

## Section 508 (ICT Refresh) vs. EN 301 549

Date: 2/16/2017

### Chapter 1 Application and Administration

### Chapter 2 Scoping Requirements

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<p>E207.2 WCAG Conformance. User interface components and content of platforms and applications shall conform to Level A and Level AA Success Criteria and Conformance Requirements specified for web pages in <a href="#">WCAG 2.0</a>.</p>	<p>Chapters 9, 10, and 11 apply <a href="#">WCAG 2.0 Level A and Level AA</a> Success Criteria to Web content (<a href="#">Chapter 9</a>), Documents (<a href="#">Chapter 10</a>), and Non-Web Software (<a href="#">Chapter 11</a>).</p> <p><a href="#">EN 301 549 Video Series</a></p>

### Chapter 3 Functional Performance Criteria

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<p><b>302.1 Without vision.</b> Where a visual mode of operation is provided, ICT shall provide at least one mode of operation that does not require user vision.</p>	<p><a href="#">4.2.1 Usage without vision</a></p> <p>Where ICT provides visual modes of operation, some users need ICT to provide at least one mode of operation that does not require vision.</p> <p>Notes: Audio and tactile user interfaces may contribute towards meeting this clause.</p>
<p><b>302.2 With limited vision.</b> Where a visual mode of operation is provided, ICT shall provide at least one mode of operation that enables users to make use of limited vision.</p>	<p><a href="#">4.2.2 Usage with limited vision</a></p> <p>Where ICT provides visual modes of operation, some users will need the ICT to provide features that enable users to make better use of their limited vision.</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>1. Magnification, reduction of required field of vision and control of contrast may contribute towards meeting this clause.</li> <li>2. Where significant features of the user interface are dependent on depth perception, the provision of additional methods of distinguishing between the features may contribute towards meeting this clause.</li> <li>3. Users with limited vision may also benefit from non-visual access (see clause 4.2.1).</li> </ol>
<p><b>302.3 Without Perception of Color.</b> Where a visual mode of operation is provided, ICT shall provide at</p>	<p><a href="#">4.2.3 Usage without perception of colour</a></p> <p>Where ICT provides visual modes of operation, some users will need the ICT to provide a visual mode of</p>

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<p>least one visual mode of operation that does not require user perception of color.</p>	<p>operation that does not require user perception of colour.</p> <p>Notes: Where significant features of the user interface are colour-coded, the provision of additional methods of distinguishing between the features may contribute towards meeting this clause.</p>
<p><b>302.4 Without Hearing.</b> Where an audible mode of operation is provided, ICT shall provide at least one mode of operation that does not require user hearing.</p>	<p><a href="#">4.2.4 Usage without hearing</a></p> <p>Where ICT provides auditory modes of operation, some users need ICT to provide at least one mode of operation that does not require hearing.</p> <p>Notes: Visual and tactile user interfaces may contribute towards meeting this clause.</p>
<p><b>302.5 With Limited Hearing.</b> Where an audible mode of operation is provided, ICT shall provide at least one mode of operation that enables users to make use of limited hearing.</p>	<p><a href="#">4.2.5 Usage with limited hearing</a></p> <p>Where ICT provides auditory modes of operation, some users will need the ICT to provide enhanced audio features.</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>1. Enhancement of the audio clarity, reduction of background noise, increased range of volume and greater volume in the higher frequency range can contribute towards meeting this clause.</li> <li>2. Users with limited hearing may also benefit from non-hearing access (see clause 4.2.4).</li> </ol>
<p><b>302.6 Without Speech.</b> Where speech is used for input, control, or operation, ICT shall provide at least one mode of operation that does not require user speech.</p>	<p><a href="#">4.2.6 Usage without vocal capability</a></p> <p>Where ICT requires vocal input from users, some users will need the ICT to provide at least one mode of operation that does not require them to generate vocal output.</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>1. This clause covers the alternatives to the use of orally-generated sounds, including speech, whistles, clicks, etc.</li> <li>2. Keyboard, pen or touch user interfaces may contribute towards meeting this clause.</li> </ol>
<p><b>302.7 With Limited Manipulation.</b> Where a manual mode of operation is provided, ICT shall provide at least one mode of operation that does not require fine motor control or simultaneous manual operations.</p>	<p><a href="#">4.2.7 Usage with limited manipulation or strength</a></p> <p>Where ICT requires manual actions, some users will need the ICT to provide features that enable users to make use of the ICT through alternative actions not requiring manipulation or hand strength.</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>1. Examples of operations that users may not be able to perform include those that require fine motor control, path dependent gestures, pinching, twisting of the wrist, tight grasping, or simultaneous manual actions.</li> </ol>

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	<ol style="list-style-type: none"> <li>2. One-handed operation, sequential key entry and speech user interfaces may contribute towards meeting this clause.</li> <li>3. Some users have limited hand strength and may not be able to achieve the level of strength to perform an operation. Alternative user interface solutions that do not require hand strength may contribute towards meeting this clause.</li> </ol>
<p><b>302.8 With Limited Reach and Strength.</b> Where a manual mode of operation is provided, ICT shall provide at least one mode of operation that is operable with limited reach and limited strength.</p>	<p><a href="#">4.2.8 Usage with limited reach</a> Where ICT products are free-standing or installed, the operational elements will need to be within reach of all users.</p> <p><i>Notes:</i> Considering the needs of wheelchair users and the range of user statures in the placing of operational elements of the user interface may contribute towards meeting this clause.</p>
<p><b>302.9 With Limited Language, Cognitive, and Learning Abilities.</b> ICT shall provide features making its use by individuals with limited cognitive, language, and learning abilities simpler and easier.</p>	<p><a href="#">4.2.10 Usage with limited cognition</a> Some users will need the ICT to provide features that make it simpler and easier to use.</p> <p><i>Notes:</i></p> <ol style="list-style-type: none"> <li>1. This clause is intended to include the needs of persons with limited cognitive, language and learning abilities.</li> <li>2. Adjustable timings, error indication and suggestion, and a logical focus order are examples of design features that may contribute towards meeting this clause.</li> </ol>

