provider. However, this process must account for limiting factors, such as the OS and form factor, and regulatory requirements, such as TTY, Enhanced 9-1-1 (E9-1-1) location capabilities, and hearing aid compatibility (HAC) functions. The software platform of the device sets critical parameters for what features are technologically possible, as described in more detail below. Each platform has a memory limit, which is a gating factor for the number and type of features on a specific device. Required features, such as TTY and E 9-1-1 location capabilities, are included in the feature list of every device and use a great deal of memory.

These mobile devices are not “one size fits all,” nor is the marketplace. Consumers, regardless of disability, place varying degrees of importance on certain features and services. While every feature is not available on every phone, not every

consumer wants a device with extensive features. A recent study conducted among cell phone users with disabilities shows that long battery life is the most important handset feature.³ Price, size, or the service provider may also be the driving factor for a purchasing decision. The result is a consumer-driven marketplace that offers a wide variety of devices at various costs.

II. INDUSTRY INCORPORATES USER INPUT INTO PRODUCT DESIGN RESULTING IN HIGH USER SATISFACTION

a. User satisfaction with the mobile phone industry is high according to recent market studies.

Recent market studies show that user satisfaction with the mobile phone industry is high. A FCC survey that was released in June 2010 found that “92 percent of cell phone users are very or somewhat satisfied with their cell phone service overall.” According to an August 2010 study of the Wireless RERC (Rehabilitation Engineering Research Center),⁴ 93% of blind and low vision persons have a phone. In the same study, 68% responded that they were somewhat or very satisfied. As described below, industry is consistently striving to meet consumer needs to increase the percentage of satisfied users.

³ WIRELESS REHABILITATION ENGINEERING RESEARCH CENTER (RERC), *Second Report: Findings of the Survey of User Needs (SUN) for Wireless Technology 2007-2009*, 11 (2009) available at http://www.wirelessrerc.org/publications/SUN%20Second%20Findings%20Report_2009-03-25.doc.

⁴ Wireless RERC, <http://www.wirelessrerc.org/about-us> (last visited Sept. 10, 2010). Funded since 2001, the Wireless RERC (Rehabilitation Engineering Research Center) has become a recognized leader on issues and solutions related to the accessibility and usability of mobile wireless products and services by people with disabilities. The Wireless RERC's mission is to promote equitable access to and use of wireless technologies by people with disabilities and encourage the adoption of Universal Design in future generations of wireless devices and applications. Id.

b. The AFB Sweet 16 Feature List sets a bar for manufacturers to incorporate accessibility features for blind and low-vision users, which have been widely achieved across the market.

The American Foundation for the Blind (AFB) conducted user research into cell phone accessibility features wanted and needed by customers with visual impairments. This resulted in the “Sweet 16,” a list of 16 features that were rated the highest by questionnaire responded. AFB published this information and their ‘Sweet 16’ features list that includes the following features:

1. Keys that are easily identifiable by touch
2. Voice output
3. Accessible documentation
4. Battery-level indicator
5. Roaming indicator
6. Message indicator
7. Phone book
8. Phone lock mode
9. Keypad lock mode
10. Power indicator
11. Ringing or vibrating mode indicator
12. GPS feature
13. Signal strength indicator
14. Ringer volume control
15. Caller identification
16. Speed dialing

TIA members have responded to this list and, as a result, there a wide variety of mobile phones available through nationwide carriers that include these features, as demonstrated in Appendix B. Appendix B includes a chart of mobile devices offered in all three categories by a variety of manufacturers, indicating which of the “Sweet 16” features are included on the device.

Publicly available research, similar to the studies conducted by the Wireless RERC and AFB, generates awareness about the needs of users with disabilities and provides

guidance to mobile device manufacturers. Where it does exist, research in this area is very limited. However, there are funded bodies, such as the wireless RERC's, to conduct such research, and TIA encourages the FCC to recommend such research as part of its accessibility awareness efforts.

III. DESPITE TECHNICAL CHALLENGES, INDUSTRY IS CONSTANTLY WORKING TO IMPROVE ACCESSIBILITY FOR USERS WHO ARE BLIND, DEAF-BLIND, OR HAVE LOW-VISION

- a. Depending upon the platform, to achieve full accessibility for many blind, deaf-blind, and low-vision users, devices may include either built in accessibility features such as screen readers, text-to-speech engines and magnifiers or the ability to interoperate with third party applications which provide similar features.**

The device platform is a critical gating factor for which devices have the technical capabilities to support full accessibility for many blind, deaf-blind, and low-vision users. In simplest terms, a handset's software platform is comprised of its operating system and its user interface. In some devices the operating system and the user interface are integrated; in other devices the operating system and the user interface are separate, linked components. In either case, the software platform of a device sets critical parameters for what features are technologically possible to have on the device. Every mobile device has a platform regardless of whether it is classified as a feature phone, a messaging phone or a smartphone. Low-tier platforms are typically limited in feature capabilities and are accompanied by very limited processing power and device memory. Other platforms are paired with more processing power and can support more memory.

There are many combinations of software platforms used across the industry, and in fact, across particular handset manufacturers. For example, a handset manufacturer

may use an the operating system (OS) and the user interface (UI) from different third party vendors, in which case the handset vendor licenses each for use on a particular model. Either the OS or the UI (or both) may be proprietary to the handset vendor. The portfolio of a particular handset manufacturer may include use any or all of these combinations of platforms depending on the portfolio strategy of the vendor. This significantly complicates the provision of integrated screen reader solutions across the portfolio.

b. There are multiple fundamental components required to make a mobile phone screen reader accessible to the blind.

