Draft Information and Communication Technology (ICT) Standards and Guidelines

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508 CHAPTER 1: APPLICATION AND ADMINISTRATION

E101 Purpose

This part provides requirements for electronic and information technology, also referred to as "information and communication technology"(ICT), necessary to implement the requirements for Federal departments and agencies ("Agencies"), including the United States Postal Service, set forth in section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794d).

E102 General Requirement

E102.1 General. Federal agencies shall apply the provisions of this part in order to ensure that:

E102.1.1 Federal Employees. Individuals with disabilities who are Federal employees have access to and use of information and data that is comparable to the access to and use of the information and data by Federal employees who are not individuals with disabilities; and

E102.1.2 Members of the Public. Individuals with disabilities who are members of the public seeking information or services from a Federal agency have access to and use of information and data that is comparable to the access to and use of the information and data by such members of the public who are not individuals with disabilities.

E103 Application

E103.1 General. The requirements in this part apply to ICT that is procured, developed, maintained, or used by or on behalf of agencies.

E103.2 Covered Agencies. This part applies to agencies, as defined in 44 U.S.C. 3502, as well as the United States Postal Service.

Advisory E103.2 Covered Agencies. Section 508 of the Rehabilitation Act (29 U.S.C. 794d) applies to Federal departments and agencies, including the U.S. Postal Service.

The term “agency” under this part shall include the U.S. Postal Service and “agency” as defined by 44 U.S.C. 3502. That section defines agency to mean any executive department, military department, Government corporation, Government controlled corporation, or other establishment in the executive branch of the Government (including the Executive Office of the President), or any independent regulatory agency, but does not include (a) the General Accounting Office; (b) Federal Election Commission; (c) the governments of the District of Columbia and of the territories and possessions of the United States, and their various subdivisions; or (d) Government-owned contractor-operated facilities, including laboratories engaged in national defense research and production activities.

E103.3 Covered Information and Communication Technology. This part applies to ICT as defined in E111 of this chapter.

E103.3.1 Electronic Content. Electronic content shall conform to E103.3.1. When Federal agencies communicate using electronic content regardless of transmission or storage method, such electronic content shall conform to applicable provisions when the communication is: (a) an official communication by the agency or a representative of the agency to Federal employees which contains information necessary for them to perform their job functions; or (b) an official communication by an agency or a representative of the agency to a member of the public, which is necessary for them to conduct official business with the agency as defined by the agency’s mission.

EXCEPTION: Electronic content stored solely for archival purposes or retained solely to preserve the exact image of the original hard copy is not required to conform to applicable provisions.

Advisory E103.3.1 Electronic Content. An official communication of the agency supports the agency’s mission, and is limited to those communications which contain information necessary for Federal employees to perform their job functions; or, when communicated to a member of the public, are necessary for them to conduct official business with the agency as defined by the agency’s mission.

Electronic content may include, but is not limited to, documents or synchronized media regardless of format or storage method. Examples of such content may include reports, invoices, or synchronized media containing promotional materials related to the agency mission or upcoming agency events or deadlines.

Examples of official communication by an agency or representative to Federal employees include announcements containing information necessary for Federal employees to perform their job functions, which are broadly disseminated to agency employees. These may include information about working conditions or policies, such as information on agency IT policies, security, or personnel information. This may also include general announcements of upcoming agency events in furtherance of the agency mission (such as the upcoming tax season at IRS, for example).

Examples of official communications by the agency or representative to a member of the public, which are necessary for the conduct of official business with the agency as defined by the agency's mission may include technical assistance provided by agency employees on agency regulations to members of the public, content posted on the agency website for public information, and information about benefits or programs administered or provided by the agency as part of the agency mission.

Advisory E103.3.1 Electronic Content Exception. The necessity for storing exact replicas of hard copy content generally relates to the need to accurately preserve or represent certain characteristics of the document, such as watermarks, signatures, dates, or other indicia relevant to the document's authenticity and application.

Where this content originates as electronic content covered by this part prior to becoming hard copy, it is a best practice to make such electronic content conformant with the standards. It is important then to retain text-based electronic copies of content prior to hard copy production and subsequent storage as an image. This will ensure, for example, that the text of a memo which is stored as an image to retain the signature of an agency official will be available for distribution as accessible text upon request.

E103.3.1.1 Location. Electronic content procured or developed by an agency shall be covered by this part, even if the content is not located on a Federal website or at a Federal location.

Advisory E103.3.1.1 Location. A Federal video posted on a social media website is required to conform to this part. For example, under this part, a video developed by a Federal agency must be compliant without regard to whether it is posted on the agency's website or on a non-Federal third party site, without charge to the agency.

E103.3.1.2 Medium. This part applies to Federal electronic content regardless of medium.

Advisory E103.3.1.2 Medium. Electronic documents, for example, are covered regardless of whether posted on a website, attached to an email, or saved on a CD, flash drive, office server, or other medium.

E103.3.1.3 Email. Email produced by or on behalf of an agency, whether transmitted to agency employees or to recipients not employed by the agency, is required to conform to the provisions of this part.

Advisory E103.3.1.3 Email. This provision covers email sent by an agency, not email received. This provision applies to e-mail sent internally as well as transmitted to recipients outside the agency. This applies to different forms of email, such as webmail. An example would be a web-push notification sent by a third party contractor to Federal employees within the agency.

E103.3.2 Components of an ICT System. When ICT is a system of interoperable components, the provisions of this part shall apply to each interoperable component that has a user interface, or transmits information.

EXCEPTION**:** When ICT is a component of a system where the principal function is not ICT, then the provisions of this part shall only apply to the ICT components which have a user interface or transmit information.

Advisory E103.3.2 Components of an ICT System. An example of ICT that is a system of interoperable components is a personal computer. In this example, the interoperable components are the CPU, the display monitor, the keyboard, the mouse, and any attachments (such as an external hard drive, removable flash drive, and printer). Each of these interoperable components is required to conform to the applicable provisions of this part.

An example of an ICT component that is not required to conform to the provisions of this part is the motherboard inside the CPU, because it does not have a user interface.

The covered components may not necessarily be in the same physical location. An example of an ICT system required to conform to the provisions of this part is a service that provides for telephone callers to adjust a thermostat or turn on a building security system and lights.

Advisory E103.3.2 Components of an ICT System Exception. Vehicles, such as cars, boats and planes, are not ICT because the principal function is not ICT. Some ICT found in vehicles would be covered where the principal function is ICT. Examples of covered ICT components in vehicles include: laptops fixed inside a vehicle used by a Federal uniformed security officer, car phones, and video players mounted in vehicles. Electronics used in the operation of a vehicle are not ICT. An example of electronics that are not covered is the dashboard of a car.

E103.4 Covered Activities. Covered activities under this part include the procurement, development, maintenance, or use of ICT by or on behalf of Federal agencies on or after the effective date of this part.

E103.4.1 Pre-existing ICT. Covered ICT that was procured, developed, maintained, or used prior to the effective date of this part, remains subject to the accessibility standards in effect at the time of the covered action.

Advisory E103.4.1 Pre-existing ICT. If an agency is acquiring "patches" to fix minor software errors on a system that is not near the end of its life expectancy and software that meets the applicable technical provisions of the standards would not operate with the system, the agency might experience a significant difficulty or expense if it had to prematurely replace its system to accommodate the new software. Thus, the acquisition might fall within the undue burden exception.

By contrast, a finding of undue burden may be difficult to justify if a system is near the end of its life expectancy, and the purpose of the "maintenance" is to significantly upgrade and update the system or its operating software (such as moving from a very old generation software to a much newer generation software), and the agency has the resources for such an upgrade.

E103.4.2 Federal Contracts. This part applies to ICT procured, developed, maintained, or used by a contractor under a contract with an agency that requires the use of such ICT in the performance of specifications or deliverables under the contract.

EXCEPTION: This part does not apply to ICT procured, developed, maintained, or used by a contractor that is not used for the performance of the contractor's duties under the contract or for meeting deliverables under the contract.

E103.5 Identifying Applicable Provisions. Agencies should first look to the provisions in Chapters 3 through 9 to determine if there are specific technical provisions that apply to the ICT need they are seeking to satisfy.

E103.5.1 Relation of Functional Performance Criteria to Technical Provisions. If there are applicable provisions in Chapters 3 through 9 that fully address the product or service being procured, then the agency need not look to Chapter 2 (Functional Performance Criteria). Acquired products that meet the specific technical provisions set forth in Chapters 3 through 9 will also meet the broader functional performance criteria in Chapter 2.

E103.5.2 ICT Not Addressed by Technical Provisions. If an agency's procurement needs are not fully addressed by Chapters 3 through 9, then the agency must look to Chapter 2 for applicable functional performance criteria.

E103.5.3 Evaluation of Failures Against Technical Provision. If any of the technical provisions in Chapters 3 through 9 are not met, the functional performance criteria in Chapter 2 must be used to evaluate if access is provided in another way through E106 Equivalent Facilitation.

E104 Undue Burden

E104.1 General. When procuring, developing, maintaining, or using ICT, each agency shall ensure that the ICT conforms to all applicable provisions of this part, unless an undue burden would be imposed on the agency.

E104.2 Basis. In determining whether compliance with all or part of the provisions in this part would impose an undue burden, an agency shall consider the difficulty or expense of compliance and agency resources available to its program or components for which the ICT is procured, developed, maintained, or used.

E104.3 Documentation. The responsible official shall document in writing the basis for an undue burden decision, including an explanation of why and to what extent compliance with each such provision in the procurement, development, maintenance, or use of ICT creates an undue burden, as well as how the agency will meet the general requirement expressed in E102.

E104.4 Alternative Means. When an agency determines that conformance to the provisions of this part imposes an undue burden, the agency shall provide individuals with disabilities with the information and data involved by an alternative means of access that allows the individual to use the information and data.

E105 General Exceptions

E105.1 Fundamental Alteration. This part shall not require a fundamental alteration in the nature of the ICT. When an agency determines that conformance to a particular provision of this part would result in a fundamental alteration, the ICT shall conform to the remaining applicable provisions of this part.

Advisory E105.1 Fundamental Alteration. A determination by an agency that conformance to a particular provision would result in a fundamental alteration does not exempt the ICT in its entirety from coverage under this part.

E105.2 National Security Systems. This part does not apply to any ICT operated by agencies as part of a national security system, as defined by 40 U.S.C. 11103(a).

Advisory E105.2 National Security Systems. The term National Security System means any telecommunication, or information system operated by the United States government, the function, operation, or use of which involves:

- Intelligence activities;
- Cryptologic activities related to national security;
- Command and control of military forces;
- Equipment that is an integral part of a weapon or weapons system; or
- Systems which are critical to the direct fulfillment of military or intelligence missions.

Systems that are critical to the direct fulfillment of military or intelligence missions do not include systems that are used for routine administrative and business applications. Examples of routine administrative and business applications are payroll, finance, logistics, and personnel management applications. Routine administrative and business applications are covered by this part.

E106 Equivalent Facilitation

Nothing in this part is intended to prevent the use of designs or technologies as alternatives to those prescribed in this part, provided they result in substantially equivalent or greater access to and use of ICT for people with disabilities.

E107 WCAG 2.0 Harmonization

Web pages as defined by WCAG 2.0, that are Level AA conformant to WCAG 2.0, as defined in that standard, (that is, all Level A and Level AA Success Criteria and Conformance Requirements 1 - 4) shall be deemed to be in conformance with the following chapters of this part, so long as they also meet the enumerated sections of this part:

Chapter 4, all corresponding WCAG 2.0 Success Criteria and Conformance Requirements plus sections 409 and 413 of this part;

Chapter 5, all corresponding WCAG 2.0 Success Criteria and Conformance Requirements;

Chapter 6, all corresponding WCAG 2.0 Success Criteria and Conformance Requirements plus sections 604.4, 604.5, 607, and 608 of this part.

Advisory E107 WCAG 2.0 Harmonization. The WCAG 2.0 definition for web page is available via the Internet at http://www.w3.org/TR/WCAG20/#webpagedef.

The WCAG 2.0 definition for conformance is available via the Internet at http://www.w3.org/TR/WCAG20/#conformance.

E108 Best Meets

When procuring ICT, each agency shall procure ICT which complies with the provisions in this part when such ICT is available in the commercial market place or when such ICT is developed in response to a government solicitation. If ICT is commercially available that meets some, but not all of the provisions, the agency must procure the product that best meets the provisions of this part, consistent with the business needs of the agency.

Advisory E108 Best Meets. Nothing in this part should be construed to require agencies to procure ICT which does not meet the business needs of the agency.

E109 Provision of Support Services and Materials

E109.1 General. Agencies shall apply the provisions of E109 and Chapter 10 when providing support services and materials.

E109.2 Alternate Methods of Communication. Help desk and technical support services shall provide alternate methods of communication.

Advisory E109.2 Alternate Methods of Communication. Help desk and technical support services include but are not limited to: agency help desks, support services outsourced by agencies, and help line assistance provided by product manufacturers and vendors.

Alternate methods of communication include both in-person and remote communication. Examples include, but are not limited to: sign language interpreters, assistive listening systems, TTYs, real-time captioning, and telecommunications relay services, such as TTY, speech-to-speech, or video relay services.

People with disabilities may use a variety of communication technologies in addition to using alternate methods of communication. Examples of such communication technologies include: Internet posting (such as message boards and website blogs); cellular telephones; e-mail; fax; postal mail; texting, and instant messaging.

E109.3 Alternate Formats. Help desk and technical support services shall provide materials in alternate formats for users with disabilities.

Advisory E109.3 Alternate Formats. Alternate formats usable by people with disabilities include, but are not limited to: braille, ASCII text, large print, recorded audio and electronic formats that conform to this part.

E109.4 Accessibility and Compatibility Features of Products. Agencies shall provide access to a description of the accessibility and compatibility features of products to users.

E110 Conventions

E110.1 Dimensions. Dimensions that are not stated as “maximum” or “minimum” are absolute.

E110.2 Figures. Unless specifically stated otherwise, figures are provided for informational purposes only.

E110.3 Units of Measurement. For usability purposes, length is provided in both United States customary units (e.g., inches) as well as metric units (e.g., millimeters).

E111 Definitions

E111.1 General. For the purpose of this document, the terms defined in 111.5 have the indicated meaning.

E111.2 Terms Defined in Referenced Standards. Terms not defined in 111.5 but specifically defined in a referenced standard, shall have the specified meaning from the referenced standard unless otherwise stated.

E111.3 Undefined Terms. The meaning of terms not specifically defined in 111.5 or in referenced standards shall be as defined by collegiate dictionaries in the sense that the context implies.

E111.4 Interchangeability. Words, terms, and phrases used in the singular include the plural and those used in the plural include the singular.

E111.5 Defined Terms.

Alternate Formats. Alternate formats usable by people with disabilities may include, but are not limited to, braille, ASCII text, large print, recorded audio and electronic formats that conform to this part.

Assistive Technology (AT). Assistive technology is any item, piece of equipment, or system, whether acquired commercially, modified, or customized, that is commonly used to increase, maintain, or improve functional capabilities of individuals with disabilities. As used in this part, the term includes traditional assistive technology hardware and software along with mainstream technology used for assistive purposes, virtual assistive technology delivered as a web service and integration of products into a system that provides assistive technology functions that allow individuals with disabilities to access information and communication technology.

Authoring Tool. Any software intended to create or modify electronic content for publication in one or more formats that support compliance with the user interface and content provisions. Simple text editors that can only create or modify content in conforming formats by directly editing the code are not considered authoring tools under this definition.

CAPTCHA. “Completely Automated Public Turing Test to tell Computers and Humans Apart." A Turing test is any system of tests designed to differentiate a human from a computer. CAPTCHA tests often involve asking the user to type in text that is presented in an obscured image or audio file.

Content. Information or sensory experience to be communicated to the user by means of software, including but not limited to: text, images, sounds, videos, controls, and animations, as well as the encoding that defines the structure, presentation, and

interactions associated with those elements. Examples include word processing files, presentation files, spreadsheet files, text files, and portable document files.

Content Format. An encoding mechanism for storing information, such as HTML, JPEG, SMIL, and PDF.

Customer Premises Equipment (CPE). Equipment employed on the premises of a person (other than a carrier) to originate, route, or terminate telecommunications or interconnected VOIP service.

Decoration. Sensory experience to be communicated to the user that does not convey relevant information, does not have a function, and is included only for aesthetic purposes.

Electronic and Information Technology (E&IT). This is also referred to as Information and Communication Technology (ICT). This includes information technology and is any equipment or interconnected system, or subsystem of equipment, which is used in the creation, conversion, duplication, automatic acquisition, storage, analysis, evaluation, manipulation, management, movement, control, display, switching, interchange, transmission, reception, or broadcast of data or information.

ICT includes, but is not limited to: electronic content, including email, electronic documents and Internet and Intranet web sites; telecommunications products, including video communication terminals; computers and ancillary equipment, including external hard drives; software, including operating systems and applications; information kiosks and transaction machines; videos; IT services; and multifunction office machines that copy, scan and fax documents.

Free-standing. Standing independently of attachment or support.

Images of Text. Text that has been rendered in a non-text form, such as an image, in order to achieve a particular visual effect. Images of text may appear on a screen or in print or be embossed on hardware. This does not include text that is part of a picture that contains significant other visual content.

Information and Communication Technology (ICT). Also referred to as electronic and information technology.

Information Technology. Any equipment or interconnected system or subsystem of equipment, that is used in the automatic acquisition, storage, analysis, evaluation, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information. The term information technology includes computers, ancillary equipment, including external hard drives, software, firmware and similar procedures, services (including support services), and related resources.

Keyboard. A set of systematically arranged keys by which a machine or device is operated and alphanumeric input is provided such as a computer keyboard, a cell-phone keypad, or a television remote control that can generate alphanumeric input. Tactilely discernible keys that are used in conjunction with the main cluster of keys are included in the definition of keyboard as long as their function also maps to keys on any keyboard interfaces.

Keyboard Interface. A means for accepting input from a keyboard. For software, this would be the ability to accept keyboard input from the operating system including on-screen keyboards. For hardware this would be the ability to connect a keyboard via wired or wireless connection.

Label. Text or other component with a text alternative that is presented to a user to identify a component within content. In many cases the name and the label are the same. A label is presented to all users, unlike a name, which may be hidden and only exposed by assistive technology.

Large Scale Text. Text that appears in at least 18 point type, or 14 point type if bolded.

Menu. Set of selectable options.

Name. Text by which software can identify a component within Web or other content to the user. The name may be hidden and only exposed by assistive technology, whereas a label is presented to all users. In many cases, the label and the name are the same. This is unrelated to the name attribute in HTML.

Non-text Content. Any content that is not a sequence of characters that can be programmatically determined or where the sequence is not expressing something in human language. Examples include ASCII art (which is a pattern of characters), emoticons, “leetspeak” (which uses character substitution of numbers for letters), and images representing text.

Operable Part. A component of ICT used to activate, deactivate, or adjust the ICT.

Platform Accessibility Services. Services provided by a platform enabling interoperability with assistive technology, such as but not limited to accessibility Application Programming Interfaces (API) or Document Object Model (DOM).

Platform Software. Collection of software components that run on an underlying software or hardware layer and that provide a set of software services to applications that allows them to be isolated from the underlying software or hardware layer.

Product. The term “product”, as used in this document, is equivalent to ICT.

Programmatically Determinable. Determined by software from author-supplied data provided in a way that different user agents, including assistive technologies, can extract and present the information to users in different modalities.