## Chapter 4 Hardware

### 402 Closed Functionality

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<p><a href="#">402.1 General.</a> ICT with closed functionality shall be operable without requiring the user to attach or install assistive technology other than personal headsets or other audio couplers, and shall conform to 402.</p>	<p>See specific requirements below.</p>	
<p><a href="#">402.2 Speech-Output Enabled.</a> ICT with a display screen shall be speech-output enabled for full and independent use by individuals with vision impairments.</p>	<p><a href="#">5.1.3.1 General</a> Where visual information is needed to enable the use of those functions of ICT that are closed to assistive technologies for screen reading, ICT shall provide at least one mode of operation using non-</p>	<p>Section 508 specifies that the non-visual mode of operation must be speech output.</p>

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	visual access to enable the use of those functions.	
<p><a href="#">402.2.1 Information Displayed On-Screen.</a> Speech output shall be provided for all information displayed on-screen.</p>	<p><a href="#">5.1.3.6 Speech output for non-text content</a> Where ICT presents non-text content, the alternative for non-text content shall be presented to users via speech output unless the non-text content is pure decoration or is used only for visual formatting. The speech output for non-text content shall follow the guidance for "text alternative" described in WCAG 2.0 [4] Success Criterion 1.1.1.</p> <p><a href="#">5.1.3.7 Speech output for video information</a> Where pre-recorded video content is needed to enable the use of closed functions of ICT and where speech output is provided as non-visual access to closed functionality, the speech output shall present equivalent information for the pre-recorded video content</p> <p><a href="#">5.1.3.8 Masked entry</a> Where auditory output is provided as non-visual access to closed functionality, and the characters displayed are masking characters, the auditory output shall not be a spoken version of the characters entered unless the auditory output is known to be delivered only to a mechanism for private listening, or the user explicitly chooses to allow non-private auditory output.</p>	<p>Section 508 specifies that the non-visual mode of operation must be speech output; EN 301 549 has a specific exception for "masked entry."</p>
<p><a href="#">402.2.2 Transactional Outputs.</a> Where transactional outputs are provided, the speech output shall audibly provide all information necessary to verify a transaction.</p>	<p><a href="#">5.1.3.16 Receipts, tickets, and transactional outputs</a> Where ICT is closed to visual access and provides receipts, tickets or other outputs as a result of a self-service transaction, speech output shall be provided which shall include all information necessary to complete or verify</p>	

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	the transaction. In the case of ticketing machines, printed copies of itineraries and maps shall not be required to be audible.	
<p><a href="#">402.2.3 Speech Delivery Type and Coordination</a>. Speech output shall be delivered through a mechanism that is readily available to all users, including, but not limited to, an industry standard connector or a telephone handset. Speech shall be recorded or digitized human, or synthesized. Speech output shall be coordinated with information displayed on the screen.</p>	<p><a href="#">5.1.3.2 Auditory output delivery including speech</a> Where auditory output is provided as non-visual access to closed functionality, the auditory output shall be delivered:</p> <ul style="list-style-type: none"> <li>a) either directly by a mechanism included in or provided with the ICT;</li> <li>b) or by a personal headset that can be connected through a 3,5 mm audio jack, or an industry standard connection, without requiring the use of vision.</li> </ul> <p><a href="#">5.1.3.3 Auditory output correlation</a> Where auditory output is provided as non-visual access to closed functionality, and where information is displayed on the screen, the ICT should provide auditory information that allows the user to correlate the audio with the information displayed on the screen.</p>	
<p><a href="#">402.2.4 User Control</a>. Speech output for any single function shall be automatically interrupted when a transaction is selected. Speech output shall be capable of being repeated and paused.</p>	<p><a href="#">5.1.3.4 Speech output user control</a> Where speech output is provided as non-visual access to closed functionality, the speech output shall be capable of being interrupted and repeated when requested by the user, where permitted by security requirements.</p> <p><a href="#">5.1.3.5 Speech output automatic interruption</a> Where speech output is provided as non-visual access to closed functionality, the ICT shall interrupt current speech output when a user action occurs and when new speech output begins.</p>	
<p><a href="#">402.2.5 Braille Instructions</a>. Where speech output is required by 402.2, braille</p>	<p><a href="#">8.5: Tactile indication of speech mode</a></p>	

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instructions for initiating the speech mode of operation shall be provided.	Where ICT is designed for shared use and speech output is available, a tactile indication of the means to initiate the speech mode of operation shall be provided.	
<a href="#">402.3 Volume</a> . ICT that delivers sound, including speech output required by 402.2, shall provide volume control and output amplification conforming to 402.3.	See specific requirements below.	
<a href="#">402.3.1 Private Listening</a> . Where ICT provides private listening, it shall provide a mode of operation for controlling the volume. Where ICT delivers output by an audio transducer typically held up to the ear, a means for effective magnetic wireless coupling to hearing technologies shall be provided.	<a href="#">5.1.3.11 Private listening volume</a> Where auditory output is provided as non-visual access to closed functionality and is delivered through a mechanism for private listening, ICT shall provide at least one non-visual mode of operation for controlling the volume. <a href="#">8.2.2.1 Fixed-line devices</a> Where ICT hardware is a fixed-line communication device with speech output and which is normally held to the ear and which carries the "T" symbol specified in ETS 300 381 [1], it shall provide a means of magnetic coupling which meets the requirements of ES 200 381-1 [2]. <a href="#">8.2.2.2 Wireless communication devices</a> Where ICT hardware is a wireless communication device with speech output which is normally held to the ear, it shall provide a means of magnetic coupling to hearing technologies which meets the requirements of ES 200 381-2 [3].	EN 301 549 refers to specific standards for magnetic coupling.
<a href="#">402.3.2 Non-private Listening</a> . Where ICT provides non-private listening, incremental volume control shall be provided with output amplification up to a level of at least 65 dB. A function shall be provided to automatically reset the volume to the default level after every use.	<a href="#">5.1.3.12 Speaker volume</a> Where auditory output is provided as non-visual access to closed functionality and is delivered through speakers on ICT, a non-visual incremental volume control shall be provided with output amplification up to a level of at least 65 dBA (-29 dBPaA).	