In addition to the platform (operating system and user interface) there are other core components needed to make a mobile phone screen reader accessible for people with low or no vision. The two most common components used to make a mobile device accessible to users with vision impairment are screen readers and Text-to-Speech (TTS) engines. A screen reader is a software application that attempts to identify and interpret what is being displayed on a screen of a computer or a mobile device. The TTS engine converts text into speech output on a mobile phone platform operating system and it is also used by screen reader software applications to convert information displayed visually into speech out. The interpretation is presented to the user via text-to-speech, sound, icons or a Braille output device.⁵ Both screen readers and TTS are assistive technology in the form of software. In general, both screen readers and TTS engines are developed and sold by third party vendors, not by the manufacturer of the mobile device.⁶

⁵ WIKIPEDIA, *Screen Reader*, http://en.wikipedia.org/wiki/Screen_reader (last visited Sept. 10, 2010).

⁶ An exception to this approach is Apple, which was able to integrate these enablers from its computer business into the iPhone.

Additional components, however, are required to create a fully accessible screen reader solution including the following:

- **Accessible Graphical User Interface (GUI) Library.** GUI is a specific type of user interface that allows the users to interact with programs in ways other than typing. The GUI is a library of components that expose their information programmatically on a mobile phone platform operating system.
- **Accessibility Application Programming Interface or API.** APIs are implemented on a mobile phone platform operating system to expose information programmatically from a GUI in a non-visual manner to other applications (including Assistive Technology). This facilitates interaction between different software programs, allowing users to download third party applications.
- **Assistive Technology (AT).** AT is used to facilitate the use of devices, including information and communications technology, by persons with disabilities, such as a screen reader used on a mobile by persons with low or no vision. AT can come in the form of software, hardware, or a peripheral device.
- **Text-to-Speech (TTS) Application Programming Interface (API).** The TTS API is implemented on a mobile phone platform operating system and enables software application developers to integrate speech output into their applications. For example, a screen reader uses the TTS API to enable speech output for its application.
- **Integrated Development Environment (IDE).** IDE is a software application that enables application software developers to build applications using GUI libraries, Accessibility API and TTS API to build the Assistive Technology such as a screen reader on a mobile phone platform operating system.

Not all mobile devices can support the additional fundamental components needed to provide a full screen reader feature; there may be limitations in the software platform or limitations in the accompanying hardware , *e.g.*, processing power, memory limitations. Some basic accessibility features, such as echo keys and talkback menus⁷, can be included in the mobile device with straightforward design and integration efforts. These are features that are now nearly ubiquitous in mobile handsets, including lower tier

⁷ Echo keys refer to the speech output of the key pressed on a keypad, for example the number “9” is spoken when the 9 key is pressed. Talkback menus refer to the speaking of menu items as the scrolling over the item. In most devices these features can be set using the menu.

feature and messaging handsets. However, more advanced accessibility features are not easily integrated and require development of specific software code for each feature on each device. In more advanced devices where supported by the platform, the handset device manufacturer can purchase and then integrate more advanced capabilities such as voice recognition (VR) software and text-to-speech software.⁸

To provide screen reading features on a mobile device, manufacturers and Assistive Technology vendors must partner to ensure compatibility. Both TTS and screen readers are assistive technology developed by third party specialty and AT vendors. Examples of AT vendors who work with handset vendors for TTS and screen readers are Code Factory, Humanware and Nuance.⁹ TTS software is unique to each and every combination of platforms because the TTS “engine”¹⁰ must be coded by a developer to the various User Interfaces. AT code developers are very specialized; generally, one will specialize in only one operating system combination, such as Symbian series 60 or Windows Mobile.

Notwithstanding the complex environment and multiple vendors required for accessibility features, handset manufacturers have added basic accessibility features such as talk back, echo key and voice recognition to many models and have provided the capability for screen readers in some models, including the Blackberry Curve and the

⁸ Yet another case is the Apple iPhone. While the Apple iPhone offers a wide range of excellent features for the blind and low-vision community out of the box, the iPhone development is a very different model, because Apple was able to integrate its accessibility features from its computer platform. Most handset vendors are not and were not ever computer vendors, so they do not have these existing platforms to leverage internally.

⁹ As already noted, Apple has its own proprietary TTS and screenreader leveraged from its PC business; other vendors do not

¹⁰ TTS or Speech Synthesis Engines convert text into speech output on a mobile phone platform operating system. A TTS engine is also used by screen reader software applications to convert information displayed visually into speech output.

Apple iPhone, and are continually working on increasing accessibility features in mobile devices.

TIA notes here the importance of the Assistive Technology vendors. These companies have unique capabilities and knowledge. They are critical partners for delivering accessibility features to address user-specific needs, which may vary depending on the type and degree of disability. The communications industry and the AT industry work together to offer a greater choice of accessible devices and features.

CONCLUSION

TIA commends the Commission's attention to these important issues and appreciates the opportunity to comment. We look forward to continuing our work with the Commission on achieving universal broadband accessibility by all Americans.

Respectfully submitted,

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