Real-time Text (RTT). Communications that employ the transmission of text where the characters are transmitted by a terminal within a maximum of 1 second of character input. This would typically be for conversational purposes but also may be used in voicemail, Interactive Voice Response and other similar applications.

Specialized Customer Premises Equipment. Equipment employed on the premises of a person (other than a carrier) to originate, route, or terminate telecommunications or VoIP services, which is commonly used by individuals with disabilities to achieve access.

Synchronized Media. Audio or video displayed at the same time as other time-based content that is required for understanding of the complete presentation. The other content that the audio or video is synchronized with to meet this definition does not include equivalents such as captions, subtitles, or video description.

Telecommunications. The transmission, between or among points specified by the user, of information of the user's choosing, without change in the form or content of the information as sent and received.

Telecommunications Equipment. Equipment, other than customer premises equipment, used by a carrier to provide telecommunications services, and includes software integral to such equipment (including upgrades).

Telecommunications Manufacturer. A manufacturer of telecommunications or VoIP equipment or customer premises equipment that sells to the public or to vendors that sell to the public; a final assembler.

Telecommunications Service. The offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used.

Terminal. Device or software with which the end user directly interacts and that provides the user interface. For some systems, the software that provides the user interface may reside on more than one device such as a phone and a server.

Text. A sequence of characters that can be programmatically determined, where the sequence is expressing something in human language.

TTY. An abbreviation for teletypewriter. Machinery or equipment that enables interactive text based communications through the transmission of frequency-shift-keying audio tones across the public switched telephone network according to TIA-825-A (A Frequency Shift Keyed Modem for Use on the Public Switched Telephone Network). As used in this part, the term TTY includes devices for text-to-text communications along with voice and text intermixed communications such as voice carry over and hearing carry over. TTYs may include computers with special modems. TTYs are a subset of devices called text telephones.

Typically Held to the Ear. A product that is positioned immediately adjacent to the ear, either by hand or by a strap or holder of some kind.

Undue Burden. Undue burden means significant difficulty or expense.

Video Description. The insertion of verbal or auditory descriptions of on-screen visuals intended to describe important visual details that are not contained in, or that cannot be understood from, the main audio output alone. Video descriptions supplement the regular audio track of a program and are usually inserted between dialogue narrations to provide information about actions, characters, and on-screen text that appear without verbalization. Video descriptions are a way to let people who are blind or have low vision know what is happening on-screen.

Voice over Internet Protocol (VoIP) Service. A service that enables real-time, two-way voice communications, requires a broadband connection from the user's location, requires Internet protocol-compatible customer premises equipment, and permits users generally to receive calls that originate on the public switched telephone network and to terminate calls to the public switched telephone network.

E112 Referenced Standards or Guidelines

E112.1 General. The standards listed in E112.2 are incorporated by reference in this document and are part of the requirements to the prescribed extent of each such reference. The Director of the Federal Register has approved these standards for incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the referenced standards may be inspected at the Access Board, 1331 F Street, NW, Suite 1000, Washington, DC 20004; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html

E112.2 Referenced Standards or Guidelines. The specific editions of the standards or guidelines listed below are referenced in this document. Where differences occur between this document and the referenced standards or guidelines, this document applies.

E112.2.1 ATSC. Copies of the referenced standard may be obtained from the Advanced Television Systems Committee (ATSC), 1776 K Street, NW, Suite 200, Washington, DC 20006-2304
http://www.atsc.org/standards/a53.php

A/52 Standard for Digital Audio Compression (AC-3) 1995; A/53 Digital Television Standard, Parts 1-6, 2007 (see 606.2.2.2); and A/65 Program and System Information Protocol for Terrestrial Broadcast and Cable 2006.

Advisory E112.2.1 ATSC. The ATSC/ A/52, A/53, and A/65 Digital Television Standards describe the transmission system characteristics of the advanced television (ATV) system. The document and its normative parts provide detailed specification of the parameters of the system including the video encoder input scanning formats and the preprocessing and compression parameters of the video encoder, the audio encoder input signal format and the pre-processing and compression parameters of the audio encoder, the service multiplex and transport layer characteristics and normative specifications, and the VSB RF/Transmission subsystem.

E112.2.2 ANSI/IEEE. Copies of the referenced standards may be obtained from the Institute of Electrical and Electronics Engineers (IEEE), 10662 Los Vaqueros Circle, P.O. Box 3014, Los Alamitos, California 90720-1264
http://www.ieee.org

ANSI/IEEE Std C63.19-2007 American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids (see 803.6).

Advisory E112.2.2 ANSI/IEEE. ANSI C63.19-2007 American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids provides a uniform method of measurement for compatibility between hearing aids and wireless communications devices.

E112.2.3 ANSI/EIA. Copies of the referenced standards may be obtained from Information Handling Services, 15 Inverness Way East, Englewood, Colorado 80155-6800
http://global.ihs.com

ANSI/EIA-470-A-1987 for analog telephones (see 803.2).

ANSI/EIA/TIA-571-1991 for digital telephones (see 803.2).

Advisory E112.2.3 ANSI/EIA. ANSI/EIA-470-A-1987 specifies the baseline volume in telecommunications products for analog telephones. ANSI/EIA/TIA-571-1991 specifies the baseline volume in telecommunications products for digital telephones.

E112.2.4 ITU-T. (International Telecommunication Union Telecommunication Standardization Sector). Copies of the referenced standards may be obtained from International Telecommunication Union Telecommunication Standardization Bureau, Place des Nations CH-1211, Geneva 20, Switzerland
http://www.itu.int/ITU-T/

ITU-T G.722 (11/88): 7 kHz Audio-Coding within 64 kbits/s (see 903.4 and 906.2).

Recommendation ITU-R BT.470-7, Conventional Analog Television Systems (1988) also known as National Television System Committee (NTSC) Standard video output (see Advisories 905.3.2.3.1 and 905.3.2.3.3).

ITU-T H.261 (3/93): Video Codec for Audiovisual Services at p x 64 kbits/s (see 905.3.2.1).

Advisory E112.2.4 ITU-T. G.722 is an ITU standard coder-decoder program that provides 7 kHz wideband audio at data rates from 48, 56, and 64 kbits/s. This standard offers a significant improvement in speech quality over earlier standards.

National Television System Committee standard video output (NTSC) is the standard for the analog television system in the United States. It has been replaced in the United States for full service television stations as of June 12, 2009 with the ATSC A/52 Standard for Digital Audio Compression (AC-3). A/53 Digital Television Standard; and A/65Program and System Information Protocol for Terrestrial Broadcast and Cable. The Advanced Television Systems Committee (ATSC) developed the ATSC Standards for digital television in the United States.

H.261 is an ITU standard which describes Common Intermediate Format (CIF), which standardizes pixel resolution in video signals and is commonly used in video conferencing systems. The resolution is 352×288 pixels.

E112.2.5 MTS/BTSC. Copies of the referenced standard may be obtained from IHS (Information Handling Services) 15 Inverness Way East, Englewood, Colorado 80155-6800
http://global.ihs.com

Broadcast Television Systems Committee (BTSC) Multichannel Television Sound standard (1984) (see 606.2.2.1).

Advisory E112.2.5 MTS/BTSC. Multichannel television sound, better known as MTS (often still as BTSC, for the Broadcast Television Systems Committee that created it), is the method of encoding three additional channels of audio into an NTSC-format audio carrier. It was adopted by the FCC as the U.S. standard for stereo analog television transmission in 1984.

E112.2.6 TIA 825-A and 1083. Copies of the referenced standard may be obtained from IHS (Information Handling Services) 15 Inverness Way East, Englewood, Colorado 80155-6800
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TIA 825-A (2003) A Frequency Shift Keyed Modem for Use on the Public Switched Telephone Network (see 902.4.1).

TIA 1083 (2007) Telephone Terminal Equipment Handset Magnetic Measurement Procedures and Performance Requirements (see 803.6).

Advisory E112.2.6 TIA. TIA 825-A is the standard for TTY signals on the publicly switched telephone network interface. TIA 1083 defines measurement procedures and performance requirements for the handset generated audio band magnetic noise of wire line telephones. This standard addresses magnetic interference issues not covered by Part 68 of the Federal Communications Commission (FCC) rules and regulations.

E112.2.7 Web Content Accessibility Guidelines (WCAG) 2.0. Copies of the referenced guidelines may be obtained from the Massachusetts Institute of Technology, 32 Vassar Street, Room 32-G515, Cambridge, Massachusetts 02139 http://www.w3.org/TR/WCAG 20

Web Content Accessibility Guidelines 2.0 (2008) (see 401.1, 501.1, and 601.1).

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255 CHAPTER 1: APPLICATION AND ADMINISTRATION

C101 Purpose

This part provides requirements for accessibility, usability, and compatibility of telecommunications and interconnected Voice over Internet Protocol (VoIP) products and Customer Premises Equipment (CPE) covered by the Telecommunications Act of 1996 (47 U.S.C. 255).

C102 General Requirement

C102.1 General. Manufacturers of telecommunications products shall apply the provisions of this part in order to ensure that the equipment is designed, developed, and fabricated to be accessible to and usable by individuals with disabilities, if readily achievable.

Advisory C102.1 General. Some cellular telephones may fall outside of the thresholds or benchmark dates established by the FCC for meeting hearing aid compatibility (HAC) requirements in Chapter 9 (Conversation Functionality and Controls), but they shall still meet other applicable provisions from this document.

C103 Application

C103.1 General. This part applies to telecommunications and interconnected VoIP products and CPE.

Advisory C103.1 General. This part applies to basic and special telecommunications services, including call waiting, speed dialing, call forwarding, computer-provided directory assistance, caller identification, call tracing, and repeat dialing.

This part applies to interactive voice response (IVR) systems and voice mail.

This part applies to other products that support two-way voice communication, such as intercoms and 2-way radios.

A range of products are addressed beyond those typically thought of as telecommunications devices. For example, telecommunications systems, such as VoIP, may involve use of web interfaces, thus evoking both electronic content design provisions and the associated electronic content exceptions.

Products such as instant messaging that support real-time conversation in other modes are also covered, and addressed, in Chapter 9 (Conversation Functionality and Controls).

C103.2 Covered Entities. This part applies to manufacturers of telecommunications products.

C103.3 Covered Information and Communication Technology. New telecommunications and interconnected VoIP products and CPE manufactured or sold on or after the effective date of this part, as well as telecommunications and interconnected VoIP products and CPE that undergo substantial change or upgrade, or for which new releases are distributed, shall be accessible to and usable by individuals with disabilities, either directly or through compatibility with devices attached to the telecommunications and interconnected VoIP devices and specialized CPE commonly used by individuals with disabilities.

C103.3.1 Minor Changes Not Affecting Functionality. This document does not apply to minor or insubstantial changes to existing telecommunications and interconnected VoIP products and CPE that do not affect functionality.

C103.4 Direct Accessibility. Telecommunications and interconnected VoIP products and CPE shall conform directly to all functional performance criteria and applicable technical design provisions in this part when readily achievable.

C103.4.1 Compatibility Design. When telecommunications and interconnected VoIP products and CPE are unable to conform to C103.4, accessibility shall be provided, when readily achievable, through compatibility with peripheral devices and specialized CPE commonly used by individuals with disabilities to achieve access.

Advisory C103.4.1 Compatibility Design. In determining whether an accessibility feature is readily achievable, weigh the nature and cost of that feature with the overall financial resources of the telecommunication service provider or manufacturer, including such factors as the type, size, and nature of that company's operation.

C103.5 Prohibited Reduction of Accessibility. No change shall be undertaken that decreases accessibility, usability, or compatibility of telecommunications and interconnected VoIP products and CPE.

EXCEPTION: Discontinuation of a product shall not be prohibited.

C103.6 Identifying Applicable Provisions. A manufacturer should first look to the provisions in Chapters 3 through 9 to determine if there are specific technical provisions that apply to the ICT need they are seeking to satisfy.

C103.6.1 Relation of Functional Performance Criteria to Technical Provisions. If there are applicable provisions in Chapters 3 through 9 that fully address the product being designed, developed, or fabricated, then the manufacturer need not look to Chapter 2 (Functional Performance Criteria). Products that meet the specific technical provisions in Chapters 3 through 9 will also meet the functional performance criteria in Chapter 2.

C103.6.2 ICT Not Addressed by Technical Provisions. If a manufacturer is not able to ensure that its equipment is designed, developed, and fabricated to be accessible to and usable by individuals with disabilities by following the provisions of Chapters 3 through 9, then the manufacturer must look to Chapter 2 for applicable functional performance criteria.

E103.6.3 Evaluation of Failures Against Technical Provision. If any of the technical provisions in Chapters 3 through 9 are not met, the functional performance criteria in Chapter 2 must be used to evaluate if access is provided in another way through E105 Equivalent Facilitation.

C104 Information, Documentation, and Training

C104.1 General. Manufacturers of telecommunications products shall apply the provisions of C104, and Chapter 10.

C104.2 Access to Information, Documentation, and Training. Telecommunications manufacturers shall ensure access to information, documentation, and training they provide to their customers.

Advisory C104.2 Access to Information, Documentation, and Training. Covered entities must provide access to the following kinds of information, documentation, and training: user guides, installation guides for end-user installable devices, and product support communications, regarding both the product in general and the accessibility features of the product.

C104.3 Alternate Methods of Communication. Help desk and support services shall provide alternate methods of communication.

Advisory C104.3 Alternate Methods of Communication. Telecommunications manufacturers are required to accommodate the communication needs of users with disabilities. These accommodations shall be available at no additional charge to users with disabilities.

Help desk and technical support services include, but are not limited to, help line assistance provided by product manufacturers and vendors.

Alternate methods of communication include both in-person and remote communication. Examples include, but are not limited to: sign language interpreters, assistive listening systems, TTYs, real-time captioning, and telecommunications relay services, such as TTY, speech-to-speech, or video relay services. Alternate forms of written material may include braille, large print, or electronic audio.

People with disabilities may use a variety of communication technologies in addition to using alternate methods of communication. Examples of such communication technologies include: Internet posting (such as message boards and website blogs), cellular telephones, two-way radios, e-mail, fax, postal mail, texting, and instant messaging.

C104.3.1 No Additional Charge for Customer Support. Help desk and technical support services shall be provided to users with disabilities at no additional charge to those users.

C104.3.2 Alternate Formats. Help desk and technical support services shall provide materials in alternate formats to users with disabilities.

Advisory C104.3.2 Alternate Formats. Alternate formats usable by people with disabilities may include, but are not limited to: braille, ASCII text, large print, recorded audio, and electronic formats that conform to this part.

C104.3.2.1 No Additional Charge for Alternate Formats. Help desk and technical support services shall provide materials in alternate formats to users with disabilities at no additional charge to those users.

C105 Equivalent Facilitation

Nothing in this part is intended to prevent the use of designs or technologies as alternatives to those prescribed in this part, provided they result in substantially equivalent or greater access to and use of a product for people with disabilities.

C106 WCAG 2.0 Harmonization

Web pages as defined by WCAG 2.0, that are Level AA conformant to WCAG 2.0, as defined in that standard, (that is, all Level A and Level AA Success Criteria and Conformance Requirements 1 - 4) shall be deemed to be in conformance with the following chapters of this part, so long as they also meet the enumerated sections of this part:

Chapter 4, all corresponding WCAG 2.0 Success Criteria and Conformance Requirements plus sections 409 and 413 of this part;

Chapter 5, all corresponding WCAG 2.0 Success Criteria and Conformance Requirements;

Chapter 6, all corresponding WCAG 2.0 Success Criteria and Conformance Requirements plus sections 604.4, 604.5, 607, and 608 of this part.

Advisory C106 WCAG 2.0 Harmonization. The WCAG 2.0 definition for web page can be found at http://www.w3.org/TR/WCAG20/#webpagedef

The WCAG 2.0 definition for conformance can be found at:
http://www.w3.org/TR/WCAG20/#conformance

C107 Product Design, Development, and Evaluation

C107.1 General. When designing, developing and fabricating products, manufacturers of telecommunications products shall comply with the provisions of C107.

C107.2 Evaluation of Accessibility. Manufacturers shall evaluate the accessibility, usability, and compatibility of telecommunications and interconnected VoIP products and CPE.

C107.2.1 Incorporation of Evaluation. Manufacturers shall incorporate such evaluation throughout product design, development, and fabrication, as early and consistently as possible.

C107.2.2 Identification of Barriers. Manufacturers shall identify barriers to accessibility and usability as part of such a product design and development process.

C107.3 Inclusion of People with Disabilities. In developing an accessible product design and evaluation process, manufacturers shall consider C107.3.1 through C107.3.3.

C107.3.1 Market Research. When market research is undertaken, manufacturers shall include individuals with disabilities in target populations of such research.

C107.3.2 Product Design, Testing, Demonstration, Trials. When product design, testing, pilot demonstrations, and product trials are conducted, manufacturers shall include individuals with disabilities in such activities.

Advisory C107.3.2 Product Design, Testing, Demonstration, Trials. In determining how and whom to enlist in assisting with design, training, demonstrating, or participation in product trials, manufacturers may consider advertising in advocacy organizations' periodic communication, with membership or demographically similar public or private groups, Federal Advisory Committees, or other associated entities.

C107.3.3 Work Cooperatively with Disability Organizations. Telecommunication manufacturers shall work cooperatively with appropriate disability-related organizations and make reasonable efforts to validate any unproven accessibility solutions through testing with appropriate disability-related organizations that have established expertise with individuals with disabilities.

C108 Conventions

C108.1 Dimensions. Dimensions that are not stated as “maximum” or “minimum” are absolute.

C108.2 Figures. Unless specifically stated otherwise, figures are provided for informational purposes only.

C108.3 Units of Measurement. For usability purposes, length is provided in both United States customary units (e.g., inches) as well as metric units (e.g., millimeters).

C109 Definitions

C109.1 General. For the purpose of this document, the terms defined in 109.5 have the indicated meaning.

C109.2 Terms Defined in Referenced Standards. Terms not defined in 109.5 but specifically defined in a referenced standard, shall have the specified meaning from the referenced standard unless otherwise stated.

C109.3 Undefined Terms. The meaning of terms not specifically defined in 109.5 or in referenced standards shall be as defined by collegiate dictionaries in the sense that the context implies.

C109.4 Interchangeability. Words, terms, and phrases used in the singular include the plural and those used in the plural include the singular.

C109.5 Defined Terms.

Alternate Formats. Alternate formats usable by people with disabilities may include, but are not limited to, braille, ASCII text, large print, recorded audio, and electronic formats that conform to this part.

Assistive Technology (AT). Assistive technology is any item, piece of equipment, or system, whether acquired commercially, modified, or customized, that is commonly used to increase, maintain, or improve functional capabilities of individuals with disabilities. As used in this part, the term includes traditional assistive technology hardware and software along with mainstream technology used for assistive purposes, virtual assistive technology delivered as a web service and integration of products into a system that provides assistive technology functions that allow individuals with disabilities to access information and communication technology.

Authoring Tool. Any software intended to create or modify electronic content for publication in one or more formats that support compliance with the user interface and content provisions. Simple text editors that can only create or modify content in

conforming formats by directly editing the code are not considered authoring tools under this definition.

CAPTCHA. "Completely Automated Public Turing test to tell Computers and Humans Apart." A Turing test is any system of tests designed to differentiate a human from a computer. CAPTCHA tests often involve asking the user to type in text that is presented in an obscured image or audio file.