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	<p><a href="#">5.1.3.13 Volume reset</a> Where auditory output is provided as non-visual access to closed functionality, a function that resets the volume to be at a level of 65 dBA or less after every use, shall be provided, unless the ICT is dedicated to a single user.</p>	
<p><a href="#">402.4 Characters on Display Screens</a>. At least one mode of characters displayed on the screen shall be in a sans serif font. Where ICT does not provide a screen enlargement feature, characters shall be 3/16 inch (4.8 mm) high minimum based on the uppercase letter "I". Characters shall contrast with their background with either light characters on a dark background or dark characters on a light background.</p>	<p><a href="#">5.1.4 Functionality closed to text enlargement</a> Where any functionality of ICT is closed to the text enlargement features of platform or assistive technology, the ICT shall provide a mode of operation where the text and images of text necessary for all functionality is displayed in such a way that a non-accented capital "H" subtends an angle of at least 0,7 degrees at a viewing distance specified by the supplier. The subtended angle, in degrees, may be calculated from:  <math display="block">\Psi = (180 \times 60 \times H) / (\pi \times D)</math> Where: <ul style="list-style-type: none"> <li>▪ <math>\psi</math> is the subtended angle</li> <li>▪ <math>H</math> is the height of the text</li> <li>▪ <math>D</math> is the viewing distance.</li> <li>▪ <math>D</math> and <math>H</math> are expressed in the same units.</li> </ul> </p>	<p>Different approaches to calculating minimum text size. Section 508 assumes fixed distance between screen and eyes. EN 301 549 accounts for screens that are both far and near the eyes.</p>
<p><a href="#">402.5 Characters on Variable Message Signs</a>. Characters on variable message signs shall conform to section 703.7 Variable Message Signs of ICC A117.1-2009 (incorporated by reference, see 702.6.1).</p>	<p><a href="#">5.1.4 Functionality closed to text enlargement</a> Where any functionality of ICT is closed to the text enlargement features of platform or assistive technology, the ICT shall provide a mode of operation where the text and images of text necessary for all functionality is displayed in such a way that a non-accented capital "H" subtends an angle of at least 0,7 degrees at a viewing distance specified by the supplier. The subtended angle, in degrees, may be calculated from:  <math display="block">\Psi = (180 \times 60 \times H) / (\pi \times D)</math> Where: <ul style="list-style-type: none"> <li>▪ <math>\psi</math> is the subtended angle</li> </ul> </p>	<p>ICC A117.1-2009 section 703.7 contains some additional font type and line spacing requirements</p>

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	<ul style="list-style-type: none"> <li>▪ <i>H</i> is the height of the text</li> <li>▪ <i>D</i> is the viewing distance.</li> </ul> <p><i>D</i> and <i>H</i> are expressed in the same units.</p>	

### 403 Biometrics

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<p><a href="#">403.1 General</a>. Biometrics shall not be the only means for user identification or control.</p> <p>Exception: Where at least two biometric options that use different biological characteristics are provided, ICT shall be permitted to use biometrics as the only means of user identification or control.</p>	<p><a href="#">5.3: Biometrics</a></p> <p>Where ICT uses biological characteristics, it shall not rely on the use of a particular biological characteristic as the only means of user identification or for control of ICT.</p>	

### 404 Preservation of Information Provided for Accessibility

Section 508	EN 301 549	Comments
<p><a href="#">404.1 General</a>. ICT that transmits or converts information or communication shall not remove non-proprietary information provided for accessibility or shall restore it upon delivery.</p>	<p><a href="#">5.4: Preservation of accessibility information during conversion</a></p> <p>Where ICT converts information or communication it shall preserve all documented non-proprietary information that is provided for accessibility, to the extent that such information can be contained in or supported by the destination format.</p>	

### 405 Privacy

Section 508	EN 301 549	Comments
<p><a href="#">405.1 General</a>. The same degree of privacy of input and output shall be provided to all individuals. When speech output required by 402.2 is enabled, the screen shall not blank automatically.</p>	<p><a href="#">5.1.3.9 Private access to personal data</a></p> <p>Where auditory output is provided as non-visual access to closed functionality, and the output contains data that is considered to be private according to the applicable privacy policy, the corresponding auditory output shall only be delivered through a mechanism for private listening that can be connected without requiring the use of vision, or</p>	<p>EN 301 549 more specific privacy requirements.</p>



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	<p>through any other mechanism explicitly chosen by the user.</p> <p><a href="#">5.1.3.8 Masked entry</a></p> <p>Where auditory output is provided as non-visual access to closed functionality, and the characters displayed are masking characters, the auditory output shall not be a spoken version of the characters entered unless the auditory output is known to be delivered only to a mechanism for private listening, or the user explicitly chooses to allow non-private auditory output.</p>	

#### 406 Standard Connections

Section 508	EN 301 549	Comments
<p><a href="#">406.1 General</a>. Where data connections used for input and output are provided, at least one of each type of connection shall conform to industry standard non-proprietary formats.</p>	<p><a href="#">8.1.2 Standard connections</a></p> <p>Where an ICT provides user input or output device connection points, the ICT shall provide at least one input and/or output connection that conforms to an industry standard non-proprietary format, directly or through the use of commercially available adapters.</p>	

#### 407 Operable Parts

Section 508	EN 301 549	Comments
<p><a href="#">407.1 General</a>. Where provided, operable parts used in the normal operation of ICT shall conform to 407.</p>	<p>See specific requirements below.</p>	
<p><a href="#">407.2 Contrast</a>. Where provided, keys and controls shall contrast visually from background surfaces. Characters and symbols shall contrast visually from background surfaces with either light characters or symbols on a dark background or dark characters or symbols on a light background.</p>	<p>Not applicable.</p>	<p>No corresponding provision in EN 301 549.</p>
<p><a href="#">407.3 Input Controls</a>. At least one input control conforming to 407.3 shall be provided for each function.</p>	<p>See specific requirements below.</p>	

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<p><a href="#">407.3.1 Tactilely Discernible</a>. Input controls shall be operable by touch and tactilely discernible without activation.</p>	<p><a href="#">5.5.2 Operable parts discernibility</a> Where ICT has operable parts, it shall provide a means to discern each operable part, without requiring vision and without performing the action associated with the operable part.</p> <p><a href="#">5.6.1 Tactile or auditory status</a> Where ICT has a locking or toggle control and that control is visually presented to the user, the ICT shall provide at least one mode of operation where the status of the control can be determined either through touch or sound without operating the control.</p>	
<p><a href="#">407.3.2 Alphabetic Keys</a>. Where provided, individual alphabetic keys shall be arranged in a QWERTY-based keyboard layout and the "F" and "J" keys shall be tactilely distinct from the other keys.</p>	<p><a href="#">5.5.2 Operable parts discernibility</a> Where ICT has operable parts, it shall provide a means to discern each operable part, without requiring vision and without performing the action associated with the operable part.</p>	<p>Section 508 refers to a specific keyboard implementation which may not be relevant for all languages.</p>
<p><a href="#">407.3.3 Numeric Keys</a>. Where provided, numeric keys shall be arranged in a 12-key ascending or descending keypad layout. The number five key shall be tactilely distinct from the other keys. Where the ICT provides an alphabetic overlay on numeric keys, the relationships between letters and digits shall conform to ITU-T Recommendation E.161 (incorporated by reference, see 702.7.1).</p>	<p><a href="#">8.4.1 Numeric keys</a> Where provided, physical numeric keys arranged in a rectangular keypad layout shall have the number five key tactilely distinct from the other keys of the keypad.</p>	<p>Section 508 has additional requirements related to alphabetic overlay on numeric keys.</p>
<p><a href="#">407.4 Key Repeat</a>. Where a keyboard with key repeat is provided, the delay before the key repeat feature is activated shall be fixed at, or adjustable to, 2 seconds minimum.</p>	<p><a href="#">5.7: Key repeat</a> Where ICT with key repeat is provided and the key repeat cannot be turned off:</p> <ul style="list-style-type: none"> <li>a) the delay before the key repeat shall be adjustable to at least 2 seconds; and</li> <li>b) the key repeat rate shall be adjustable down to one character per 2 seconds.</li> </ul>	
<p><a href="#">407.5 Timed Response</a>. Where a timed response is required, the user shall be alerted visually, as well as by touch or</p>	<p>Not applicable.</p>	<p>EN 301 549 treats timed response as a software</p>

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<p>sound, and shall be given the opportunity to indicate that more time is needed.</p>		<p>issue. See <a href="#">11.2.1.17 (Timing Adjustable)</a>.</p>
<p><a href="#">407.6 Operation</a>. At least one mode of operation shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts shall be 5 pounds (22.2 N) maximum.</p>	<p><a href="#">5.5.1 Means of operation</a> Where ICT has operable parts that require grasping, pinching, or twisting of the wrist to operate, an accessible alternative means of operation that does not require these actions shall be provided <a href="#">8.4.2.1 Means of operation of mechanical parts</a> Where a control requires grasping, pinching, or twisting of the wrist to operate it, an accessible alternative means of operation that does not require these actions shall be provided. <a href="#">8.4.2.2 Force of operation of mechanical parts</a> Where a control requires a force greater than 22,2 N to operate it, an accessible alternative means of operation that requires a force less than 22,2 N shall be provided.</p>	
<p><a href="#">407.7 Tickets, Fare Cards, and Keycards</a>. Where tickets, fare cards, or keycards are provided, they shall have an orientation that is tactilely discernible if orientation is important to further use of the ticket, fare card, or keycard.</p>	<p><a href="#">8.4.3 Keys, tickets and fare cards</a> Where ICT provides keys, tickets or fare cards, and their orientation is important for further use, they shall have an orientation that is tactilely discernible.</p>	
<p><a href="#">407.8 Reach Height and Depth</a>. At least one of each type of operable part of stationary ICT shall be at a height conforming to 407.8.2 or 407.8.3 according to its position established by the vertical reference plane specified in 407.8.1 for a side reach or a forward reach. Operable parts used with speech output required by 402.2 shall not be the only type of operable part complying with 407.8 unless that part is the only operable part of its type.</p>	<p>See specific requirements below.</p>	<p>EN 301 549 provisions in the 407.8 series are recommendations ("should" versus "shall").</p>
<p><a href="#">407.8.1 Vertical Reference Plane</a>. Operable parts shall be positioned for a side reach or a forward reach determined with respect to a vertical reference plane. The</p>	<p>See specific requirements below.</p>	