Content. Information and sensory experience to be communicated to the user by means of software, including but not limited to: text, images, sounds, videos, controls, and animations, as well as the encoding that defines the structure, presentation, and interactions associated with those elements. Examples include word processing files, presentation files, spreadsheet files, text files, and portable document files.

Content Format. An encoding mechanism for storing information, such as HTML, JPEG, SMIL, and PDF.

Customer Premises Equipment (CPE). Equipment employed on the premises of a person (other than a carrier) to originate, route, or terminate telecommunications or interconnected VOIP service.

Decoration. Sensory experience to be communicated to the user that does not convey relevant information, does not have a function, and is included only for aesthetic purposes.

Electronic and Information Technology (E&IT). This is also referred to as Information and Communication Technology (ICT). This includes information technology and is any equipment or interconnected system, or subsystem of equipment, which is used in the creation, conversion, duplication, automatic acquisition, storage, analysis, evaluation, manipulation, management, movement, control, display, switching, interchange, transmission, reception, or broadcast of data or information.

ICT includes, but is not limited to: electronic content, including email, electronic documents and Internet and Intranet web sites; telecommunications products, including video communication terminals; computers and ancillary equipment, including external hard drives; software, including operating systems and applications; information kiosks and transaction machines; videos; IT services; and multifunction office machines that copy, scan and fax documents.

Free-standing. Standing independently of attachment or support.

Images of Text. Text that has been rendered in a non-text form, such as an image, in order to achieve a particular visual effect. Images of text may appear on a screen or in print or be embossed on hardware. This does not include text that is part of a picture that contains significant other visual content.

Information and Communication Technology (ICT). Also referred to as electronic and information technology.

Information Technology. Any equipment or interconnected system or subsystem of equipment, that is used in the automatic acquisition, storage, analysis, evaluation, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information. The term information technology includes computers, ancillary equipment, including external hard drives, software, firmware and similar procedures, services (including support services), and related resources.

Keyboard. A set of systematically arranged keys by which a machine or device is operated and alphanumeric input is provided such as a computer keyboard, a cell-phone keypad, or a television remote control that can generate alphanumeric input. Tactilely discernible keys that are used in conjunction with the main cluster of keys are included in the definition of keyboard as long as their function also maps to keys on any keyboard interfaces.

Keyboard Interface. A means for accepting input from a keyboard. For software, this would be the ability to accept keyboard input from the operating system including on-screen keyboards. For hardware this would be the ability to connect a keyboard via wired or wireless connection.

Label. Text or other component with a text alternative that is presented to a user to identify a component within content. In many cases the name and the label are the same. A label is presented to all users, unlike a name, which may be hidden and only exposed by assistive technology.

Large Scale Text. Text that appears in at least 18 point type, or 14 point type if bolded.

Menu. Set of selectable options.

Name. Text by which software can identify a component within Web content to the user. The name may be hidden and only exposed by assistive technology, whereas a label is presented to all users. In many cases, the label and the name are the same. This is unrelated to the name attribute in HTML.

Non-text Content. Any content that is not a sequence of characters that can be programmatically determined or where the sequence is not expressing something in human language. Examples include ASCII art (which is a pattern of characters), emoticons, “leetspeak” (which uses character substitution of numbers for letters), and images representing text.

Operable Part. A component of ICT used to activate, deactivate, or adjust the ICT.

Peripheral Devices. Devices employed in connection with telecommunications equipment or customer premises equipment (CPE) to translate, enhance, or otherwise transform telecommunications into a form accessible to individuals with disabilities.

Platform Accessibility Services. Services provided by a platform enabling interoperability with assistive technology, commonly in the form of accessibility APIs (application programming interfaces.)

Platform Software. Collection of software components that runs on an underlying software or hardware layer and that provides a set of software services to applications that allows them to be isolated from the underlying software or hardware layer.

Product. The term “product”, as used in this document, is equivalent to ICT.

Programmatically Determinable. Determined by software from author-supplied data provided in a way that different user agents, including assistive technologies, can extract and present the information to users in different modalities.

Readily achievable. Easily accomplishable and able to be carried out without much difficulty or expense.

Real-time Text (RTT). Communications that employ the transmission of text wherein the characters are transmitted by a terminal within a maximum of 1 second of character input. This would typically be for conversational purposes but also may be used in voicemail, Interactive Voice Response and other similar applications.

Specialized Customer Premises Equipment. Equipment employed on the premises of a person (other than a carrier) to originate, route, or terminate telecommunications or VoIP services, which is commonly used by individuals with disabilities to achieve access.

Synchronized Media. Audio or video displayed at the same time as other time-based content that is required for understanding of the complete presentation. The other content that the audio or video is synchronized with does not include equivalents such as captions, subtitles, or video description.

Telecommunications. The transmission, between or among points specified by the user, of information of the user’s choosing, without change in the form or content of the information as sent and received.

Telecommunications Equipment. Equipment, other than customer premises equipment (CPE), used by a carrier to provide telecommunications services, and includes software integral to such equipment (including upgrades).

Telecommunications Manufacturer. A manufacturer of telecommunications or VoIP equipment or customer premises equipment (CPE) that sells to the public or to vendors that sell to the public; a final assembler.

Telecommunications Service. The offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used.

Terminal. Device or software with which the end user directly interacts and that provides the user interface. For some systems, the software that provides the user interface may reside on more than one device such as a phone and a server.

Text. A sequence of characters that can be programmatically determined, where the sequence is expressing something in human language.

TTY. An abbreviation for teletypewriter. Machinery or equipment that enables interactive text based communications through the transmission of frequency-shift-keying audio tones across the public switched telephone network according to TIA-825-A (A Frequency Shift Keyed Modem for Use on the Public Switched Telephone Network). As used in this part, the term TTY includes devices for text-to-text communications along with voice and text intermixed communications such as voice carry over and hearing carry over. TTYs may include computers with special modems. TTYs are a subset of devices called text telephones.

Typically Held to the Ear. A product that is positioned immediately adjacent to the ear, either by hand or by a strap or holder of some kind, in typical use.
Video Description. The insertion of verbal or auditory description(s) of on-screen visuals intended to describe important visual details that are not contained in, or that cannot be understood from, the main audio output alone. Video descriptions supplement the regular audio track of a program and are usually inserted between dialogue narrations to provide information about actions, characters, and on-screen text that appear without verbalization. Video descriptions are a way to let people who are blind or have low vision know what is happening on screen.

Voice over Internet Protocol (VoIP) Service. A service that enables real-time, two-way voice communications, requires a broadband connection from the user's location, requires Internet protocol-compatible customer premises equipment (CPE), and permits users generally to receive calls that originate on the public switched telephone network and to terminate calls to the public switched telephone network.

C110 Referenced Standards or Guidelines

C110.1 General. The standards listed in C110.2 are incorporated by reference in this document and are part of the requirements to the prescribed extent of each such reference. The Director of the Federal Register has approved these standards for incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the referenced standards may be inspected at the Access Board, 1331 F Street, NW, Suite 1000, Washington, DC 20004 or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html

C110.2 Referenced Standards or Guidelines. The specific editions of the standards or guidelines listed below are referenced in this document. Where differences occur

between this document and the referenced standards or guidelines, this document applies.

C110.2.1 ATSC. Copies of the referenced standard may be obtained from the Advanced Television Systems Committee (ATSC), 1776 K Street, NW, Suite 200, Washington, DC 20006-2304
http://www.atsc.org/standards/a53.php

A/52 Standard for Digital Audio Compression (AC-3) (1995); A/53 Digital Television Standard, Parts 1-6, 2007 (see 606.2.2.2); and A/65 Program and System Information Protocol for Terrestrial Broadcast and Cable (2006).

Advisory C110.2.1 ATSC. The ATSC/ A/52, A/53, and A/65 Digital Television Standards describe the transmission system characteristics of the advanced television (ATV) system. The document and its normative parts provide detailed specifications of the parameters of the system including the video encoder input scanning formats and the preprocessing and compression parameters of the video encoder, the audio encoder input signal format and the pre-processing and compression parameters of the audio encoder, the service multiplex and transport layer characteristics and normative specifications, and the VSB RF/Transmission subsystem.

C110.2.2 ANSI/IEEE. Copies of the referenced standards may be obtained from the Institute of Electrical and Electronics Engineers (IEEE) Publications Office, 10662 Los Vaqueros Circle, P.O. Box 3014, Los Alamitos, California 90720-1264
http://www.ieee.org

ANSI/IEEE STD C63.19-2007 American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids (see 803.6).

Advisory C110.2.2 ANSI/IEEE. ANSI C63.19-2007 American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids provides a uniform method of measurement for compatibility between hearing aids and wireless communications devices.

C110.2.3 ANSI/EIA. Copies of the referenced standards may be obtained from Information Handling Services, 15 Inverness Way East, Englewood, Colorado 80155-6800
http://global.ihs.com

ANSI/EIA-470-A-1987 for analog telephones (see 803.2).

ANSI/EIA/TIA-571-1991 for digital telephones (see 803.2).

Advisory C110.2.3 ANSI/EIA. ANSI/EIA-470-A-1987 specifies the baseline volume in telecommunications products for analog telephones. ANSI/EIA/TIA-571-1991 specifies the baseline volume in telecommunications products for digital telephones.

C110.2.4 ITU-T. International Telecommunication Union Telecommunication Standardization Sector. Copies of the referenced standards may be obtained from International Telecommunication Union Telecommunication Standardization Bureau, Place des Nations CH-1211, Geneva 20, Switzerland
http://www.itu.int/ITU-T/

ITU-T G.722 (11/88): 7 kHz audio-coding within 64 kbits/s (see 902).

Recommendation ITU-R BT.470-7, Conventional Analog Television Systems (1988) also known as National Television System Committee (NTSC) standard video output (see Advisories 905.3.2.3.1 and 905.3.2.3.3).

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C110.2.6 TIA /TIA. Copies of the referenced standard may be obtained from IHS (Information Handling Services) 15 Inverness Way East, Englewood, Colorado

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TIA TIA-825-A (2003) A Frequency Shift Keyed Modem for Use on the Public Switched Telephone Network (see 902.4.1).

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http://www.w3.org/TR/WCAG20

Web Content Accessibility Guidelines 2.0 (2008) (see 401.1, 501.1, and 601.1).

Advisory C110.2.7 Web Content Accessibility Guidelines (WCAG) 2.0. The Web Content Accessibility Guidelines offer a series of recommendations to make web content more accessible to all users, including persons with disabilities.

CHAPTER 2: FUNCTIONAL PERFORMANCE CRITERIA

201 General

201.1 Scope. The provisions of this chapter shall apply to ICT covered under E103.3 and C103.3.

202 Functional Performance Criteria

202.1 General. ICT shall provide access to all functionality, either directly or by supporting the use of assistive technology, and shall conform to E202 where applicable.

202.2 Without Vision. At least one mode of operation using non-visual access shall be provided.

202.3 With Limited Vision. When a visual mode of operation is provided, at least one visual mode of operation that does not require visual acuity greater than 20/200 or a field of vision greater than 20 degrees shall be provided.

Advisory 202.3 With Limited Vision. The term "blindness" means central visual acuity of 20/200 or less in the better eye with the use of a correcting lens. An eye which is accompanied by a limitation in the fields of vision such that the widest diameter of the visual field subtends an angle no greater than 20 degrees is considered as having a central visual acuity of 20/200 or less.

Visual acuity of 20/200 is comparable to adjusting the optical viewing distance to 10 times the viewing distance for unimpaired vision. In North America, legal blindness is defined as visual acuity of 20/200. Many people with even this degree of low vision prefer a visual mode of operation.

202.4 Without Perception of Color. At least one mode of operation that does not require user perception of color shall be provided.

202.5 Without Hearing. At least one mode of operation that does not require user hearing shall be provided.

202.6 With Limited Hearing. When an auditory mode of operation is provided, at least one mode of operation which improves clarity, reduces background noise, or allows user control of volume shall be provided.

Advisory 202.6 With Limited Hearing. This provision requires ICT that offers an auditory mode of operation to provide at least one mode of operation in an enhanced auditory fashion by reducing background noise, improving clarity, and providing user control of amplification.

202.7 Without Speech. At least one mode of operation that does not require user speech shall be provided.

202.8 With Limited Manipulation. At least one mode of operation shall be provided that does not require the user to have fine motor control or to operate more than one control at the same time.

202.9 With Limited Reach and Strength. At least one mode of operation that is operable with limited reach and limited strength shall be provided.

202.10 Without Physical Contact. At least one mode of operation that does not require physical contact shall be provided.

EXCEPTIONS: 1. This provision only applies after the initial connection, configuration, and setup of any customized interface device.

2. This provision does not apply to providing power to ICT.

3. This provision does not apply to changing consumables or providing physical maintenance.

Advisory 202.10 Without Physical Contact. The use of a standard interface or protocol that allows users to control a product using software or hardware via a wired or wireless network connection conforms to this provision.

Examples of wired connections include Ethernet, USB, and IEEE 1394. Examples of wireless, Wi-Fi, Bluetooth, and wireless USB adaptors. The use of an infra-red ("IR") remote control provided with consumer electronics products also conforms to this provision.

Advisory 202.10 Without Physical Contact Exception 1. An initial connection includes any physical connections to attach the user's customized interface device. An example of physical connection is connecting an augmentative communication device to a kiosk via a USB cable.

A customized interface device may not be part of the default configuration. A customized interface device could be assistive technology or it could be information technology. Examples of customized interface devices are voice recognition software or an IR port.

Advisory 202.10 Without Physical Contact Exception 2. The accessibility features of many products require that all the hardware be "powered up" and in standby mode. Providing power may require physically switching a circuit breaker.

Advisory 202.10 Without Physical Contact Exception 3. An example of changing consumables is replacing batteries. Pneumatic switches are an example of adaptive technology which requires routine physical maintenance.

202.11 Minimize Photosensitive Seizure Triggers. ICT shall provide at least one mode of operation that minimizes the potential for triggering photosensitive seizures.

Advisory 202.11 Minimize Photosensitive Seizure Triggers. ICT that emits light in flashes at any time may visually induce seizures for people who have photosensitive seizure disorders.

For further clarification of this requirement, consult WCAG 2.0 Success Criteria 2.3.1 Three Flashes or Below Threshold and Success Criteria 2.3.3 Three Flashes.

See also the WCAG 2.0 definitions for “general flash and red flash thresholds”. These are found at: http://www.w3.org/TR/WCAG20/#general-thresholddef.

CHAPTER 3: COMMON FUNCTIONALITY

301 General

301.1 Scope. The provisions of this chapter shall apply where required by Chapter 1 or where referenced by a requirement in this document.

302 Closed Functionality

302.1 General. ICT that has closed functionality shall conform to 302.

Advisory 302.1 General. ICT has closed functionality for many reasons. These reasons include design or policy. ICT may have closed functionality in practice even though the manufacturer did not design or develop ICT to be closed. Computers which are "locked down" to the extent that end users cannot adjust settings are functionally closed.

Information kiosks and most hand held calculators have closed functionality because their functionality is self-contained. By design, no provision is made to add peripherals to them. Examples of peripherals include alternative input and output devices.

An example of ICT that has closed functionality is an electronic "book" that is "locked" by the publisher. The "lock" prevents the content from being converted into alternate formats.

As a result of using Digital Rights Management (DRM) technology, publishers sometimes prevent visual content from being played in audio form (or audio content from being displayed in visual form). A best practice is for publishers not to implement DRM technology which creates barriers to accessibility. An alternative best practice for publishers is to provide an alternate format which is compatible with assistive technology.

Electronic content, including "e-books", holds great promise for people who have limited cognitive ability, limited or no vision, or limited manipulation. Electronic copy is much more flexible and adaptable than hard copy paper, and includes the ability to be read in alternate formats such as large print or braille.

302.2 Without Attachment of Assistive Technology. ICT that has closed functionality shall be usable by people with disabilities without requiring assistive technology other than personal headsets for private listening, to be attached.

303 Biometrics

303.1 General. When biometric forms of user identification or control are provided, ICT shall conform to 303.

EXCEPTION: When the biometric form of user identification or control employs biological characteristics possessed by all people, conformance to 303 shall not be required.

Advisory 303.1 Biometrics General Exception. Examples of biological characteristics that all people possess are DNA and circulatory systems.

303.2 Alternate Identification or Control. ICT shall provide an alternate form of user identification or control that conforms to either 303.2.1 or 303.2.2.

Advisory 303.2 Alternate Identification or Control. Biometrics use biological characteristics for user identification or control. Examples of biometrics used for identification or control include but are not limited to: fingerprints, retinal scans, iris patterns, voice prints, facial recognition, and hand veins. However, people with disabilities might not possess all biological characteristics.

Biometrics that are restricted to a single biological characteristic pose a significant barrier to people with disabilities who do not possess that specific biological characteristic.

This provision requires ICT that uses biometrics either to provide for two (or more) dissimilar biological characteristics, or to offer an alternate mode for user identification or control.

303.2.1 Alternate Biometric. An alternate biometric that uses a biological characteristic dissimilar to the biological characteristic of the default biometric shall be provided.

Advisory 303.2.1 Alternate Biometric. Examples of biometrics that rely upon dissimilar biological characteristics are voice recognition and face recognition. Biometric methods based on dissimilar biological characteristics increase the likelihood that people with disabilities possess at least one of the specified biological characteristics. Examples of dissimilar biological characteristics are: fingerprints, eye retinal patterns, voice, and face.

Examples of biometrics that rely upon similar biological characteristics are finger printing and thumb scans.

303.2.2 Non-Biometric Alternative. A non-biometric alternative that does not require the user to possess any specific biological characteristics shall be provided.

Advisory 303.2.2 Non-Biometric Alternative. An example of a non-biometric form of user identification or control is entering a pass code.

304 Preservation of Information Provided for Accessibility

304.1 General. ICT that transmits or converts information or communication shall conform to 304.

304.2 Encoding, Compression, or Transformation. ICT that transmits or converts information or communication, shall not remove non-proprietary information provided for accessibility or shall restore it upon delivery.

Advisory 304.2 Encoding, Compression, or Transformation. This provision applies to ICT using industry-standard codes, translation protocols, or formats. It applies to conversion techniques, such as encoding, signal compression, and format transformation.

Examples of ICT that encode, compress, or transform include firewalls, routers, and gateways.

An example of ICT preserving information provided for accessibility is a media player that displays embedded captions from a captioned video and does not strip out the captioning.

Another example of preserving information provided for accessibility is converting a document into a new format while retaining information about the identity, operation, and state of the interface elements.

This provision does not require the addition or translation of information. For example, this is not a requirement to change voice mail to text or to vocalize captions.

305 Color

305.1 Not Only Color. ICT shall not use color as the only visual means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.

Advisory 305.1 Not Only Color. This requirement allows color to be used. An example is an electronic form with required and optional fields. Instructions at the beginning of the form explain that required fields are both labeled with an asterisk and appear in red text. In this example, the asterisk is the non-color dependent visual means of conveying information.

This provision only addresses the ability to distinguish color. Other forms of perception are addressed by 503.2 Information, Structure, and Relationships which includes programmatically determinable access to information conveyed by visual presentation.

306 Flashing

306.1 Flash Threshold. When ICT emits lights in flashes, there shall be no more than three flashes in any one second period.

EXCEPTION: Flashes that do not violate the general flash or red flash thresholds are not required to conform to 306.

Advisory 306.1 Flash Threshold. For further clarification of this requirement, consult WCAG 2.0 Success Criteria 2.3.1 “Three Flashes or Below Threshold”.

See also the WCAG 2.0 definition for “general flash and red flash thresholds” found at: http://www.w3.org/TR/WCAG20/#general-thresholddef.