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vertical reference plane shall be located in conformance to 407.8.2 or 407.8.3.		
<p><a href="#">407.8.1.1 Vertical Plane for Side Reach.</a> Where a side reach is provided, the vertical reference plane shall be 48 inches (1220 mm) long minimum.</p>	<p><a href="#">8.3.2.2 Clear floor or ground space</a> Where the operating area is integral to the ICT, it should provide a clear floor area that has the minimum dimensions of 760 mm (30 inches) by 1220 mm (48 inches) from which to operate the ICT.</p>	
<p><a href="#">407.8.1.2 Vertical Plane for Forward Reach.</a> Where a forward reach is provided, the vertical reference plane shall be 30 inches (760 mm) long minimum.</p>	<p><a href="#">8.3.2.2 Clear floor or ground space</a> Where the operating area is integral to the ICT, it should provide a clear floor area that has the minimum dimensions of 760 mm (30 inches) by 1 220 mm (48 inches) from which to operate the ICT.</p>	
<p><a href="#">407.8.2 Side Reach.</a> Operable parts of ICT providing a side reach shall conform to 407.8.2.1 or 407.8.2.2. The vertical reference plane shall be centered on the operable part and placed at the leading edge of the maximum protrusion of the ICT within the length of the vertical reference plane. Where a side reach requires a reach over a portion of the ICT, the height of that portion of the ICT shall be 34 inches (865 mm) maximum.</p>	See specific requirements below.	
<p><a href="#">407.8.2.1 Unobstructed Side Reach.</a> Where the operable part is located 10 inches (255 mm) or less beyond the vertical reference plane, the operable part shall be 48 inches (1220 mm) high maximum and 15 inches (380 mm) high minimum above the floor.</p>	<p><a href="#">8.3.3.2.1 Unobstructed high side reach</a> Where the access space is integral to the ICT, allows a parallel approach, and the side reach is unobstructed or obstructed by an element integral to the ICT which is less than 255 mm (10 inches), all essential controls should be within a high side reach which is less than or equal to 1 220 mm (48 inches) above the floor of the access space.</p> <p><a href="#">8.3.3.2.2 Unobstructed low side reach</a> Where the access space is integral to the ICT, allows a parallel approach, and the side reach is</p>	

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	<p>unobstructed or obstructed by an element integral to the ICT which is less than 255 mm (10 inches), all essential controls should be within a low side reach which is greater than or equal to 380 mm (15 inches) above the floor of the access space.</p>	
<p><a href="#">407.8.2.2 Obstructed Side Reach</a>. Where the operable part is located more than 10 inches (255 mm), but not more than 24 inches (610 mm), beyond the vertical reference plane, the height of the operable part shall be 46 inches (1170 mm) high maximum and 15 inches (380 mm) high minimum above the floor. The operable part shall not be located more than 24 inches (610 mm) beyond the vertical reference plane.</p>	<p><a href="#">8.3.3.2.3.1 Obstructed (&lt;= 255 mm) side reach</a>  Where the access space is integral to the ICT, allows a parallel approach and has an obstruction which is integral to the ICT, the height of the obstruction should be less than 865 mm (34 inches). Where the depth of the obstruction is less than or equal to 255 mm (10 inches), the high side reach to all essential controls should be no higher than 1 220 mm (48 inches) above the floor of the access space.</p> <p><a href="#">8.3.3.2.3.2 Obstructed (&lt;= 610 mm) side reach</a>  Where the access space is integral to the ICT, allows a parallel approach and has an obstruction which is integral to the ICT, the height of the obstruction should be less than 865 mm (34 inches). Where the depth of the obstruction is greater than 255 mm (10 inches) and 610 mm (24 inches) maximum, the high side reach to all essential controls should be no higher than 1 170 mm (46 inches) above the floor of the access space.</p>	
<p><a href="#">407.8.3 Forward Reach</a>. Operable parts of ICT providing a forward reach shall conform to 407.8.3.1 or 407.8.3.2. The vertical reference plane shall be centered, and intersect with, the operable part. Where a forward reach allows a reach over a portion of the ICT, the height of that portion of the ICT shall be 34 inches (865 mm) maximum.</p>	<p>See comments</p>	<p>Corresponding provision in EN 301 549, see <a href="#">8.3.3.1.1</a>, <a href="#">8.3.3.1.2</a>, <a href="#">8.3.3.1.3.2</a>, and <a href="#">8.3.3.1.3.3</a>.</p>

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<p><a href="#">407.8.3.1 Unobstructed Forward Reach.</a> Where the operable part is located at the leading edge of the maximum protrusion within the length of the vertical reference plane of the ICT, the operable part shall be 48 inches (1220 mm) high maximum and 15 inches (380 mm) high minimum above the floor.</p>	<p><a href="#">8.3.3.1.1 Unobstructed high forward reach</a> Where the access space is integral to the ICT and the forward reach is unobstructed, the essential controls should be located no higher than 1 220 mm (48 inches) above the floor of the access space.</p> <p><a href="#">8.3.3.1.2 Unobstructed low forward reach</a> When the access space is integral to the ICT and the forward reach is unobstructed, the essential controls shall be located no lower than 380 mm (15 inches) above the floor of the access space.</p>	
<p><a href="#">407.8.3.2 Obstructed Forward Reach.</a> Where the operable part is located beyond the leading edge of the maximum protrusion within the length of the vertical reference plane, the operable part shall conform to 407.8.3.2. The maximum allowable forward reach to an operable part shall be 25 inches (635 mm).</p>	See Comments	Corresponding provision in EN 301 549, see <a href="#">8.3.3.1.3.2</a> , and <a href="#">8.3.3.1.3.3</a> .
<p><a href="#">407.8.3.2.1 Operable Part Height for ICT with Obstructed Forward Reach.</a> The height of the operable part shall conform to <a href="#">Table 407.8.3.2.1</a>.</p>	<p><a href="#">8.3.3.1.3.2 Obstructed (&lt; 510 mm) forward reach</a> Where the access space is integral to the ICT and has an obstruction which is integral to the ICT and which is less than 510 mm (20 inches), the forward reach to all essential controls should be no higher than 1 220 mm (48 inches) above the floor contact of the ICT.</p> <p><a href="#">8.3.3.1.3.3 Obstructed (&lt; 635 mm) forward reach</a> Where the access space is integral to the ICT and has an obstruction which is integral to the ICT and which is greater than 510 mm (20 inches) and less than 635 mm (25 inches) maximum, the forward reach to all essential controls should be no higher than 1 120 mm (44 inches) above the floor contact of the ICT.</p>	

Section 508	EN 301 549	Comments
<p><a href="#">407.8.3.2.2 Knee and Toe Space under ICT with Obstructed Forward Reach</a>. Knee and toe space under ICT shall be 27 inches (685 mm) high minimum, 25 inches (635 mm) deep maximum, and 30 inches (760 mm) wide minimum and shall be clear of obstructions.</p> <p>Exceptions:</p> <p>1. Toe space shall be permitted to provide a clear height of 9 inches (230 mm) above the floor and a clear depth of 6 inches (150 mm) maximum from the vertical reference plane toward the leading edge of the ICT.</p> <p>2: At a depth of 6 inches (150 mm) maximum from the vertical reference plane toward the leading edge of the ICT, space between 9 inches (230 MM) and 27 inches (685 mm) minimum above the floor shall be permitted to reduce at a rate of 1 inch (25 mm) in depth for every 6 inches (150 mm) in height.</p>	<p><a href="#">8.3.2.4 Knee and toe clearance width</a></p> <p>Where the space under an obstacle that is integral to the ICT is part of access space, the clearance should be at least 760 mm (30 inches) wide.</p> <p><a href="#">8.3.2.5 Toe clearance</a></p> <p>Where an obstacle is integral to the ICT, a space under the obstacle that is less than 230 mm (9 inches) above the floor is considered toe clearance and should:</p> <p>a) extend 635 mm (25 inches) maximum under the whole obstacle;</p> <p>b) provide a space at least 430 mm (17 inches) deep and 230 mm above the floor under the obstacle;</p> <p>c) extend no more than 150 mm (6 inches) beyond any obstruction at 230 mm (9 inches) above the floor.</p> <p><a href="#">8.3.2.6 Knee clearance</a></p> <p>Where an obstacle is integral to the ICT, the space under the obstacle that is between 230 mm and 685 mm above the floor is considered knee clearance and should:</p> <p>a) extend no more than 635 mm (25 inches) under the obstacle at a height of 230 mm (9 inches) above the floor;</p> <p>b) extend at least 280 mm (11 inches) under the obstacle at a height of 230 mm (9 inches) above the floor;</p> <p>c) extend at least 205 mm (8 inches) under the obstacle at a height of 685 mm (27 inches) above the floor;</p> <p>d) be between 230 mm (9 inches) and 685 mm (27 inches) above the floor be permitted to be reduced in depth at a rate of 25 mm (1</p>	<p>Some differences in approach to knee and toe clearance.</p>

Section 508	EN 301 549	Comments
	inch) for each 150 mm (6 inches) in height.	

#### 408 Display Screen

Section 508	EN 301 549	Comments
<a href="#">408.1 General</a> . Where provided, display screens shall conform to 408.	See specific requirements below.	
<a href="#">408.2 Visibility</a> . Where stationary ICT provides one or more display screens, at least one of each type of display screen shall be visible from a point located 40 inches (1015 mm) above the floor space where the display screen is viewed.	<a href="#">8.3.4 Visibility</a> Where the operating area is integral to the ICT, and a display screen is provided, information on the screen should be legible from a point located 1 015 mm (40 inches) above the centre of the floor of the operating area (as defined in clause <a href="#">8.3.2.2</a> ).	
<a href="#">408.3 Flashing</a> . Where ICT emits lights in flashes, there shall be no more than three flashes in any one-second period.	Not applicable.	EN 301 549 treats issues related to flashing and photosensitivity as a functional performance criteria (see <a href="#">4.2.9</a> ) and a software criteria (see <a href="#">11.2.1.19</a> )

#### 409 Status Indicators

Section 508	EN 301 549	Comments
<a href="#">409.1 General</a> . Where provided, status indicators shall be discernible visually and by touch or sound.	<a href="#">5.6.1 Tactile or auditory status</a> Where ICT has a locking or toggle control and that control is visually presented to the user, the ICT shall provide at least one mode of operation where the status of the control can be determined either through touch or sound without operating the control. <a href="#">5.6.2 Visual status</a> When ICT has a locking or toggle control and the control is non-visually presented to the user, the ICT shall provide at least one mode of operation where the status of the control can be visually determined when the control is presented.	

#### 410 Color Coding



Section 508	EN 301 549	Comments
<a href="#">410.1 General</a> . Where provided, color coding shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.	<a href="#">8.1.3 Colour</a> Where the ICT has hardware aspects that use colour, colour shall not be used as the only visual means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.	

#### 411 Audible Signals

Section 508	EN 301 549	Comments
<a href="#">411.1 General</a> . Where provided, audible signals or cues shall not be used as the only means of conveying information, indicating an action, or prompting a response.	Not applicable.	EN 301 549 treats issues related to conveying information via multiple modalities as software issues (see <a href="#">11.2.1.9</a> )

#### 412 ICT with Two-Way Voice Communication

Section 508	EN 301 549	Comments
<a href="#">412.1 General</a> . ICT that provides two-way voice communication shall conform to 412.	See specific requirements below.	
<a href="#">412.2 Volume Gain</a> . ICT that provides two-way voice communication shall conform to 412.2.1 or 412.2.2.	See specific requirements below.	
<a href="#">412.2.1 Volume Gain for Wireline Telephones</a> . Volume gain conforming to 47 CFR 68.317 shall be provided on analog and digital wireline telephones.	<a href="#">8.2.1.1 Speech volume range</a> Where ICT hardware has speech output, it shall provide a means to adjust the speech output volume level over a range of at least 18 dB. <a href="#">8.2.1.2 Incremental volume control</a> Where ICT hardware has speech output and its volume control is incremental, it shall provide at least one intermediate step of 12 dB gain above the lowest volume setting.	Section 508 refers to 47 CFR 68.317 (a US regulation) whereas EN 301 549 refers to the specific level of volume gain required.
<a href="#">412.2.2 Volume Gain for Non-Wireline ICT</a> . A method for increasing volume shall be provided for non-wireline ICT.	<a href="#">8.2.1.1 Speech volume range</a> Where ICT hardware has speech output, it shall provide a means to adjust the speech output volume level over a range of at least 18 dB.	EN 301 549 has more specific requirements related to volume gain.