307 Operable Parts

307.1 General. ICT with operable parts shall conform to 307.

307.2 Clear Floor Space. A clear floor or ground space conforming to 36 CFR Part 1191 Appendix D, Section 305 shall be provided for ICT with operable parts.

307.3 Height. ICT with operable parts shall be placed so that the operable parts are within one or more of the reach ranges conforming to 36 CFR Part 1191 Appendix D, Section 308.

Advisory 307.3 Height. This provision applies to reach ranges applicable to both forward and side approaches. Diagrams appear in ABAAG/ADAAG (36 CFR Part 1191).

307.4 Operation. ICT with operable parts shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist.

307.4.1 Activating Force. The force required to activate operable parts shall be 5 pounds (22.2 N) maximum.

307.5 Touch-Operated Controls. ICT with controls that are designed to be operated by touch using the fingers, including but not limited to keys, buttons, switches, and touch pads, shall conform to 307.5.1 through 307.5.3.

307.5.1 Tactilely Discernible. Controls shall be tactilely discernible without activating the controls.

307.5.2 Locking or Toggle Controls. When ICT has locking or toggle controls, the status of all locking or toggle controls shall be visually discernible and discernible through touch or sound.

Advisory 307.5.2 Locking or Toggle Controls. Locking or toggle controls are those controls that can only have two or three values and that keep their value while being used.

An example of locking or toggle controls is the “Caps Lock” key found on most keyboards. Another example is the volume button on a pay telephone which is set at normal, loud, or extra loud volume. An example of making a control discernible is when a sound is emitted when a user runs a mouse over a control.

307.5.3 Key Repeat. When key repeat is supported by a keyboard interface, the delay before key repeat shall be adjustable to at least two seconds.

307.5.3.1 Adjustability. Key repeat shall be adjustable to two seconds per character.

Advisory 307.5.3 Key Repeat. Key repeat is the keyboard feature in which a typed character is repeated by holding down a single key. Key repeat can pose a problem for accessibility. If the repeating starts too soon, or if the repeat happens too quickly, slow typists can end up with lots of extra characters which are cumbersome to remove. Use of the backspace delete key also relies upon delay before repeat and repeat rate being controllable.

307.6 Non-Mechanical Controls. ICT that utilize non-mechanical controls shall provide an alternate mode of operation by touch, voice control or gesture input that conforms to 307.6.1 or 307.6.2, as applicable.

Advisory 307.6 Non-Mechanical Controls. Examples of alternate modes of operation include touch screens, keyboards, virtual keyboards, and buttons.

Examples of non-mechanical controls that are touch operated include touch screens, touch pads, gesture input devices, and membrane keyboards.

Examples of non-mechanical controls that can be operated without physical contact are user interfaces that operate by voice or in-the-air gestures.

307.6.1 Touch Operation. ICT with controls that are operated by touch shall conform to 307.6.1.1 or 307.6.1.2.

307.6.1.1 Alternate Controls. Touch-operated controls that conform to 307.5 shall be provided.

307.6.1.2 Without User Vision. A mode of operation for the controls that does not require user vision for interaction shall be provided.

307.6.2 Operation Without Physical Contact. When ICT is designed for use without physical contact, a mode of operation without touch shall be provided that does not require user vision for interaction.

CHAPTER 4: PLATFORMS, APPLICATIONS, AND INTERACTIVE CONTENT

401 General

401.1 Scope. The provisions of this chapter shall apply to platforms, applications, and interactive content and where required by Chapter 1 or where referenced by a requirement in this document.

> EXCEPTION**:** Platforms, applications, and interactive content complying with the WCAG 2.0 Level AA Success Criteria and Conformance Requirements and, where applicable, 409 and 413 of this chapter shall not be required to comply with other requirements of this chapter.

Advisory 401.1 Scope. Examples of platforms include, but are not limited to, desktop, mobile, or embedded operating systems, web browsers, plug-ins to web browsers which render a particular media or format, or a set of components which allow other applications to execute.

Examples of applications include, but are not limited to, web-based and traditional applications, such as an email client, word processor, help desk system, content management system, e-learning course, or terminal emulator.

When applications provide accessibility services that other applications use, they are also considered to be platforms. Accessibility services are an application programming interface (API) or other mechanism for software to interact with assistive technology.

Electronic content can also function as a platform. Some formats provide for the inclusion of interactive user interface elements and a set of accessibility services.

Examples of electronic content formats that are a platform include, but are not limited to, interactive forms, spreadsheets, web-based content which includes user inputs, and other content which includes user input functionality.

Interactive elements written only using HTML according to specification are known to meet the provisions of this part.

When scripting is used to produce web-based interactive user interface elements all requirements from this chapter and from Chapter 5 (Electronic Documents) apply.

Additional requirements for non-interactive electronic content are identified in Chapter 5 (Electronic Documents). Those requirements are applicable to applications or interactive electronic content which includes non-interactive content.

402 Non-Text Content

402.1 Non-Text Content. When applications contain non-text content, the non-text content shall conform to 502.

402.2 Audio and Video Content. When an application contains audio and video content, the audio and video content shall conform to Chapter 6 (Synchronized Media Content and Players).

402.3 Alternate CAPTCHA. When a CAPTCHA is provided, an alternative form of CAPTCHA using an output mode for a different type of sensory perception shall be provided.

403 Distinguishable Content

403.1 General. ICT that contains audio or text content shall conform to 403.

Advisory 403.1 General. Many individuals with visual and hearing disabilities have difficulty separating foreground and background information. A best practice to make it easier for users to see and hear content is to separate foreground from background.

For visual presentations, this involves making sure that information presented on top of a background contrasts sufficiently with the background. For audio presentations, this involves making sure that foreground sounds are sufficiently louder than the background sounds.

403.2 Audio Control. ICT containing audio that plays automatically for more than three seconds shall conform to either 403.2.1 or 403.2.2.

Advisory 403.2 Audio Control. A best practice is for ICT to conform to both 403.2.1 and 403.2.2.

403.2.1 Pause or Stop Audio. A mode of operation shall be available to pause or stop audio.

403.2.2 Independent Volume Control. A mode of operation shall be available to control audio volume independently from the overall platform volume.

Advisory 403.2.2 Independent Volume Control. Individuals who use screen reading software can find it hard to hear the speech output if there is other audio playing at the same time. This difficulty is made worse when the screen reader's speech output is software based and is controlled by the same volume control as the sound. Therefore, it is important that the user be able to turn off the background sound. Having control of the volume includes being able to reduce its volume to zero (also called "mute").

403.3 Resizable Text. ICT shall support the ability to resize text content up to 200 percent without loss of content or functionality and without relying upon assistive technology.

EXCEPTION: Images of text, including text used for captioning, are not required to support the ability to be resized.

Advisory 403.3 Resizable Text. A best practice is to use text rather than images of text wherever text can be used to achieve the desired visual presentation.

404 Keyboard Operation

404.1 General. ICT that accepts user input shall conform to 404.

404.2 Keyboard Interface. All functionality of the ICT shall be operable through a keyboard interface without requiring specific timings for individual keystrokes.

EXCEPTIONS: 1. When the underlying function requires input that depends on the path of a user's movement and not just the endpoints of the movement, a keyboard interface shall not be required.

2. When the underlying function requires voice input, and voice operation that does not require user vision is provided, a keyboard interface shall not be required.

Advisory 404.2 Keyboard Interface. This provision refers to the underlying function of the input method. This provision does not prohibit and should not discourage providing for mouse input or other input methods in addition to providing for keyboard operation.

An example of ICT that requires a keyboard interface is a product which by default provides for handwriting as a means to enter text. The default input technique (handwriting) requires path-dependent input, but the underlying function (text entry) does not. Therefore, Exception 1 is not applicable.

The phrase "without requiring specific timings" is included so that end users can enter keystrokes through a keyboard interface at their preferred pace.
Examples of "specific timings for individual keystrokes" include situations where a user would be required to repeat or execute multiple keystrokes within a short period of time or where a key must be held down for an extended period before the keystroke is registered.

The use of "MouseKeys" would not satisfy this provision because "MouseKeys" is not a keyboard equivalent to the application; it is a mouse equivalent (that is, it looks like a mouse to the application).

Advisory 404.2 Keyboard Interface Exception 1. The phrase "underlying function requires input that depends on the path of the user's movement, and not just the endpoints" is included as an exception to distinguish operations that cannot reasonably be controlled from a keyboard.

This exception refers to the underlying function, not to the default input technique. An example of an underlying function that uses path dependent input is a watercolor painting program. The brush strokes (the user's input in this example) vary depending on the speed and duration of the movements, therefore a keyboard interface is not required.

Another example where the exception might appear to apply but does not apply, involves the use of drag and drop functionality. Although performing a drag and drop function with a mouse would require path-dependent movement and would thus seem not to require keyboard access, here again, the underlying function, moving items from one location to another or selecting an item from one list while another item is highlighted in another list of items would in fact require keyboard access, since the moving or selecting of data can be accomplished through non-path-dependent keyboard mechanisms such as select boxes and other similar controls.

Advisory 404.2 Keyboard Interface Exception 2. An example of a product that does not require a keyboard interface is a voice operated speaker telephone that does not have a screen and that provides for all dialing and on/off hook functions to be executed through voice commands.

404.3 No Trapping of the Keyboard Focus Cursor. When the keyboard focus can be moved to a component of ICT using a keyboard interface, a mode of operation shall be provided to move the keyboard focus away from that component using only a keyboard interface.

Advisory 404.3 No Trapping of the Keyboard Focus Cursor. This requirement ensures mobility of the keyboard focus. The intent of this provision is to ensure that a product does not "trap" the keyboard focus cursor within a subsection of content. This is a common problem that can occur when multiple formats are combined within content or embedded applications.

404.3.1 Exit Method. The ICT shall provide an exit method that conforms to either 404.3.1.1 or 404.3.1.2 for moving the keyboard focus away from a component.

404.3.1.1 Standard Exit Method. ICT shall use the standard exit method or standard navigation keys for the platform.

Advisory 404.3.1.1 Standard Exit Method. The unmodified arrow or tab keys are the standard navigation keys for software used on personal computers.

404.3.1.2 Non-standard Exit Method. The ICT shall provide instruction of the non-standard exit method to the user.

Advisory 404.3.1.2 Non-standard Exit Method. There may be times when it is appropriate to temporarily restrict the keyboard focus cursor to a subsection of the content, as long as the user is provided instruction on how to leave that state and "untrap" the focus.

404.4 Presentation of Keyboard Shortcuts. ICT shall provide at least one mode of operation where all keyboard shortcuts associated directly with user interface controls are presented to the user.

Advisory 404.4 Presentation of Keyboard Shortcuts. Keyboard shortcuts include keystroke commands such as those used to activate a menu item or button, for example, the "S" of a "Save File" menu item.

An example of one mode of operation is a help screen that lists keyboard commands.

A best practice is for the keyboard shortcuts to be available directly as part of the live user interface.

This provision does not require adding keyboard shortcuts beyond those usually associated with a platform.

There are many common conventions that do not require a visual indication of keyboard shortcuts because they are not associated with specific visual elements of the user interface. Examples include the command to switch windows (such as Alt-Tab) and the command to advance the caret in text (such as Ctrl-Arrow).

User-configurable keyboard shortcuts are not considered to be directly tied to interface elements and thus are not required to be displayed. However, a best practice is to display user-configurable keyboard shortcuts.

404.5 Visible Keyboard Focus Indicator. A mode of operation shall be provided so the keyboard focus indicator is visible.

Advisory 404.5 Visible Keyboard Focus Indicator. An example of a visible keyboard focus indicator is an I-beam cursor.

The focus indicator may be provided by the interface itself or by the interface in combination with accessibility services provided by the platform.

For a text area, the presence of the default text insertion point indicator (for example, an I-beam cursor) is sufficient for most platforms to conform to this provision.

When a user relies on the keyboard to interact with content, this provision requires a visible cursor so that the user can visually determine the component with which keyboard operations will interact at any point in time.

People with low vision (but who are not using assistive technology), attention limitations, short term memory limitations, or limitations in executive processes benefit by being able to determine where the focus is visually located.

404.6 Focus, Text Cursor, and Attributes. Programmatically determinable object information shall include information necessary to track and modify: focus, text insertion point, and selection attributes of user interface components.

405 Time Limits

405.1 General. ICT that contains time based content shall conform to 405.

405.2 Control Over Time Limits. ICT shall provide a mode of operation that conforms to one of 405.2.1 through 405.2.3.

EXCEPTIONS: 1. When the time limit is essential and user modification of the time limit would invalidate the activity, no user control over the default time limit is required.

2. When the time limit is a required part of a real-time event and no alternative to the time limit is possible, no user control over the default time limit is required.

3. When the time limit is at least eight hours, no user control over the default time limit is required.

Advisory 405.2 Control Over Time Limits Exception 1. A server time out, even for security reasons, is not a situation when user modification of the time limit would invalidate the activity. Therefore, a server time out is not an appropriate use of Exception 1.

Advisory 405.2 Control Over Time Limits Exception 2. An example is an on-line ticket-purchasing site which gives the user two minutes to confirm a purchase before the seats are returned to the general pool. Because tickets on such sites can sell out quickly, this is a case in which the time limit is a required part of a real-time event. A best practice is for the site to move as much of the process out of the time-limited period as possible, allowing users to provide necessary information like name, payment method, etc., before entering the time-limited period.

Advisory 405.2 Control Over Time Limits Exception 3. A best practice is to provide the option to turn off, adjust, or extend the time limit even when the time limit is at least eight hours.

405.2.1 Turn Off. Before encountering a time limit, a mode of operation shall be provided for the user to turn off the time limit.

405.2.2 Adjust. Before encountering a time limit, a mode of operation shall be provided for the user to adjust the time limit to at least ten times the length of the default time limit.

405.2.3 Extend. A mode of operation shall be provided for the user to extend a time limit with a simple action that conforms to 405.2.3.1 and 405.2.3.2.

Advisory 405.2.3 Extend. An example of a simple action to extend the time limit is a prompt to "press the space bar for more time."

405.2.3.1 Expiration Warning. The user shall be warned at least twenty seconds before a time limit expires.

405.2.3.2 Multiple Extensions. The user shall be able to extend a time limit at least ten times.

405.3 Control Over Moving, Blinking, or Scrolling Information, and Automatic Updates. Moving, blinking, or scrolling information, and automatically updating information shall conform to 405.3.1 or 405.3.2 as applicable.

EXCEPTIONS: 1. Moving, blinking, or scrolling information, and automatically updating information that is an essential part of an activity shall not be required to conform to 406.4.

2. Moving, blinking, or scrolling information, and automatically updating information that does not start automatically shall not be required to conform to 405.3.

3. Moving, blinking, or scrolling information, and automatically updating information that is not presented at the same time and in the same location as other content shall not be required to conform to 405.3.

Advisory 405.3 Control Over Moving, Blinking, or Scrolling Information, and Automatic Updates. Content that is streamed, or otherwise automatically updated periodically, might not be preserved when paused. Preservation might not be technically possible, and in many situations might be misleading.

Examples of moving, blinking, scrolling, or automatically updating information include:

- A Web site helps users understand "how things work" through animations that demonstrate processes. Animations have "pause" and "restart" buttons.
- An advertisement blinks to get viewers attention but stops after five seconds.
- A form blinks an arrow near the submit button if a user finishes filling out the form but does not activate the submit button. The blinking stops after five seconds.
- An animation runs in the upper portion of the page but has a "freeze animation" button near the bottom of the animation.

Advisory 405.3 Control Over Moving, Blinking, or Scrolling Information, and Automatic Updates Exception 1. An example of essential moving content is animation that occurs as part of a preloading phase, when interaction cannot occur during that phase for all users. In this situation, not indicating progress would likely confuse users or cause them to think that content was frozen or broken.

Advisory 405.3 Control Over Moving, Blinking, or Scrolling Information, and Automatic Updates Exception 2. Automatically updating information does not start automatically when users have to activate a control to start the update and are advised of the behavior before the automatic update starts.

Advisory 405.3 Control Over Moving, Blinking, or Scrolling Information, and Automatic Updates Exception 3. An example is animation that is shown on a web page which requires a certain percentage of a large video file to be downloaded before video play can begin. The animation is the only content on the web page. The user has to wait while the video loads. Because the moving content is not presented at the same time and in the same location as other content, no mode of operation to pause, stop, or hide the animation is required, even though the animation may run for more than five seconds for users with slower connections.

Another example is a web site that requires all users to view a fifteen second advertisement before they can access free content available from the site. Because the advertisement is not presented in parallel with other content, a mode of operation to pause, stop, or hide the advertisement is not required.

405.3.1 Pause, Stop, or Hide. When moving, blinking, or scrolling information lasts for more than five seconds, a mode of operation shall be provided for the user to pause, stop, or hide the moving, blinking, or scrolling information.

405.3.2 Pause, Stop, Hide, or Control Frequency. When information updates automatically, a mode of operation shall be provided for the user to pause, stop, hide, or to control the frequency of the update.

406 Navigation

406.1 General. ICT shall conform to 406.

Advisory 406.1 General. A best practice is for developers to provide ways to help users navigate, find content, and determine where they are within an ICT product.

406.2 Bypass Blocks of Content. A mode of operation shall be provided for the user to bypass blocks of content that are repeated within an ICT product.

Advisory 406.2 Bypass Blocks of Content. The ability to bypass blocks of content is used to jump focus (or “reading”) to get to other portions of content.

An example is when the start of the content of an onscreen interface includes a set of menu options. A user may choose to bypass this set of menu options by jumping focus to the main content.

A best practice that meets this provision is consistently providing headings within content. Assistive technologies often allow users to navigate from heading to heading. Therefore, consistently providing headings is providing a mode of operation that provides users the ability to bypass blocks of content.

Use of tables of content and internal "same page" links can be used to meet this requirement as they allow navigation to specific content without requiring lengthy sequential "skimming".

406.3 Focus Order. When content can be navigated sequentially and the navigation sequences affect meaning or operation, components that are capable of receiving focus shall receive focus in an order that preserves meaning and operation.

406.4 Multiple Ways to Locate Content. More than one way shall be provided for a user to locate content within ICT.

EXCEPTION: When the content is the result of, or a step in a process, more than one way for a user to locate content is not required.

Advisory 406.4 Multiple Ways to Locate Content. Examples of ways to meet this provision include providing a site map, index, table of contents, or flexible search features.

407 Predictability

407.1 General. ICT shall conform to 407.

Advisory 407.1 General. A best practice is for interfaces to appear and to operate in predictable ways.

407.2 No Change of Context from Focus. When any component receives focus, the component shall not initiate a change of context.

Advisory 407.2 No Change of Context from Focus. A change of context is a major change in the content that, if made without user awareness, can disorient users who are not able to view the entire page simultaneously.

This provision does not prohibit changes of context. Changes of context are an expected consequence of the user actively interacting with components. This provision prohibits changes of context that are triggered by the user only moving the focus around the user interface.

Users of assistive technology move the focus around the user interface in order to explore and read the web page or screen. This provision prohibits components from activating because the component receives focus.

Focus can be indicated by keyboard, mouse-over cursor, or through other input devices. Any component that is able to trigger an event when it receives focus must not change the context.

Examples of automatically changing context when a component receives focus which are prohibited by this provision include, form submission without a submit button, new windows opening without activation of a link (pop-over and pop-under), and changing (jumping) focus from the current component to another (perhaps on the same screen or in the same document).

407.3 No Change of Context from Change of Settings. Changing the setting of any user interface component shall not automatically cause a change of context.

EXCEPTION: When advance notice of a potential change in context is provided before a user activates any component which will change user interface settings, conformance with 407.3 shall not be required.

Advisory 407.3 No Change of Context from Change of Settings Exception. An example is a form which contains an auto-advance feature, which is described to the user at the beginning of the form. The form requires the user to enter a series of identification numbers. After the user enters a certain number of digits in each field, the focus automatically moves to the next field, without requiring the user to press enter or tab.

407.4 Consistent Navigation Order. When navigation mechanisms are repeated within an ICT product, they shall occur in the same relative order each time they are repeated.

EXCEPTION: When a change to the navigation mechanism is initiated by the user, conformance to 407.4 shall not be required.

407.5 Consistent Identification. Components that have the same functionality within an ICT product shall be identified consistently.

408 Input Assistance

408.1 General. ICT shall conform to 408.

408.2 Input Error Identification and Description. When an input error is automatically detected, the item that is in error shall be identified, and the error shall be described to the user in text.

Advisory 408.2 Input Error Identification and Description. The intent of this provision is to ensure that users are aware that an error has occurred and can determine what is wrong.

A best practice is for the error identification and description to be as specific as possible.

409 User Preferences

409.1 General. Applications, including web applications, shall conform to 409.

409.2 User Preferences. Applications shall provide a mode of operation that uses user preferences for platform settings for color, contrast, font type, font size, and focus cursor.

409.2.1 Underlying Platform Settings. Applications that are also platforms shall provide a mode of operation that uses the underlying platform's settings for color, contrast, font type, font size, and focus cursor.

Advisory 409.2.1 Underlying Platform Settings. An example of an application that is also a platform is a web browser.

410 Interoperability with Assistive Technology

410.1 General. Platforms, including applications which are also platforms, and software toolkits for those platforms shall conform to 410.

EXCEPTION: Platforms, including applications which are also platforms, and software toolkits for those platforms, that have closed functionality, shall not be required to conform to 410.

Advisory 410.1 General Exception. Requirements for ICT that has closed functionality are found in 302 (Closed Functionality).

410.2 Accessibility Services. Platforms and software toolkits for those platforms shall provide a set of accessibility services that support a mode of operation for applications running on the platform to interoperate with assistive technology.

410.3 Documented Accessibility Usage. Platforms and applications that have platform documentation available to application developers shall conform to both 410.3.1 and 410.3.2.

410.3.1 User Control of Accessibility Features. Platforms shall provide a mode of operation for end-user control over platform features that are defined in the platform documentation as having an accessibility usage.

410.3.2 No Disruption of Accessibility Features. Applications shall not disrupt platform features that are defined in the platform documentation as having an accessibility usage.

410.4 Object Information. Information about components, interactive elements, and other objects shall be programmatically determinable using platform accessibility services.

Advisory 410.4 Object Information. Object information must be exposed to assistive technologies using information from content, application, or platform accessibility services as is most appropriate for the ICT. When access to remote graphical user interfaces is provided by software, such software must expose the object information from the remote system to the assistive technology for use.

Delivering the object information to the assistive technology from a remote graphical user interface is not equivalent to operating the assistive technology remotely.

Operation of assistive technology remotely does not meet the requirements for providing the objective information via content, or application or platform accessibility services. While remote operation of assistive technology can provide functional access in some circumstances, currently such solutions are not scalable to a general solution for more than very small environments, and are limited only to specific assistive technologies.

Additionally, it is a best practice for platform software and accessibility services to include keyboard shortcuts and implicit designators in the object information that is exposed.

411 Compatible Technologies

411.1 General. ICT content shall conform to 411.

Advisory 411.1 General. ICT content includes information and sensory experience communicated to the user and encoding that defines the structure, presentation, and interactions associated with those elements. Examples of content are text, images, sounds, videos, controls, and animations.

A best practice is to maximize compatibility with current and future technologies, including assistive technology.

411.2 User Interface Components. User interface components found in content shall conform to 411.2.1 through 411.2.4.

Advisory 411.2 User Interface Components. Providing role, state, and value information on all user interface components enables compatibility with assistive technology. Examples of assistive technology that can make use of role, state, and value information include screen readers, screen magnifiers, and speech recognition software.

This provision is primarily aimed at content providers who develop or script their own user interface components and includes but is not limited to form elements, links, and components generated by scripts.

For example, standard HTML controls and form elements conform to this requirement when used according to specification.

A best practice is for the information which is programmatically determinable to be descriptive. Examples include:

- Any possible value ranges, including any minimum or maximum.
- Any relationship a component has as a label for, or how it is labeled by, another component.
- The name of any parent or containing component, and a list of any children components (nesting).
- Boundary information, including size and coordinates.
- Whether the component can accept focus.
- Whether the component can be used for “drag-and-drop” operations, either as object or target.

411.2.1 Name and Role. For all user interface components, the name and role shall be programmatically determinable.

411.2.2 States, Properties, and Values. States, properties, and values shall conform to 412.2.2.1 and 412.2.2.2.

411.2.2.1 Programmatically Determinable. When states, properties, and values are conveyed to the user, they shall be programmatically determinable.

411.2.2.2 Set Programmatically. When states, properties, and values can be set by the user, they shall be capable of being set programmatically.

411.2.3 Change Notification. Notification of changes to states, properties, and values shall be available to user agents, including assistive technologies.

411.2.4 Tables. Components in a table shall conform to 411.2.4.1 and 411.2.4.2.

411.2.4.1 Row and Column. A component’s object information shall include row and column location within the table.

411.2.4.2 Headers. When the table has row or column headers, a component's object information shall include the headers associated with the row or column.

411.3 Use of Platform Accessibility Services. Applications shall use platform accessibility services to make information about components, interactive elements, and other objects programmatically determinable.

Advisory 411.3 Use of Platform Accessibility Services. Platform accessibility services define the rules for interaction between assistive technology, other applications, content, and the platform.

This provision requires the use by assistive technology of the information exposed through platform accessibility services to deliver the alternate interface to the user with a disability. This ensures that electronic content designed to be accessible is available to the end-user. An example is an alternate text description of an image, which is invisible, but which a screen reader vocalizes.

This provision is not intended to limit the creativity of assistive technology developers or to limit methods of delivering alternate user interfaces. This provision requires that when a platform provides accessibility services, such services must be used to provide accessibility.

412 Assistive Technology Function

412.1 General. Applications providing an alternate user interface that functions as assistive technology shall use, at a minimum, platform accessibility services to make information about components, interactive elements, and other objects programmatically determinable.

413 Authoring Tools

413.1 General. Applications that are used for creating documents or otherwise used for authoring shall conform to 413.

EXCEPTION: When content formats do not support the provisions of Chapter 5 (Electronic Documents), applications shall not be required to conform to 413 when working with files of those formats.

Advisory 413.1 General. Applications that are used to create documents or otherwise used for authoring content are called "authoring tools".

An example of an authoring tool is a web application that allows users to create new web pages.

Another example is an application for editing video.

Authoring tools can also be used to create and publish content for use with telecommunications products or services. An example is an interactive voice response system (IVR) that includes software for the creation of content used to populate menu choices. These requirements for authoring tools enable this content to be accessible.

413.2 Authoring Tools. For all formats supported by the authoring tool, authoring tools shall provide a mode of operation to create or modify content that conforms to Chapter 5 (Electronic Documents).

EXCEPTIONS: 1. Simple text editors that can only create or modify content in conforming formats by directly editing raw source code shall not be required to conform to 413.2.

2. The author shall retain the ability to override information required for accessibility.

Advisory 413.2 Authoring Tools. Content includes information and sensory experience communicated to the user and encoding that defines the structure, presentation, and interactions associated with those elements. Examples of content are text, images, sounds, videos, controls, and animations.

Content includes materials derived from programmatic sources.

Examples of content formats include, but are not limited to: word processing files, presentation files, spreadsheet files, text files, PDFs, and HTML files.

Authoring tools which remove information required for accessibility do not conform to this provision. For example, if a video editing tool is used to edit a captioned movie, the tool must not remove the captioning.

Advisory 413.2 Authoring Tools Exception 1. Examples of content formats that do not support the provisions of Chapter 5 include image-only formats, such as JPEG, and audio-only formats, such as MP3 or audio tape.

Some audio formats do support the provisions of Chapter 5 (Electronic Documents). An example is Daisy or National Instructional Materials Accessibility Standards (NIMAS) digital talking books. An example of a simple text editor is an ASCII text editor such as Windows Notepad.

Advisory 413.2 Authoring Tools Exception 2. Authoring tools which automatically provide information required for accessibility can make mistakes. As with automated spelling or grammar checking, which also can make mistakes, it is important for authors to retain control of the process with authoring tools.

413.2.1 Preservation of Accessibility Information in Format Conversion. When authoring tools include the ability to convert from one format to another or to save content in multiple formats, these authoring tools shall preserve the information required for accessibility to the extent that information is supported by the destination format.

Advisory 413.2.1 Preservation of Accessibility Information in Format Conversion. When converting from one format to another, a best practice is for authors to have control over how information required for accessibility is handled in the destination format to ensure consistent use of the information required for accessibility in both formats.

413.3 Prompts. When programmatically determinable, authoring tools shall provide a mode of operation that prompts authors to create content that conforms to Chapter 5 (Electronic Documents).

Advisory 413.3 Prompts. Prompts do not need to be provided for every element in the content. Overuse of prompts can decrease usability.

413.4 Templates. When templates are provided with authoring tools, at least one template for each template type supported by the authoring tool shall conform to Chapter 5 (Electronic Documents).

CHAPTER 5: ELECTRONIC DOCUMENTS

501 General

501.1 Scope. The provisions of this chapter shall apply where required by Chapter 1 or where referenced by a requirement in this document.

EXCEPTION: Electronic documents complying with the WCAG 2.0 Level AA Success Criteria and Conformance Requirements shall not be required to comply with other requirements of this chapter.

Advisory 501.1 Scope. The provisions of this chapter apply to electronic documents, which are mostly static, read-only, non-interactive electronic content. Examples include Word files, PDFs, PowerPoint presentations, Excel spreadsheets, and simple web pages (which do not contain Flash). However, electronic documents may also contain interactive content, such as hypertext links, buttons, and form elements or fields. All of these elements are covered in this chapter. Electronic content covered by this chapter includes most non-paper documents and web content, regardless of format.

This chapter is oriented towards document authors, rather than developers.

Provisions relevant to more robust user interaction, including scripting, are found in Chapter 4 (Platforms, Applications, and Interactive Content).

Additional requirements for audio and video content are found in Chapter 6 (Synchronized Media Content and Players).

502 Non-Text Content

502.1 General. When ICT provides non-text content, the non-text content shall conform to 502.

502.2 Text Alternatives. When non-text content is provided, text alternatives for the non-text content shall conform to 502.2.1 or 502.2.2.

Advisory 502.2 Text Alternatives. The intent of this provision is to provide text alternatives for any non-text content so that the non-text content can be changed into alternate formats that people with disabilities can use. Some text alternatives shall identify the purpose of the non-text content, as in 502.2.1. Some text alternatives shall describe the non-text content, as in 502.2.2.

502.2.1 Equivalent Purpose. When non-text content is provided, text alternatives for the non-text content shall serve the equivalent purpose.

Advisory 502.2.1 Equivalent Purpose. Examples of text alternatives that serve the equivalent purpose include:

- A search button uses an image of a magnifying glass. An appropriate text alternative for the button is “search” and not “magnifying glass”.
- A picture shows how a knot is tied including arrows showing how the ropes go to make the knot. An appropriate text alternative for the picture describes how to tie the knot, not “picture of ropes being tied into a knot.”
- An animation shows how to change an ink cartridge. A short text alternative for the animation identifies what the animation is about. A long text alternative for the animation describes how to change an ink cartridge.
- A logo of the TechTron Company appears next to each of their products in a list. A short text alternative for this logo is “TechTron”.
- A chart shows sales for October of Acme Co. A short text alternative for the chart is “Acme Co. October sales chart”. A long text alternative for the chart provides all of the information on the chart.
- A heading contains an image of the words, “The History of War” in elaborately stylized text. The alternative text for the image is “The History of War”.
- An image of a series of books on a shelf contains interactive areas that provide links to a web page about each book. The text alternative for the image is “Books available in this section. Select a book for more details about that book.”

502.2.1.1 Images of Text. When non-text content is images of text, the text alternative shall be the text in the image.

Advisory 502.2.1.1 Images of Text. A best practice is to use text instead of images of text.

502.2.1.2 Controls or Inputs. When non-text content is a control or accepts user input, the non-text content shall have a name that describes its purpose.

Advisory 502.2.1.2 Controls or Inputs. A “name” is programmatically determinable text by which software can identify a component within content to the user. While the name might not be visually presented to users, it must be programmatically determinable by assistive technology.

502.2.1.3 Decoration, Formatting, or Invisible. When non-text content is pure decoration, is used only for visual formatting, or is not presented to users, the non-text content shall be implemented in a way that can be ignored by assistive technology.

Advisory 502.2.1.3 Decoration, Formatting, or Invisible. An example of a text alternative that is implemented in a way that can be ignored by assistive technology is using alt="" on an HTML image that does not convey information.

502.2.2 Descriptive Identification. When non-text content is provided, text alternatives for the non-text content shall conform to 502.2.2.1 through 502.2.2.4, as applicable to the type of non-text content.

502.2.2.1 Audio or Video. When non-text content is audio or video content, text alternatives shall provide descriptive identification of the non-text content.

502.2.2.2 Test or Exercise. When non-text content is a test or exercise that would be invalidated if presented in text, text alternatives shall provide descriptive identification of the non-text content.

Advisory 502.2.2.2 Test or Exercise. An example of a test or exercise that would be invalidated if presented in text is an audio-only spelling quiz. For this example, the text alternative might be “audio-only spelling quiz”.

502.2.2.3 Sensory Experience. When non-text content is primarily intended to create a specific sensory experience, text alternatives shall provide descriptive identification of the non-text content.

Advisory 502.2.2.3 Sensory Experience. An example of non-text content that is primarily intended to create a specific sensory experience is an audio-only recording of an orchestra. For this example, the text alternative might be “recording of city orchestra”.

Another example is an unattended and automatically updating weather satellite photo. For this example, the text alternative might be “photo from weather satellite updated every hour”.

A third example is video from an unattended camera at an airport. For this example, the text alternative might include the current temperature and wind speed.

A best practice is for the descriptive identification to provide as much textual information as possible.

502.2.2.4 CAPTCHA. When the purpose of non-text content is to confirm that the content is being accessed by a person rather than a computer, text alternatives that identify and describe the purpose of the non-text content shall be provided.

502.3 Audio and Video Content. Audio and video content shall conform to Chapter 6 (Synchronized Media Content and Players).

503 Adaptable Presentation of Content

503.1 General. Content shall conform to 503.

Advisory 503.1 General. A best practice is to create content that can be presented in different ways without losing information or structure. An example is providing end-users the option to choose a high contrast presentation for a web site.

503.2 Information, Structure, and Relationships. Information, structure, and relationships presented visually to the user shall be programmatically determinable or be available in text.

Advisory 503.2 Information, Structure and Relationships. The intent of this provision is to ensure that information and relationships that are implied by visual or auditory formatting are preserved when the presentation format changes. An example is the presentation format changing when the content is read by a screen reader or when a user style sheet is substituted for the style sheet provided by the author.

The sub provisions under 503.2 are not an exhaustive list of information, structure, and relationships that might be presented to an end-user.

503.2.1 Data Tables. When data tables are provided, data tables shall conform to 503.2.1.1 and 503.2.1.2.

503.2.1.1 Data Tables. Row and column headings shall be programmatically determinable.

503.2.1.2 Multi-Level Tables. When data tables have two or more logical levels of row or columns headings, associations between data cells and heading cells shall be programmatically determinable.

503.2.2 Forms. When forms are provided, labels associated with form fields shall be programmatically determinable.

503.2.3 Section Headings. When content is divided into sections, section headings shall be programmatically determinable.

503.3 Logically Correct Reading Sequence. When the sequence in which content is presented affects its meaning, a logically correct reading sequence shall be programmatically determinable.

Advisory 503.3 Logically Correct Reading Sequence. A logically correct reading sequence is a sequence where words and paragraphs are presented in an order that does not change the meaning of the content.

There may be more than one choice for a logical reading sequence of some content. An example is a sidebar item that might reasonably be read before, after, or in the middle of the main body content. Content authors and developers have flexibility in deciding a logically correct reading sequence.

An example of a reading sequence that is not logically correct is where content is divided into two or more newspaper-style columns, but the programmatically determined reading sequence reads across columns rather than down each column.

Another example is using a style sheet to visually position blocks of text on a page. If the reading sequence used by assistive technology follows a reading sequence implied visually, then the reading sequence is logically correct. If the programmatically determined reading sequence seems random and does not follow any reading sequence implied visually, then the reading sequence is not logically correct.

503.4 Sensory Characteristics. Instructions provided for understanding and operating content shall not rely solely on those characteristics of components perceived through the senses of hearing or vision, such as shape, size, visual location, orientation, or sound.

Advisory 503.4 Sensory Characteristics. Rather than stating, “Click the oval button to the right when done”, an instruction should tell the user to “Activate the Submit button when done.”

Object information (provided per 503) which describes the necessary visual cues or relationships, may be used in providing instructions that conform to this provision.

504 Distinguishable Presentation of Text Content

504.1 General. Text content or images of text content shall conform to 504.

Advisory 504.1 General. A best practice is to make it easier for users to see content, including separating visual foreground from background.

504.2 Text and Images of Text Contrast Ratio. The visual presentation of text and images of text shall conform to 504.2.1 or 504.2.2.

EXCEPTION: When visual presentations of text or images of text are part of an inactive user interface component, are pure decoration, are not presented to users, are part of a picture that contains significant other visual content, or are part of a logo or brand name, there is no contrast requirement.

Advisory 504.2 Text and Images of Text Contrast Ratio Exception. An example of an “inactive user interface component” is an item within a menu that automatically “grays out” when its selection is not available. In this example, the deemphasized item remains in the menu as a placeholder.

An example of images of text in “part of a picture that contains significant other visual content” is the lettering on a shop window in a photograph of a street scene when the lettering on the window is not relevant to the purpose of the photograph.

504.2.1 Large-Scale Text Contrast Ratio. Large-scale text and images of large-scale text shall have a contrast ratio of at least 3:1.

504.2.2 Text Contrast Ratios. Text and images of text that are not large scale text shall have a contrast ratio of at least 4.5:1.

Advisory 504.2.2 Text Contrast Ratios. For further clarification of this requirement, consult WCAG 2.0 Success Criteria 1.4.3 “Contrast (Minimum)”.

See also the WCAG 2.0 definitions for “contrast ratio” found at: http://www.w3.org/TR/WCAG20/#contrast-ratiodef.

504.3 Resize and Reflow Text. Text content shall support the native capability of the platform for text to resize and reflow text without loss of content or functionality.

EXCEPTION: Captions and images of text are not required to conform to 504.3.

504.3 Resize and Reflow Text. Most content formats and platforms natively provide a capability for users to adjust font size. Content can be developed which interferes with this native capability and thus creates a barrier to accessibility for users with low vision.

Reflow of text is necessary because just making letters larger would result in text moving off the screen or text appearing on top of other text.

A best practice is for captions and images of text to support the resizing and reflow of text.

Another best practice is to use text, rather than images of text, wherever possible, because text gives users more control over font size.