Section 508	EN 301 549	Comments
	<a href="#">8.2.1.2 Incremental volume control</a> Where ICT hardware has speech output and its volume control is incremental, it shall provide at least one intermediate step of 12 dB gain above the lowest volume setting.	
<a href="#">412.3 Interference Reduction and Magnetic Coupling</a> . Where ICT delivers output by a handset or other type of audio transducer that is typically held up to the ear, ICT shall reduce interference with hearing technologies and provide a means for effective magnetic wireless coupling in conformance with 412.3.1 or 412.3.2.	See specific requirements below.	
<a href="#">412.3.1 Wireless Handsets</a> . ICT in the form of wireless handsets shall conform to ANSI/IEEE C63.19-2011 (incorporated by reference, see 702.5.1).	<a href="#">8.2.2.2 Wireless communication devices</a> Where ICT hardware is a wireless communication device with speech output which is normally held to the ear, it shall provide a means of magnetic coupling to hearing technologies which meets the requirements of ES 200 381-2 [3].	Each refer to relevant local standards.
<a href="#">412.3.2 Wireline Handsets</a> . ICT in the form of wireline handsets, including cordless handsets, shall conform to TIA-1083-B (incorporated by reference, see 702.9.1).	<a href="#">8.2.2.1 Fixed-line devices</a> Where ICT hardware is a fixed-line communication device with speech output and which is normally held to the ear and which carries the "T" symbol specified in ETS 300 381 [1], it shall provide a means of magnetic coupling which meets the requirements of ES 200 381-1 [2].	Each refer to relevant local standards.
<a href="#">412.4 Digital Encoding of Speech</a> . ICT in IP-based networks shall transmit and receive speech that is digitally encoded in the manner specified by ITU-T Recommendation G.722.2 (incorporated by reference, see 702.7.2) or IETF RFC 6716 (incorporated by reference, see 702.8.1).	<a href="#">6.1: Audio bandwidth for speech (informative recommendation)</a> Where ICT provides two-way voice communication, in order to provide good audio quality, that ICT should be able to encode and decode two-way voice communication with a frequency range with an upper limit of at least 7000 Hz.	The EN 301 549 requirements are informative and refer to an upper frequency limit rather than the ITU standard.

Section 508	EN 301 549	Comments
<p><a href="#">412.5 Real-Time Text Functionality</a>. Reserved.</p>	<p>See RTT requirements in EN 301 549 Chapter 6, below.</p>	<p>EN 301 549 provides RTT requirements, discussed below.</p>
<p><a href="#">412.6 Caller ID</a>. Where provided, caller identification and similar telecommunications functions shall be visible and audible.</p>	<p><a href="#">6.3: Caller ID</a> Where ICT provides caller identification and similar telecommunications functions are provided, the caller identification and similar telecommunications functions shall be available in text form and in at least one other modality.</p>	<p>EN 301 549 specifies “text form and at least one other modality” whereas Section 508 specifies “visible and audible.”</p>
<p><a href="#">412.7 Video Communication</a>. Where ICT provides real-time video functionality, the quality of the video shall be sufficient to support communication using sign language.</p>	<p><a href="#">6.5.1 General (informative)</a> Clause 6.5 (Video communications) provides performance requirements that support users who communicate using sign language and lip-reading. For these users, good usability is achieved with Common Intermediate Format (CIF) resolution, a frame rate of 20 frames per second and over, with a time difference between speech audio and video that does not exceed 100 ms. When the resolution is reduced to Quarter Common Intermediate Format (QCIF) and the frame rate drops to 12 frames per second the communication is still usable with some restrictions. A lower resolution causes less disturbance to the perception of sign language and lip-reading than that caused by a lower frame rate. Delay can be a problem in video communication. Overall delay values below 0,4 s are preferred, with an increase in preference down to 0,1 s. Values over 0,8 s are felt to hinder a good sign conversation. Overall delay depends on multiple factors, including e.g. network delay and video processing. For this reason a testable requirement on minimum</p>	<p>EN 301 549 contains more specific requirements.</p>

Section 508	EN 301 549	Comments
	<p>values for overall delay cannot be produced.</p> <p><a href="#">6.5.2 Resolution</a> Where ICT that provides two-way voice communication includes real time video functionality, the ICT:</p> <p>a) shall support at least QCIF resolution;</p> <p>b) should preferably support at least CIF resolution.</p> <p><a href="#">6.5.3 Frame rate</a> Where ICT that provides two-way voice communication includes real-time video functionality, the ICT:</p> <p>a) shall support a frame rate of at least 12 frames per second (FPS);</p> <p>b) should preferably support a frame rate of at least 20 frames per second (FPS) with or without sign language in the video stream.</p> <p><a href="#">6.5.4 Synchronization between audio and video</a> Where ICT that provides two-way voice communication includes real-time video functionality, the ICT should ensure a maximum time difference of 100 ms between the speech and video presented to the user.</p>	