Web documents that support resize and reflow of text are sometimes described as “fluid”, “liquid”, or “elastic”.

505 Navigation and Orientation

505.1 General. Content shall conform to 505.

Advisory 505.1 General. A best practice is for authors to provide ways to help users navigate, find content, and determine where they are.

505.2 Document Titles. Documents shall have titles that describe topic or purpose.

505.3 Link Purpose. The purpose of each link shall be determinable from the link text alone, or from the link text together with its programmatically determined link context.

EXCEPTION: When the purpose of a link is ambiguous to users in general, the purpose of that link shall not be required to conform to 505.3.

Advisory 505.3 Link Purpose. The intent of this provision is to help users understand the purpose of each link so that they can decide whether they want to follow the link.

A best practice is to provide link text that identifies the purpose of the link without needing additional context.

Assistive technology has the ability to provide users with a list of links that are on the Web page. Link text that is as meaningful as possible will aid users who want to choose from this list of links. Meaningful link text also helps those who wish to tab from link to link. Meaningful link text helps users choose which links to follow without requiring complicated strategies to understand the page.

In some situations, authors may want to provide part of the description of the link in logically related text that provides the context for the link. An example of this is when only one word in a sentence is a link, and the purpose of this link is made apparent from the context provided by the entire sentence.

When the link text alone is not sufficiently descriptive, this provision requires that a user be able to identify the purpose of a link without moving focus from the link.

Users should be able to arrive on a link and find out more about where the link leads without losing their place in content. Examples of programmatically determined link context include: putting the description of the link in the same sentence, paragraph, list item, a heading immediately preceding the link, and table headings cell for a link in a data table.

An example of link text being used together with its programmatically determined link context is a list of books available in three formats: HTML, PDF, and MP3. In this example, so that screen reader users do not have to hear the title of each book three times (once for each format), the first link for each book is the title of the book, the second link says “PDF”, and the third says “MP3”.

Text that is in title or alt attributes is programmatically determinable and may also be used for compliance with this provision. An example of this technique is a news article summary where the main page lists the first few sentences of each article followed by a “Read More” link. In this example, each “Read More” link includes a title attribute with a value that is unique to each article.

505.3 Link Purpose Exception. An example where links are ambiguous to all users in general is an online quiz that has possible answers identified only with an arbitrary number. In this example, descriptive link text might influence choices, and invalidate the purpose of the quiz.

505.4 Descriptive Headings and Labels. When supported by the technology and appropriate to the task, headings and labels shall describe topic or purpose.

Advisory 505.4 Headings and Labels. An example of this provision would be descriptive section headings in a document.

An example of a technology that does not allow the document author to create headings or labels which describe topic or purpose is a spreadsheet; therefore, this provision would not apply to spreadsheets.

An example of a situation where headings and labels are not appropriate to the task is a data table. Short non-descriptive identifying labels are appropriate for this task. Headings for data tables are required by 503.2.1.

506 Readability

506.1 General. Text content shall conform to 506.

506.2 Language of Document. The default human language of each document shall be programmatically determinable.

506.3 Language of Passage or Phrase. When supported by the technology, the human language of each passage or phrase in the content shall be programmatically determinable.

EXCEPTION: The human language for proper names, technical terms, words of indeterminate language, and words or phrases that have become part of the vernacular of the immediately surrounding text, shall not be required to be programmatically determinable.

Advisory 506.3 Language of Passage or Phrase. An example of technology that does not support the human language of a passage or a phrase being programmatic determinable is plain ASCII text.

507 Input Assistance

507.1 General. Content shall conform to 507.

Advisory 507.1 General. A best practice is for authors to help users avoid and correct mistakes. For example, instructions for filing out a form should help the reader to complete the form.

507.2 Labels or Instructions. When content requires user input, labels or instructions shall be provided.

Advisory 507.2 Labels or Instructions. The intent of this provision is to ensure that enough information is provided for the user to accomplish the task without undue confusion or navigation.

Labels do not need to be lengthy. A word, or even a single character, may be sufficient if it provides an appropriate cue to finding and navigating content.

An example of a sufficient label for a telephone number data entry field is the use of a hyphen, and not just white space, to separate parts of the phone number.

An example of an insufficient label for a telephone number data entry field is the use of formatting implied only visually by shape, size, or location of the parts of the phone number.

508 Compatible Technologies

508.1 General. Content shall conform to 508.

508.2 Markup Language Used According to Specification. Content that is implemented using markup languages shall conform to 508.2.1 through 508.2.4.

Advisory 508.2 Markup Language Used According to Specification. HTML (hyper text markup language) and XML (extensible markup language) are examples of markup languages which are used in the creation of electronic content.

The intent of this requirement is to ensure that user agents, including assistive technologies, can accurately interpret and parse content using markup language. Content that is properly coded using all of the above requirements is correctly read by user agents, such as screen readers.

In markup languages, errors in element and attribute syntax and failure to provide properly nested start and end tags lead to errors that prevent user agents from parsing the content reliably. This provision requires that the content can be parsed using only the rules of the formal grammar for the technology.

Many authoring tools ensure unambiguous parsing. When available for the content format, validation ensures unambiguous parsing. A best practice is to use authoring tools that provide validation or otherwise ensure unambiguous parsing. See section 413 for more guidance on the use of authoring tools.

Content which is poorly coded and omits any one of the requirements in the provision may be unreadable by a user agent. For example, a table is coded, but the nested (508.2.2) start and end tags (508.2.1) are omitted. As a result, the screen reader tool reports “not in a table” when the user tries to invoke table navigation commands to move from one data cell to another. The screen reader is unable to properly read the poorly coded document, since some of the requirements, such as properly nested start and end tags in this case, were omitted.

Some user agents use “repair techniques” to render poorly coded content but the resulting rendering can be unpredictable, and documents that rely on such repair techniques are not conformant to this provision. If the content cannot be parsed into a data structure, then different user agents may present it differently or be completely unable to parse it.

Repair techniques vary among user agents. A best practice is for content to be created according to the rules defined in the formal grammar for that technology. When this best practice is not followed, authors cannot assume that content will be accurately parsed into a data structure. Authors also cannot assume that content will be rendered correctly by specialized user agents, including assistive technologies. Markup language must be used according to specification.

508.2.1 Tags. Elements shall have complete start and end tags.

508.2.2 Nesting. Elements shall be nested according to their specifications.

508.2.3 No Duplicate Attributes. Elements shall not contain duplicate attributes.

508.2.4 Identity. When identity attributes are used, identity values shall be unique unless the specifications allows for duplication.

508.3 User Interface Components. User interface components shall be used according to their specification and shall conform to 411.2.

Advisory 508.3 User Interface Components. The intent of this provision is to ensure that document authors do not disrupt accessibility features. This provision is applicable but not limited to form elements, links, and components generated by scripts.

Examples of user interface components in documents include hypertext links, buttons, and form elements or fields.

Standard HTML controls and form elements conform to this requirement when used according to specification.

Chapter 4 (Platforms, Applications, and Interactive Content) contains requirements for user interface components.

CHAPTER 6: SYNCHRONIZED MEDIA CONTENT AND PLAYERS

601 General

601.1 Scope. The provisions of this chapter shall apply where required by Chapter 1, or where referenced by a requirement in this document.

> EXCEPTION**:** Synchronized media content and players complying with the WCAG 2.0 Level AA Success Criteria and Conformance Requirements and, where applicable, 604.4, 604.5, 607, and 608 of this chapter shall not be required to comply with other requirements of this chapter.

Advisory 601.1 Scope. Synchronized media is audio or video displayed at the same time as other time-based content that is required for understanding of the complete presentation. The other content that the audio or video is synchronized with to meet this definition does not include equivalents such as captions, subtitles, or video description. Examples of time-based content are video, audio, and user-action.

602 Video or Audio Content with Interactive Elements

602.1 General. Video or audio content containing interactive elements shall provide a mode of operation that conforms to Chapter 4 (Platforms, Applications, and Interactive Content).

Advisory 602.1 General. Examples of video or audio content with interactive elements include DVD menus and dynamic on-screen television program guides.

603 Captions and Transcripts for Audio Content

603.1 General. Regardless of format, materials containing audio content, or video with audio content, shall conform to 603.

603.2 Pre-recorded Audio Content with No Video Content or User Interaction. Materials containing pre-recorded audio content, and no video content or user interaction, shall provide a transcript of the content.

Advisory 603.2 Pre-recorded Audio Content with No Video Content or User Interaction. A best practice is to provide synchronized captions for pre-recorded and real-time (live) audio-only media. This best practice is not a requirement. Complementing an audio-only stream with captions entails the addition of a visual stream and translation of the data. An example where this would be a fundamental alteration is a radio broadcast.

An audio-only presentation used in a public setting may require captions or other real-time visual equivalent under sections 501 and 504 of the Rehabilitation Act.

603.2.1 Transcript. When a separate transcript is provided, the text shall conform to Chapter 5 (Electronic Documents).

603.3 Pre-recorded Audio Content with User Interaction. Materials containing pre-recorded audio content with user interaction shall provide synchronized captions.

Advisory 603.3 Pre-recorded Audio Content with User Interaction. An example of pre-recorded audio with user interaction would be an on-line tutorial where spoken narration guides a user through a task.

603.4 Pre-recorded Video Content with Synchronized Audio Content. Materials containing pre-recorded video content with synchronized audio content shall provide synchronized captions.

Advisory 603.4 Pre-recorded Video Content with Synchronized Audio Content. Captions are either closed or open. "Closed" means capable of being turned on and off. "Open" means visible to all users.

A best practice is for captions to conform to Chapter 5 (Electronic Documents) to provide alternate formats for people who are deaf-blind and rely on braille.

603.5 Real-Time Video Content. Materials that contain real-time video content with audio information shall provide synchronized captions.

EXCEPTION: When real-time video is unattended and has the primary purpose of conveying a visual experience, and a text alternative that provides descriptive identification is provided, synchronized captions shall not be required.

604 Video Description and Transcripts for Video Content

604.1 General. Regardless of format, materials containing video content, with or without audio content, shall conform to 604.

604.2 Pre-recorded Video Content with No Audio Content or User Interaction. Materials containing pre-recorded video content and no audio content or user interaction, shall provide either a separate transcript or an equivalent audio alternative.

Advisory 604.2 Pre-recorded Video with No Audio or User Interaction. An example of pre-recorded video with no audio information or user interaction is a silent movie.

The purpose of the transcript is to provide an equivalent to what is presented visually.

The purpose of the audio alternative is to be an equivalent to the video.

A text equivalent is not required for audio that is provided as an equivalent for video with no audio information. For example, it is not required to caption video description that is provided as an alternative to a silent movie.

A video-only presentation used in a public setting may require video description or other real-time audio equivalent as a reasonable accommodation under section 501 and 504 of the Rehabilitation Act.

604.2.1 Transcript. When a separate transcript is provided electronically, the text shall conform to Chapter 5 (Electronic Documents).

604.3 Pre-recorded Video with Synchronized Audio Content. Materials containing pre-recorded video with synchronized audio content shall provide video description.

604.4 Real-Time Video. Materials that contain real-time video, with or without audio content, shall provide real-time video description.

EXCEPTION: When real-time video is unattended and has the primary purpose of extending a visual experience, and a text alternative that provides descriptive identification is provided, video description shall not be required.

Advisory 604.4 Real-Time Video. A best practice is for speakers to incorporate verbal descriptions of any visual information presented. This practice is necessary for any live presentation to be accessible. This practice may also avoid having to add video description to presentations that are recorded.

An example of real-time video is a live “on-site” news broadcast.

Advisory 604.4 Real-Time Video Exception. An example of real-time video that is unattended and has the primary purpose of extending a sensory experience is an automated fixed camera that overlooks a national park and continuously broadcasts sights and sounds.

A best practice to provide as much textual based information as possible, even when only descriptive identification is required. An example of this is adding current wind speed and temperature information to the text alternative associated with an unattended “beach cam”.

604.5 Multiple Visual Areas of Focus. Materials containing real-time or pre-recorded video content with synchronized audio content that display visual content in multiple areas of focus shall provide video description for visual content necessary for the comprehension of content.

Advisory 604.5 Multiple Visual Areas of Focus. Video may contain more than a single visual focus. This provision requires that video description be provided for each area of focus. An example is in-house agency broadcast programs where scrolling event notices appear under the main program. People who are blind have traditionally missed out on visual information in videos, when it was necessary to understand more than one thing at the same time. For example, a video of an interview should audibly describe who is speaking when their names are visually displayed. In addition, streaming information, such as daily news highlights, should also be video described.

In particular, visual emergency communication, such as emergency announcements in the form of text scrolling on a screen, is covered by this requirement. This is consistent with the Federal Communications Commission (FCC) rule requiring broadcasters and cable operators to make local emergency information accessible to persons who are deaf or hard of hearing, and to persons who are blind or have visual disabilities. This part extends that requirement to ICT.

A second method for meeting this requirement is to stream the audio information in two tracks that can be fed separately into the right and left ears. Since the video description stream can be closed, people without disabilities would not have to listen to the competing audio streams. People who are blind often have the skill to listen to two audio streams simultaneously or can be trained to do so.

605 Caption Processing Technology

605.1 General. ICT that displays or processes video with synchronized audio content shall conform to 605.

Advisory 605.1 General. Examples of products that display synchronized media include but are not limited to: Analog television (TV), digital television (DTV), tuners (including TV tuner cards for use in computers), digital-to-analog TV converter boxes, personal video display devices, and software players.

A TV tuner card is a computer component that allows television signals to be received by a computer.

A digital-to-analog TV converter box is a stand-alone device that receives and converts digital signals into a format for display on an analog television receiver.

Components of a system may be obtained separately and integrated. Such a system could include a separate DVD player and projector. This provision requires that the system, as a whole, will include the necessary technology to support the display of open and closed captions. As described in Chapter 10 (ICT Support Documentation and ICT Support Services), a best practice is for manufacturers who sell system components to explain in their product documentation how to integrate the system to support open and closed captions.

Caption technology may offer features that enhance the usability of captions. These features include choices for background and foreground color, font selection, and contrast.

605.2 Audio-Visual Players and Displays. Audio-visual players and displays shall conform to 605.2.1 or 605.2.2.

605.2.1 Decoding of Closed Captions to Open Captions. Audio-visual players and displays that process video with synchronized audio information shall decode closed caption data and pass on an open-captioned signal to the video display.

605.2.2 Pass through of Closed Caption Data. Audio-visual players and displays that process video with synchronized audio information shall pass closed caption data through to the video display for decoding as displayed text. All cabling or ancillary equipment shall not block the passing through of closed captioning.

606 Video Description Processing Technology

606.1 General. ICT that displays or processes video with synchronized audio information shall conform to 606.

606.2 Audio-Visual Players and Displays. Audio-visual players and displays shall conform to 606.2.1 or 606.2.2.

606.2.1 Audio for Video Description. Audio-visual players and displays that process video with synchronized audio information shall play audio information associated with video description.

606.2.2 Processing of Video Description. Audio-visual players and displays that process video with synchronized audio information shall conform to 606.2.2.1 or 606.2.2.2.

606.2.2.1 Analog Signal Tuners. Analog signal tuners shall conform to MTS/BTSC Broadcast Television Systems Committee (BTSC) Multichannel Television Sound Standard (1984) (incorporated by reference, see “Referenced Standards or Guidelines“in 508 Chapter 1). Analog signal tuners shall be equipped with Secondary Audio Program (SAP) process circuitry as defined by the Broadcast Television Systems Committee (BTSC) Multichannel Television Sound Standard.

606.2.2.2 Digital Television Tuners. Digital television tuners shall conform to ATSC A/53 Digital Television Standard, Parts 1-6 (2007) (incorporated by reference, see “Referenced Standards or Guidelines” in 508 Chapter 1). Digital television tuners shall support processing of video description when encoded as a Visually Impaired (VI) associated audio service that is provided as a complete

program mix containing video description according to the A/53 standard developed by the Advanced Television Systems Committee (ATSC).

607 User Controls for Captions and Video Description

607.1 General. ICT that displays video with synchronized audio content shall provide user controls for closed captions and video description that conform to 607 and Chapter 3 (Common Functionality).

607.2 User Controls Location. Location of user controls for closed captions and video description shall conform to 607.2.1 through 607.2.3.

607.2.1 Caption Controls. When controls are provided for the selection of volume, controls for the selection of captions shall be provided in at least one location that is comparable in prominence to the location of the controls for volume.

607.2.2 Dedicated Video Description Controls. When controls are provided for the selection of channels, the controls for the selection of video description shall be provided in at least one location that is comparable in prominence to the location of the controls for channels.

Advisory 607.2.1 Dedicated Caption Controls; Advisory 607.2.2 Dedicated Video Description Controls. The user controls needed to access captioning and video description must be in at least one location that is comparable in prominence to the controls needed to control volume or program selection. At a minimum, this requires placement of such controls on either the product's physical apparatus or its remote control, where the ability to control volume or program selection is otherwise provided on that apparatus or remote control.

607.2.3 On-screen Menus. When an on-screen menu is used to control the selection of volume or channels, the controls for the selection of captions and video description shall be at the same menu level as the corresponding volume and channel selection.

608 Audio Track and Volume Control

608.1 General. ICT that displays and processes synchronized media shall conform to 608.

Advisory 608.1 General. The intent of this provision is to provide users with a control so that they can distinguish speech from background audio. Examples of ICT that displays and processes synchronized media are audio visual players and displays.

This provision applies to players of digital broadcast signals and players of media. An example of this is a DVD player.

A best practice is to produce videos with speech and background sounds on separate tracks in order for users to be able to select a preferred audio track.

Some individuals with hearing loss may find it difficult to understand speech in videos or broadcasts when there is competing background music or other sound effects.

In some videos developed under the DTV A/53 Standard, users may choose to listen to speech only, without background sound that may interfere with comprehension.

608.2 Independent Selection. When materials contain speech content that is provided on a separate track from the other audio tracks, audio-visual players and displays shall provide users with a mode of operation to select the speech track independently from the other audio tracks.

608.3 Volume Adjustment. When materials contain multiple audio tracks, audio-visual players and displays shall provide users with a mode of operation to adjust the volume of each audio track independently.

CHAPTER 7: HARDWARE ASPECTS OF ICT

701 General

701.1 Scope. The provisions of this chapter shall apply where required by Chapter 1, or where referenced by a requirement in this document.

702 Reach Ranges for Installed or Free-Standing ICT

702.1 General. Reach ranges for controls and keys on installed or free-standing non-portable ICT intended to be used in one location shall conform to 36 CFR Part 1191 Appendix D, Section 308.

Advisory 702.1 General. An example of free-standing, non-portable ICT is a multifunction machine which can transmit, copy, scan, or fax materials. It is accessed either by someone approaching it and placing materials upon it, or by sending print jobs from a workstation.

703 Standard Connections

703.1 General. When connection points are provided, at least one of each type of connection shall conform to industry standard non-proprietary formats.

EXCEPTION: This provision does not apply to products with closed functionality.

Advisory 703.1 General. The intent of this provision is to ensure compatibility with assistive technologies by requiring the use of standard connections on products.

Examples of connections points include expansion slots, ports, and connectors for cables.

Industry standard non-proprietary formats include wireless connections to products. Examples of wireless connections include infrared (IR) and Bluetooth.

704 Text, Images of Text, and Symbols for Product Use

704.1 General. Text, images of text, and symbols provided for product use shall conform to 704.

704.2 Accessible Mode for Text, Images of Text and Symbols. At least one mode of operation that conforms to Chapter 5 (Electronic Documents) shall be provided for text, images of text, and symbols provided for product use.

EXCEPTIONS: 1. When not provided for product use, safety labels, regulatory labels, logos, and certifications shall not be required to conform to 704.2.

2. Captions shall not be required to conform to 704.2.

3. Information for product use that is conveyed in a way that is uniquely tactilely discernible through shape shall not be required to conform to 704.2.

4. Information for product use that is conveyed in a way that is uniquely audibly discernible through tone or speech shall not be required to conform to 704.2.

5. Electronic text in embedded firmware or installed software that is not electronic text for product use shall not be required to conform to 704.2.

Advisory 704.2 Accessible Mode for Text, Images of Text and Symbols. An example of text provided for product use is a user manual. To meet the requirements of this provision, the user manual could be stored in an accessible electronic file on a product.

An example of images of text provided for product use is an on-screen menu for adjusting picture quality on a television. To meet the requirements of this provision, the on-screen menus could be vocalized by the audio processor of the television.

Advisory 704.2 Accessible Mode for Text, Images of Text and Symbols Exception 3. Products may be labeled with symbols rather than text. These symbols are sometimes raised and uniquely tactilely discernible. An example is a portable computer with ports that are identifiable by shape and tactile markings. Another example is a numeric keypad with a nib on the 5 key.

704.3 Attributes and Contrast Ratio for Images of Text on Hardware. When images of text are provided for product use on hardware and they are the only visual means of conveying information, the images of text shall conform to 704.3.1 and 704.3.2.

EXCEPTION: Images of text for secondary functions shall not be required to conform to 704.3.

Advisory 704.3 Attributes and Contrast Ratio for Images of Text on Hardware. This provision applies to print and embossed text as well as electronic text that is not programmatically determinable.

Advisory 704.3 Attributes and Contrast Ratio for Images of Text on Hardware Exception. Keyboard keys frequently have secondary and tertiary functions, such as the blue numbers on an embedded number pad of a portable computer. The markings for such infrequently used keys are less prominent than the markings for primary functions in order to reduce visual clutter and confusion.

704.3.1 Text Attributes. Characters in images of text shall be in a sans serif font. Characters shall be 3/16 inch (4.8 mm) high minimum, based on the uppercase letter “I”.

704.3.2 Contrast Ratio for Images of Text. Images of text shall have a contrast ratio of at least 3:1.

Advisory 704.3.2 Contrast Ratio for Images of Text. This provision addresses background contrast and reflectance contrast.

Images of text that rely on reflectance contrast use ambient light for discernability.

Examples of ICT products with images of text that feature background contrast include LCD displays with a backlight, and devices with dark characters on a light background.

An example of a passively illuminated display is a keyboard with legends that requires reflectance contrast.

CHAPTER 8: AUDIO OUTPUT FROM HARDWARE

801 General

801.1 Scope. The provisions of this chapter shall apply where required by Chapter 1, or where referenced by a requirement in this document.

Advisory 801.1 Scope. The scope of this Chapter is not limited to support for speech output. It is broad and encompasses products such as computers and portable media players that play music. It also covers other audio sounds, such as beeps that provide information about a product's operation.

Interconnected VoIP telephones and interconnected VoIP telephone-emulation software are addressed in 906.

Installed or free-standing non-portable products with audio output are required to conform to 702.

802 Interactive ICT Within Reach

802.1 General. ICT that provides audio output as a function of its operation, when such output is necessary to inform, alert, or transmit information or data, and is intended to be operated within reach of the user, shall conform to 802 and 307.

Advisory 802.1 General. All the provisions of 802 are "interactive and within reach of the user". The ICT in this provision may either normally be held to the ear or normally not held to the ear.

Examples of Interactive ICT within reach, normally held to the ear, which provides audio output include wireless and landline telephones.

Another example of ICT, within reach, not normally held to the ear, which conforms to this provision, is a set of speakers attached to a desktop personal computer, where the audio output is controlled through knobs on the speakers, the keyboard, or by onscreen software.

A public address system is an example of a product that is not covered by this provision because generally users cannot reach it or interact with it.

802.2 Products that Provide Audio Output. ICT shall conform to 802.2.1, 802.2.2, 802.2.3, or 802.2.4.

Advisory 802.2 Products that Provide Audio Output. Examples of products covered by this requirement include wireless and landline telephones, computers, information transaction machines, kiosks, and some museum exhibits.

This provision does not require the addition of handsets where audio jacks are provided. Nor does this provision require the addition of audio jacks where handsets are provided.

Users of hearing aids and cochlear implants may benefit by using assistive technology to improve coupling for hearing enhancement. Examples of such assistive technology include silhouette inductors and neck loops.

Adaptors may be used to conform to the requirements of this provision.

Examples of hardware connections that have commonly available adaptors include Bluetooth, RCA, USB, and RJ-9/RJ-10/RJ-11/4P4C.

Such adaptors should not be intended for communal use.

802.2.1 Conforming Handset. When ICT that is designed for use in a public location does not require simultaneous use of a keyboard and produces auditory output via an audio transducer typically held to the ear, the audio transducer shall conform to 803.

802.2.2 Audio Jack. ICT designed for use in a public location shall provide an industry standard non-proprietary 2.5 mm or 3.5 mm audio jack.

802.2.3 Hardwire Adapter. ICT not designed for use in a public location shall provide a hardwire adapter that converts the product's audio jack format to an industry standard non-proprietary 2.5 mm or 3.5 mm audio jack.

802.2.4 Wireless Adapter. ICT not designed for use in a public location shall provide a wireless adapter that conforms to 802.2.4.1 through 802.2.4.3.

802.2.4.1 Size and Battery Life. The wireless adaptor shall have a similar size and battery life performance to the ICT for which it is provided.

802.2.4.2 Without Assistance. The wireless adaptor shall allow the user to pair the adapter to the product without assistance.

802.2.4.3 Without Cable. The wireless adaptor shall allow the user to pair the adapter to the product without requiring the user to plug in a cable for each use.

802.3 Adjustable Volume Control. ICT shall provide a user-adjustable control for the audio output level through speakers and audio jacks.

Advisory 802.3 Adjustable Volume Control. This provision applies to products typically held to the ear, and those that are not typically held to the ear. An example of ICT that is not typically held to the ear for which this provision is applicable is a desktop speaker.

802.3.1 Speaker Audio. Audio output level provided through speakers shall conform to 804.

802.3.2 Audio Jacks. Audio output level through jacks shall conform to 803.

802.3.3 Software Controls. ICT with software controls shall conform to requirements for accessible interfaces in Chapter 4 (Platforms, Applications, and Interactive Content).

Advisory 802.3.3 Software Controls. An example of a software control is a program that allows users to customize hotkeys to preset preferred volume settings.

802.3.4 Hardware Controls. ICT with hardware controls shall conform to 307. The controls shall be within the reach of the user.

Advisory 802.3.4 Hardware Controls. The intent of this provision is to ensure that the hardware control for volume is within the reach of the user, in the part that a user has with them.

For corded products with audio transducers typically held to the ear, the volume control does not have to be built into the ear-level component of the product (e.g., handset) when a control for volume adjustment is provided within reach through another component of the complete system, such as the base unit of a telephone.

Examples of hardware volume controls are wheels, slides, and push buttons.

802.3.4.1 Wireless Handset Controls. Wireless products shall provide volume control in a handset.

Advisory 802.3.4.1 Wireless Handset Controls. Examples of wireless ICT products are mobile and cordless telephones.

Cordless telephones would not be conformant with this provision if the volume control was placed only in the phone base because it is not in the handset and might not be close to the user.

803 ICT Typically Held to the Ear

803.1 General. ICT with audio output that is typically held to the ear shall conform to 803.

803.2 Volume Gain. ICT with audio output typically held to the ear shall conform to 803.2.1 or 803.2.2.

Advisory 803.2 Volume Gain. This provision covers ICT with an audio transducer held to the ear, which has two way voice communication, such as telecommunications products, and ICT typically held to the ear with one way audio output, such as kiosks with handsets.

Examples of ICT with an audio transducer typically held to the ear that are capable of two way voice communication are telecommunications products such as mobile cell phones and landline cordless and corded phones. Headsets with self-contained volume controls are another example of ICT that is required to conform to this provision.

This provision also covers products with audio-only functionality that do not support two-way voice communication. Examples of products typically held to the ear with audio-only output are information kiosks and museum exhibits with handsets.

The baseline volume in telecommunications products is called the normal unamplified level. It is specified in industry standards ANSI/EIA-470-A-1987 (for analog telephones) and ANSI/EIA/TIA-571-1991 (for digital telephones).

Guidance on how to apply FCC regulation 47 CFR 68.317 to test methods for measuring received acoustic loudness specified in current standards, including measurement procedures for analog, digital, and VoIP telephones, is provided by clause 15.2 of TIA TSB-31-C, Telecommunications – Telephone Terminal Equipment – Rationale and Measurement Guidelines for U.S. Network Protection.

803.2.1 ICT with Two Way Voice Communication. ICT with two way voice communication shall provide a volume gain that is adjustable to a minimum of 18 dB over baseline volume. The baseline volume shall conform to ANSI/EIA-470-A-1987 (for analog telephones) and ANSI/EIA/TIA-571-1991 (for digital telephones) (incorporated by reference, see “Referenced Standards and Guidelines” in 508 Chapter 1 and 255 Chapter 1).

803.2.2 ICT with One Way Audio Output. ICT with one way audio output shall provide a volume gain that is adjustable to a minimum of 18 dB over baseline volume.

803.3 Incremental Volume Control. When ICT with two way voice communication provides incremental volume control, at least one intermediate step of 12 dB, or a series of incremental steps totaling 12 dB, shall be provided.

Advisory 803.3 Incremental Volume Control. Some telephones increase amplification in steps through the push of a button. For these telephones, this provision requires an intermediate step at the 12 dB level, rather than providing only two steps, default, and 18 dB.

803.4 Automatic Reset. When ICT allows users to adjust the volume to a level greater than 18 dB above baseline, it shall automatically reset the volume to a level not greater than 18 dB above baseline after every use.

EXCEPTION: ICT with audio output that is typically held to the ear shall not be required to conform to 803.4 if it also provides a manual override control that prevents the automatic reset and that conforms to the following requirements:

(a) The volume reset override switch shall be labeled as such and located on the ICT in such a way as not to be accessible to accidental engagement;
(b) A bright indicator light shall be prominently displayed on the front of the ICT and shall light up when the override is engaged and the ICT is placed in an off-hook condition;
(c) A warning shall be placed next to the light indicating that the amplification is at a high level;
(d) A caution on the use of the volume reset override switch shall be included in the users' manual; and
(e) The ICT shall include a warning printed in braille that can be securely attached to the back of the handset, or, if the ICT has only a headset, above the dial buttons, to indicate that a high volume setting may be engaged.

Advisory 803.4 Automatic Reset Exception. A discussion of how to apply the exception is found in Federal Communications Commission Memorandum Opinion and Order DA 01-578, in the matter of Tandy Corporation, NSD-L-00-17; Walker Equipment Company, NSD-L-00-22; Ameriphone, Inc., NSD-L-00-63; and Ultratec, Inc., NSD-L-00-193, regarding requests for waiver of volume control reset, 47 C.F.R. 68.317(f), March 5, 2001.

803.5 Magnetic Coupling. ICT that is covered by this section shall provide a means for magnetic coupling to hearing technologies.

Advisory 803.5 Magnetic Coupling. Examples of ICT that are typically held to the ear are handsets of wireless and landline telephones. This provision also applies to handsets on kiosks used only for listening.

In addition, this provision applies to headsets, headphones, and other products with audio transducers that may rest on or in the ear. Further, this provision applies to small ear buds with audio transducers which can magnetically couple with some hearing aids.

802.3.2 Audio jacks references 803 for audio jacks. An example of assistive technology that plugs into an audio jack and that provides a means for magnetic coupling is a neck loop.

The term "hearing technologies" refers to hearing aids and cochlear implants. Newer model cochlear implants are ear-level, similar in position to over-the-ear hearing aids. Both types of technologies may contain telecoils that enable coupling with products held up to the ear.

803.6 Minimize Interference. ICT that supports two-way voice communication shall reduce generated interference to the lowest possible level that allows users of hearing technologies to utilize the products. ICT in the form of cellular and Personal Communication Service (PCS) handsets shall conform to American National Standards

Institute (ANSI) C 63.19-2007 (incorporated by reference, see “Referenced Standards and Guidelines” in 508 Chapter 1 and 255 Chapter 1). ICT in the form of digital wireline cordless devices shall conform to TIA-1083, Telephone Terminal Equipment Handset Magnetic Measurement Procedures and Performance Requirements (2007) (incorporated by reference, see “Referenced Standards and Guidelines” in 508 Chapter 1 and 255 Chapter 1).

Advisory 803.6 Minimize Interference. This requirement is met by conforming to the applicable standards for interference levels. Applicable standards are:

1. American National Standards Institute (ANSI) C 63.19-2007 - for cellular and PCS handsets: M3 or M4 and T3 or T4 measurement rating.

2. TIA-1083, (2007) Telephone Terminal Equipment Handset Magnetic Measurement Procedures and Performance Requirements - for digital wireline cordless devices.

804 ICT Not Typically Held to the Ear

804.1 General. ICT with audio output that is not typically held to the ear shall conform to 804.

804.2 Volume Gain. ICT shall provide volume gain that is adjustable to a minimum of 15 dB above baseline and that has less than 12 dB symmetrical clipping at all volume levels.

Advisory 804.2 Volume Gain. Examples of ICT with audio output that is not typically held to the ear are speakerphones, information kiosks, and information transaction machines.

Accessibility for ICT that is designed for communal use and placement in public areas with high ambient noise levels may require higher levels of volume gain than with products that are not intended for such use. A best practice is to for ICT to adjust volume automatically to compensate for background noise.

804.3 Incremental Volume Control. When ICT provides incremental volume control, at least one intermediate step of 15 dB, or a series of incremental steps totaling 15 dB, shall be provided.

804.4 Automatic Reset. When ICT allows users to adjust the volume to a level greater than 15 dB above baseline, it shall automatically reset the volume to a level not greater than 15 dB above baseline after every use.

CHAPTER 9: CONVERSATION FUNCTIONALITY AND CONTROLS

901 General

901.1 Scope. The provisions of this chapter shall apply where required by Chapter 1, or where referenced by a requirement in this document.

Advisory 901.1 Scope. This chapter covers ICT features that support a real time telecommunications conversation, whether it is in an audio, text, or video format. Much of the chapter discusses conversation functionality apart from audio, which is covered in Chapter 8 (Audio Output from Hardware).

902 Real-Time Text Functionality

902.1 General. ICT that provides real-time voice conversation functionality shall support real-time text (RTT) functionality and shall conform to 902.

902.2 Real-Time Text Interoperability. ICT shall provide at least one system for RTT communication that conforms to 902.4.

902.3 Real-Time Text Reliability. ICT shall provide at least one system for RTT communication that conforms to 902.3.1 through 902.3.5.

Advisory 902.3 Real-Time Text Reliability. This provision covers hardware and software products for voice communication and video communication.

A best practice is for voice terminal hardware and software to minimize interference in order to maximize intelligibility of speech.

902.3.1 Standard RTT Format. The RTT format shall be a standard RTT format for the voice platform that is supported by all terminals, routers, gateways, and other products on that platform.

902.3.2 RTT Transmission Delay. The RTT system shall transmit characters with less than 1 second delay from entry when entered at 5 characters per second (cps) or less.

902.3.3 RTT System Error Rate. The RTT system shall transmit text with less than 1% total character error rate at the peak network traffic specified for intelligible speech transmission.

Advisory 902.3.3 RTT System Error Rate. This intent of this provision is to ensure that when the network is at its highest traffic level, text transmission, and video communication will be reliable.

902.3.3.1 Equitable Support for RTT and Video Communication. At peak network traffic specified for intelligible speech transmission, the RTT system shall function on the network whenever speech communication and video communication are supported.

902.3.4 RTT System Speech and Text Support. The RTT system, together with the audio system, shall support speech and text in both directions in the same call session.

902.3.4.1 Simultaneous Speech and Text. When the call system is Internet Protocol (IP) based, the RTT system, together with the audio system, shall support speech and text simultaneously in both directions.

902.3.5 No Audio Tone Use. The RTT system shall not use audio tones for transmission of RTT over IP.

902.4 Interoperability with Outside Systems. When ICT interoperates outside of its closed system, or when ICT connects to other systems, ICT shall conform to 902.4.1 through 902.4.3.

902.4.1 PSTN. When ICT interoperates with the Public Switched Telephone Network (PSTN), RTT shall use the TIA 825A Baudot standard for TTY signals at the PSTN interface. RTT in this instance shall conform to TIA 825-A (2003) (incorporated by reference, see "Referenced Standards and Guidelines" in 255 Chapter 1 and 508 Chapter 1).

902.4.2 VoIP Using SIP. When ICT interoperates with Voice over Internet Protocol (VoIP) products or systems using Session Initiation Protocol (SIP), they shall support transmission of RTT that conforms to a commonly used cross-manufacturer non-proprietary standard.

Advisory 902.4.2 VoIP Using SIP. Session Initiation Protocol (SIP) is a signaling protocol for Internet conferencing, telephony, presence, events notification, and instant messaging.

902.4.3 Other Call Control System. When ICT interoperates with other VoIP products or systems using a specific call control system other than SIP, RTT shall use a standard RTT protocol that conforms to 902.4.

Advisory 902.4.3 Other Call Control System. All products may support and use other protocols in addition to those specified in 902.4, as long as they meet 902.4.

For the purposes of this section, a platform may be a public telecommunication platform like an Instant Messaging Service (IMS). It also may be a proprietary telecommunication platform such as a proprietary VoIP system installed in agencies for use over the Internet (and which may or may not be connected to the public telecommunication system).

902.5 RTT Error Rate in Pass-through Products. Firewalls, routers, gateways and other products that pass real-time voice communication shall also pass real-time text communication signals, including mixed voice and real-time text, without distortion or error beyond 1 percent.

Advisory 902.5 RTT Error Rate in Pass-through Products. Transmitted mistakes in text may be due either to inaccuracy of information entered by users or to errors caused by RTT pass-through technology. This provision refers to errors caused by the technology, not by the person.

902.6 Real-Time Text in Voice Terminal Hardware and Software. Terminal hardware or software that is capable of providing voice communication in real-time shall conform to 902.6.1 or 902.6.2.

Advisory 902.6 Real-Time Text in Voice Terminal Hardware and Software. The term “terminal” is industry standard vernacular for what end users commonly would refer to as a “telephone”.

902.6.1 RTT over IP. Terminals that provide voice conversation over Internet Protocol (IP) in any form shall conform to 902.6.1.1 and 902.6.1.2.

902.6.1.1 RTT Capability. Terminals having RTT send or receive capability shall conform to 902.6.1.1.1 and 902.6.1.1.2.

902.6.1.1.1 Display of RTT. Terminals having a user interface with a multi-line display, or a user interface that runs on devices that have a multi-line display, shall display any RTT that is received in the format for the voice and RTT system being used on the network on which it is installed.

902.6.1.1.2 Text Generation. Terminals having text generation capability shall allow users to send RTT in the format for the voice and RTT system being used on the network on which it is installed.

902.6.1.2 Connection of Alternate Device. Terminals having neither RTT send or receive capability shall support the addition of terminals and equipment attached to the terminal that supports RTT functionality in conjunction with the voice call functionality.

902.6.2 TTY Compatibility. Terminals that provide voice conversation which are analog or time-division multiplexing (TDM) digital wired terminals shall conform to 902.6.2.1 and 902.6.2.2.

Advisory 902.6.2 TTY Compatibility. These requirements ensure compatibility of telephones with TTYs. Time-division multiplexing (TDM) is a type of digital or (rarely) analog multiplexing in which two or more signals or bit streams are transferred apparently simultaneously as sub-channels in one communication channel, but are physically taking turns on the channel.

902.6.2.1 TTY Connection. Terminals shall support the connection of a TTY via an RJ-11 jack.

902.6.2.2 Simultaneous or Combination of Speech and Text. Terminals covered by this requirement shall conform to 902.6.2.2.1 or 902.6.2.2.2.

Advisory 902.6.2.2 Simultaneous or Combination of Speech and Text. This provision supports the use of both text and speech in conversations by people with hearing or speech disabilities.

Older technologies required each person on the call to take turns communicating throughout the conversation. Advances in technology enable users with the specialized technology to converse simultaneously. These conversations may occur directly between two parties or through use of a telecommunications relay service. This service uses operators, called Communications Assistants, to facilitate telephone calls between people with hearing or speech disabilities and other individuals.

A person who is deaf or hard of hearing with good speech may use a technique called “voice carry over” (VCO) to talk and utilize a text terminal, such as a TTY, to read the response of the other party. Similarly, a person with a speech disability may use a text terminal, such as a TTY, to send their communication while using a telephone to listen to a response from the other party via “hearing carry over” (HCO).

902.6.2.2.1 Simultaneous Speech and Text. Terminals covered by this requirement shall be capable of simultaneous speech and text conversation.

902.6.2.2.2 Microphone Control. Terminals shall provide a microphone that users are able to turn on and off to permit users to converse through any combination of speaking, listening, typing, or reading.

903 Voice Mail, Messaging, Auto-Attendant, Conferencing, and Interactive Voice Response

903.1 General. ICT that includes voice mail, messaging, auto-attendant, conferencing, and interactive voice response (IVR) functions shall conform to 903.

Advisory 903.1 General. The provision covers services that use voice recognition and traditional telecommunications products.

903.2 Comparable Functionality for RTT Users. All functionality of ICT covered by this section which is available to voice users shall also be directly available to users of RTT.

Advisory 903.2 Comparable Functionality for RTT Users. The intent of this provision is to ensure that people who are deaf are provided a comparable level of service to people who are hearing. Historically, services provided to real-time text users have not been available in a similar quantity or quality as services provided to traditional phone users.

A best practice is for RTT broadcast messages in IP systems to be sent along with voice mail messages. For analog systems, this is not practical. When products do not support dedicated TTY messaging, a best practice is to offer TTY users an alternate method, such as email or website postings, for accessing RTT broadcast information.

This provision does not require automatic conversion between voice and text.

Calls made through telecommunications relay services are not direct and do not satisfy this requirement.

903.3 Message and Prompt Navigation. ICT covered by this section shall provide controls that allow users to pause, skip, rewind, slow down, and repeat all messages and prompts.

Advisory 903.3 Message and Prompt Navigation. An example of a prompt is an instruction to save or delete a voice mail message after a user listens to the voice mail message.

For providing features such as skip and slow down, the specifications for the Digital Talking Book ANSI/NISO Z39.86-2002 standard can be used as a reference.

903.4 Audio Encoder Intelligibility. ICT covered by this section shall use an audio encoder that complies with the ITU-T G.722 standard for encoding and storing audio information (1988) (incorporated by reference, see “Referenced Standards and Guidelines” in 508 Chapter 1 and 255 Chapter 1).

Advisory 903.4 Audio Encoder Intelligibility. G.722 is an ITU standard coder-decoder program that provides 7 kHz wideband audio at data rates from 48, 56, and 64 kbits/s. This standard offers a significant improvement in speech quality over earlier standards, and thus provides greater accessibility to users.

903.5 No Background Sounds. ICT covered by this section shall provide prompts that do not have any background sounds.

Advisory 903.5 No Background Sounds. The purpose of this provision is to maximize intelligibility of prompts for people with hearing disabilities.

904 Information About Call Status and Functions

904.1 General. Information in an electronic format provided by an interface of ICT that supports two-way conversation shall conform to 904.

Advisory 904.1 General. An example of information in an electronic format provided by an interface of ICT that supports two-way conversation is the display on a telephone.

904.2 Call Status and Product Functions. Information provided about call status and related product functions shall conform to Chapter 5 (Electronic Documents).

Advisory 904.2 Call Status and Product Functions. Types of information provided about call status addressed by this requirement include caller identification, messages waiting, duration of call in progress, dialing directory, wireless signal strength, and battery power.

Related product functions include search and set-up.

Products can often meet this provision through redundancy. An example of redundancy is using both a stutter tone and a blinking LED to indicate the presence of a new message.

A best practice is for telephone systems to send information to a connected computer. This practice promotes accessibility of information because people can use their preferred assistive technology. For example, a person with low vision can use screen magnification to provide enlargement.

905 Video Communication Support

905.1 General. ICT that is used for video communication in real-time between and among individuals shall support interoperability that permits video communication between and among users of terminals from different manufacturers and service providers, and shall conform to 905.

905.2 Audio Output and Input. ICT covered by 905.1 shall be equipped with a speaker or with an audio jack and a microphone capable of being muted.

Advisory 905.2 Audio Output and Input. The purpose of this provision is to support simultaneous audio and visual conversations.

It should be possible to use products or systems in any combination of speaking, listening, signing, or viewing. An example is a person who is deaf who prefers to speak when using video communication with a hearing person who is signing.

905.3 Video Communication Quality. ICT covered by 905.1 shall conform to 905.3.1 through 905.3.2.

Advisory 905.3 Video Communication Quality. The purpose of this provision is to ensure that products or systems that are used to transmit video conversations provide sufficient quality and fluidity for real-time video conversation in which at least one party is using a visual method of communication, such as sign language.

Communication products or systems that are used to transmit video conversation can facilitate lip reading and finger-spelling, as well as support sign language conversation.

The separate requirements for speed, data stream, and latency are needed to provide sufficient quality and fluency that will support real time video communication where one or more parties are using sign language or taking in the picture.

905.3.1 Video Communication Data Processing. ICT supported by 905.1 shall conform to 905.3.1.1 through 905.3.1.3.

905.3.1.1 Speed. ICT covered by 905.1 shall support a speed of 30 frames per second (FPS).

905.3.1.2 Data Stream. ICT covered by 905.1 shall be capable of sustaining a full-duplex synchronous data stream of 256 kbps simultaneously and symmetrically for both inbound and outbound data.

Advisory 905.3.1.2 Data Stream. Sign language requires continuous and smooth video connection to support communication because sign language includes hand movements and facial expressions that are visually nuanced.

Data connections that are established at a rate lower than 256 kbps often result in missing or stuttering images or freeze frames. This result impedes the utility of the video for individuals using sign language communication.

905.3.1.3 Latency. ICT covered by 905.1 shall have a latency of less than 400 milliseconds.

905.3.2 Video Display Quality. ICT covered by 905.1 shall conform to either 905.3.2.1 and 905.3.2.2, or 905.3.2.3.

905.3.2.1 Display Screen Resolution. ICT covered by 905.1 shall support a display with a minimum resolution equal to Common Intermediate Format (CIF) resolution (352 x 288 pixels) (incorporated by reference, see "Referenced Standards and Guidelines" in 508 Chapter 1 and 255 Chapter 1).

905.3.2.2 Display Connectors. ICT covered by 905.1 shall have standard connectors conformant with 703, and the connectors shall be capable of supporting a device with a resolution of 640 x 480 pixels.

905.3.2.3 Alternative Video Display. Where ICT covered by 905.1 does not conform to 905.3.2.1 and 905.3.2.2, then an alternate video display screen shall be provided and it shall conform to 905.3.2.3.1 through 905.3.2.3.3.

905.3.2.3.1 Alternate Display Screen. When an alternate display screen is provided, at least one model shall have at least a 15 inch screen with video output in an industry standard non-proprietary format supporting a minimum color display resolution of 640 x 480 pixels.

Advisory 905.3.2.3.1 Alternate Display Screen. Examples of industry standard non-proprietary formats for video output include National Television System Committee (NTSC), VGA, and DVI.

905.3.2.3.2 Alternate Display Connectors. An alternate display screen provided under this section shall have standard connectors conformant with 703.

905.3.2.3.3 Common Technologies. An alternate display screen provided under this section shall be supported by the same technology as the primary product.

Advisory 905.3.2.3.3 Common Technologies. Products that provide conversation functionality use a variety of communications technologies and infrastructure. Where an alternative display screen is provided as a means to meet this requirement, the alternative must be supported by technologies similar to the primary product and must be readily available and supported in the same market. For example, a PAL (Phase encoding line – a type of television encoding system) compliant alternative product would not meet this requirement where the primary device is sold in the U.S., even though the same 3G frequencies are (infrastructure) used in other PAL markets, since the U.S. uses the NTSC standard, not PAL.

905.4 Non-Auditory Alerting System. ICT shall provide a non-auditory alerting system for incoming video communications that conforms to either 905.4.1 or 905.4.2.

905.4.1 Built-in. ICT shall include a built-in non-auditory alerting system.

905.4.2 External Compatibility. ICT shall provide compatibility with an external non-auditory alerting system.

905.5 Visual Indicator of Camera Status. ICT shall provide a visual indication of whether the camera is on or off.

Advisory 905.5 Visual Indicator of Camera Status. This requirement supports 302 because security policy may not permit use of video communication products or systems unless the on/off status of the camera can be visually determined.

905.6 User Controls. When ICT provides user controls, privacy features that include audio and video on and off shall be provided.

905.6.1 Location. User controls for video on and off shall be provided in the same location as user controls for audio on and off.

906 Audio Clarity for Interconnected VoIP

906.1 General. ICT that is interconnected VoIP telephones and interconnected VoIP telephone-emulation software shall conform to 906.

Advisory 906.1 General. The intent of this provision is to ensure audio clarity for VoIP calls.

906.2 ITU Standard G.722. ICT shall transmit and receive speech that is digitally encoded in the manner specified by International Telecommunication Union (ITU) Standard G.722 for encoding and storing audio information (1988) (incorporated by reference, see "Referenced Standards and Guidelines" in 508 Chapter 1 and 255 Chapter 1).

EXCEPTION: Where ICT is a closed system, standards other than ITU Standard G.722 may be used, so long as equivalent or better acoustic performance is provided, and if conversion to International Telecommunication Union (ITU) Standard G.722 at the borders of the closed system is supported.

Advisory 906.2 ITU Standard G.722 Exception. An example of a closed system is a telephone network system on a Federal site that enables calls to be placed between buildings and departments within that site, but is not used to receive or make calls outside of that site system.

907 Alternate Alerting for VoIP Telephone Systems

907.1 General. ICT that is interconnected VoIP telephone systems, interconnected VoIP terminal adapters, or software for interconnected VoIP telephone systems shall conform to 907.

907.2 Alternate Alerting System. For incoming communications, ICT shall provide an alternate alerting system conforming to either 907.2.1 or 907.2.2.

Advisory 907.2 Alternate Alerting System. The intent of this provision is to provide people who are deaf and hard of hearing with accessible alerting systems for incoming communications.

An alternate alerting system can be visual, tactile, or loud audible.

907.2.1 Built-in. ICT shall include a built-in alternate alerting system.

Advisory 907.2.1 Built-in. Small built-in light emitting diodes (LEDs) are insufficient to alert people with hearing disabilities to incoming calls if the person is not looking directly at the device. Large visual alerts combined with loud audible alerts are more effective.

907.2.2 External Compatibility. ICT shall provide a mode of operation that electronically signals an external alternate alerting system.

Advisory 907.2.2 External Compatibility. Examples of external alerting devices include: loud ringers, light flashers, and vibrating devices.

An external alternate alerting system which features a microphone that is placed near a sound source, such as a telephone, does not conform to 907.2.2 because the ICT does not provide a mode of operation that electronically signals the alternate alerting device.

CHAPTER 10: ICT SUPPORT DOCUMENTATION AND ICT SUPPORT SERVICES

1001 General

1001.1 Scope. The provisions of this chapter apply to ICT support documentation and ICT support services and shall apply where required by Chapter 1, or where referenced by a requirement in this document.

1002 ICT Support Documentation

1002.1 General. ICT support documentation, where provided, that supports ICT use shall conform to 1002.

Advisory 1002.1 General. Examples of ICT support documentation include, but are not limited to installation guides, user guides, and manuals that may come with software applications.

ICT support documentation also includes documentation provided to end-users, developers, and administrators.

The documentation covered by this section includes information about general features and accessibility features of products.

ICT support documentation may take the form of stand-alone documents or be integrated into products in the form of on-line or context-sensitive help.

1002.2 Accessibility Documentation. Documentation covered by this section provided to users shall conform to 1002.2.1 through 1002.2.4.

1002.2.1 Built-in Accessibility Features. Documentation shall include descriptions of the built-in accessibility features of a product.

1002.2.2 Features that Support Accessibility. Documentation shall include descriptions of features that support accessibility, including the capability to change settings, and compatibility with assistive technology.

Advisory 1002.2.2 Features that Support Accessibility. Accessibility documentation ensures that information about ICT accessibility features, and features that support accessibility, is available to people with disabilities. It is important that comprehensive product information be available to users with disabilities because installation and configuration can often impact accessibility of ICT.

There also may be features of a product which are useful for accessibility, even though they may not be identified by the manufacturer as accessibility features. Descriptions of these features are required to be included in the accessibility documentation.

1002.2.3 Explanation of System Configuration to Support Accessibility. When ICT components are designed to be part of an integrated system, documentation shall explain how to configure the system to support accessibility.

Advisory 1002.2.3 Explanation of System Configuration to Support Accessibility. An example of an integrated system is a DVD player and multimedia projector. To conform to 1002.2.3, the ICT support documentation is required to explain how to configure the DVD player and multimedia projector to support the display of closed captions.

1002.2.4 Keyboard Operation. Documentation shall provide information about operation of all features that can be accessed from the keyboard, including available keyboard commands and keyboard navigation.

Advisory 1002.2.4 Keyboard Operation. Keyboard control of features is important to users of assistive technology. Voice recognition, screen readers, and alternative keyboards all rely upon keyboard control of features for accessible and efficient operation.

Keyboard navigation includes support for the following: cursor keys (up, down, left and right arrows), tab and shift-tab (to cycle through fields), enter or spacebar (to select or activate), hot keys, macros, and other keyboard acceleration mechanisms.

1002.3 Alternate Formats. Documentation shall be available in alternate formats upon request.

Advisory 1002.3 Alternate Formats. Manufacturers of telecommunications products are required to provide alternate formats upon request, at no additional charge. See C104.3.2.1.

Examples of alternate formats of product support documentation include braille, large print, audio, and electronic documents.

1002.3.1 Electronic Documents. Alternate formats provided as electronic documents shall conform to Chapter 5 (Electronic Documents) and Chapter 4 (Platforms, Applications, and Interactive Content) as appropriate.

Advisory 1002.3.1 Electronic Documents. A best practice is to use electronic documents for alternate formats because they are convertible and can be used to generate a hard copy. Examples of alternate formats in hard copy include braille and large print customized with the specific font size and font style requested by an end-user.

Electronic documents also can be used with assistive technologies. Examples of assistive technologies that might be used for reading electronic documents include screen readers, refreshable braille displays, and screen magnification software.

Electronic documents have an advantage over hard copy documents because they can have interactive features. Examples of interactive features include table of contents, index, and search functions. Assistive technology is compatible with these interactive features.

Electronic documents provided as alternate formats may be stored and distributed in a variety of media. Examples of these media include flash drives, CDs, and web sites.

Examples of file formats for electronic documents provided as alternate formats include HTML, RTF, word-processed documents, and properly tagged PDFs.

1003 ICT Support Services

1003.1 General. When provided, ICT support services shall conform to 1003.

1003.2 Help Desk, Technical Support Services, and Training. Help desk, technical support services, and training shall conform to either 1003.2.1 or 1003.2.2.

Advisory 1003.2 Help Desk, Technical Support Services, and Training. A best practice is for information provided by help desk, technical support services, and training to take into account assistive technology commonly used with products.

Another best practice is for technical support services to develop or implement training programs about the following topics: accessibility requirements of individuals with disabilities; methods of communication used by people with disabilities; assistive technology commonly used with ICT products; designing for accessibility; solutions for accessibility and compatibility of ICT with assistive technology, the use of people-first language, and sensitivity training concerning disability issues.

1003.2.1 Direct. Where provided, help desk, technical support services, and training shall provide information on ICT accessibility features directly to the end user.

1003.2.2 Referral. Help desk and technical support services shall provide information on ICT accessibility features through a referral to a point of contact and a contact method.

Advisory 1003.2.2 Referral. The Federal Communications Commission maintains a list of contact information for telecommunications service providers and manufacturers of telecommunications products.

1003.3 Alternate Methods of Communication. Help desk and technical support services shall provide alternate methods of communication.

Advisory 1003.3 Alternate Methods of Communication. Manufacturers of telecommunications products are required to accommodate the communication needs of users with disabilities. This accommodation shall be available at no additional charge to users with disabilities. See C104.3.1.

Help desk and technical support services include but are not limited to: agency help desks, support services outsourced by agencies, and help line assistance provided by product manufacturers and vendors.

Alternate methods of communication include both in-person and remote communication. Examples include sign language interpreters, assistive listening systems, TTYs, real-time captioning, and telecommunications relay services, such as TTY, speech-to-speech, or video relay services.

A best practice is for help desk and technical support services to use a variety of communication technologies. This is because people with disabilities use a variety of communication technologies in addition to using alternate methods of communication. Examples of such communication technologies include Internet posting (such as message boards and website blogs), cellular telephones, two-way radios, e-mail, fax, postal mail, texting, and instant messaging.

1003.4 Materials Provided by ICT Support Services. When help desk and technical support services provide documentation, materials shall conform to 1002.

AMENDMENTS TO THE ADA ACCESSIBILITY GUIDELINES

220 Automatic Teller Machines, Fare Machines, and Self-Service Machines

220.1 Automatic Teller Machines and Fare Machines. Where automatic teller machines or self-service fare vending, collection, or adjustment machines are provided, at least one of each type provided at each location shall comply with 707. Where bins are provided for envelopes, waste paper, or other purposes, at least one of each type shall comply with 811.

Advisory 220.1 Automatic Teller Machines and Fare Machines. If a bank provides both interior and exterior ATMs, each such installation is considered a separate location. Accessible ATMs, including those with speech and those that are within reach of people who use wheelchairs, must provide all the functions provided to customers at that location at all times. For example, it is unacceptable for the accessible ATM only to provide cash withdrawals while inaccessible ATMs also sell theater tickets.

220.2 Self-Service Machines. Where self-service machines, other than automatic teller machines and fare machines covered by 220.1, meet the definition of information and communication technology in 36 CFR Part 1194 and they are used for ticketing, check-in or check-out, seat selection, boarding passes, or ordering food in restaurants and cafeterias, at least one of each type provided at each location shall comply with the provisions in 36 CFR Part 1194, Chapters 3-9.

EXCEPTIONS: 1. Self-service machines shall not be required to comply with the following sections in 36 CFR Part 1194: 302; 409-412; 503.1-503.3; 506; 508; 703; 802.2.3; and 802.2.4.

2. Self-service machines which are located at drive-up only locations shall not be required to comply with section 702 in 36 CFR Part 1194.