### 413 Closed Caption Processing Technologies

Section 508	EN 301 549	Comments
<p><a href="#">413.1 General</a>. Where ICT displays or processes video with synchronized audio, ICT shall provide closed caption processing technology that conforms to 413.1.1 or 413.1.2.</p>	<p>See specific requirements below.</p>	
<p><a href="#">413.1.1 Decoding and Display of Closed Captions</a>. Players and displays shall decode closed caption data and support display of captions.</p>	<p><a href="#">7.1.1 Captioning playback</a> Where ICT displays video with synchronized audio, it shall have a mode of operation to display the available captions. Where closed captions are provided as part of the content, the ICT shall allow the user to choose to display the captions.</p>	

Section 508	EN 301 549	Comments
<p><a href="#">413.1.2 Pass-Through of Closed Caption Data</a>. Cabling and ancillary equipment shall pass through caption data.</p>	<p><a href="#">5.4: Preservation of accessibility information during conversion</a> Where ICT converts information or communication it shall preserve all documented non-proprietary information that is provided for accessibility, to the extent that such information can be contained in or supported by the destination format.</p> <p><a href="#">7.1.3 Preservation of captioning</a> Where ICT transmits, converts or records video with synchronized audio, it shall preserve caption data such that it can be displayed in a manner consistent with clauses 7.1.1 and 7.1.2. Additional presentational aspects of the text such as screen position, text colours, text style and text fonts may convey meaning, based on regional conventions. Altering these presentational aspects could change the meaning and should be avoided wherever possible.</p>	

#### 414 Audio Description Processing Technologies

Section 508	EN 301 549	Comments
<p><a href="#">414.1 General</a>. Where ICT displays or processes video with synchronized audio, ICT shall provide audio description processing technology conforming to 414.1.1 or 414.1.2.</p>	<p>See specific requirements below.</p>	
<p><a href="#">414.1.1 Digital Television Tuners</a>. Digital television tuners shall provide audio description processing that conforms to ATSC A/53 Digital Television Standard, Part 5 (2014) (incorporated by reference, see 702.2.1). Digital television tuners shall provide processing of audio description when encoded as a Visually Impaired (VI) associated audio service that is provided as a complete program mix containing audio description according to the ATSC A/53 standard.</p>	<p><a href="#">7.2.3 Preservation of audio description</a> Where ICT transmits, converts, or records video with synchronized audio, it shall preserve audio description data such that it can be played in a manner consistent with clauses 7.2.1 and 7.2.2.</p>	<p>Section 508 refers to specific local standards related to Digital Television Tuners.</p>

Section 508	EN 301 549	Comments
<p><a href="#">414.1.2 Other ICT.</a> ICT other than digital television tuners shall provide audio description processing.</p>	<p><a href="#">7.2.3 Preservation of audio description</a> Where ICT transmits, converts, or records video with synchronized audio, it shall preserve audio description data such that it can be played in a manner consistent with clauses 7.2.1 and 7.2.2.</p>	

## 415 User Controls for Captions and Audio Descriptions

Section 508	EN 301 549	Comments
<p><a href="#">415.1 General.</a> Where ICT displays video with synchronized audio, ICT shall provide user controls for closed captions and audio descriptions conforming to 415.1.</p>	<p>See specific requirements below.</p>	
<p><a href="#">415.1.1 Caption Controls.</a> Where ICT provides operable parts for volume control, ICT shall also provide operable parts for caption selection.</p>	<p><a href="#">7.3: User controls for captions and audio description</a> Where ICT primarily displays materials containing video with associated audio content, user controls to activate subtitling and audio description shall be provided to the user at the same level of interaction (i.e. the number of steps to complete the task) as the primary media controls.</p>	<p>Section 508 focuses on operable parts whereas EN 301 549 focuses on the level of interaction.</p>
<p><a href="#">415.1.2 Audio Description Controls.</a> Where ICT provides operable parts for program selection, ICT shall also provide operable parts for the selection of audio description.</p>	<p><a href="#">7.3: User controls for captions and audio description</a> Where ICT primarily displays materials containing video with associated audio content, user controls to activate subtitling and audio description shall be provided to the user at the same level of interaction (i.e. the number of steps to complete the task) as the primary media controls.</p>	<p>Section 508 focuses on operable parts whereas EN 301 549 focuses on the level of interaction.</p>

## Chapter 5 Software

### 501 General

Section 508	EN 301 549	Comments
<p><a href="#">501.1 Scope.</a> The requirements of Chapter 5 shall apply to software where</p>	<p>Chapters 9, 10, and 11 apply <a href="#">WCAG 2.0 Level A and Level AA</a></p>	

Section 508	EN 301 549	Comments
<p>required by 508 <a href="#">Chapter 2</a> (Scoping Requirements), 255 Chapter 2 (Scoping Requirements), and where otherwise referenced in any other chapter of the Revised 508 Standards or Revised 255 Guidelines.</p> <p>Exception: Where Web applications do not have access to platform accessibility services and do not include components that have access to platform accessibility services, they shall not be required to conform to 502 or 503 provided that they conform to Level A and Level AA Success Criteria and Conformance Requirements in WCAG 2.0 (incorporated by reference, see 702.10.1).</p>	<p>Success Criteria to Web content (<a href="#">Chapter 9</a>), Documents (<a href="#">Chapter 10</a>), and Non-Web Software (<a href="#">Chapter 11</a>).</p>	

## 502 Interoperability with Assistive Technology

Section 508	EN 301 549	Comments
<p><a href="#">502.2.1 User Control of Accessibility Features</a>. Platform software shall provide user control over platform features that are defined in the platform documentation as accessibility features.</p>	<p><a href="#">11.4.1 User control of accessibility features</a></p> <p>Where software is a platform it shall provide sufficient modes of operation for user control over those platform accessibility features documented as intended for users.</p>	
<p><a href="#">502.2.2 No Disruption of Accessibility Features</a>. Software shall not disrupt platform features that are defined in the platform documentation as accessibility features.</p>	<p><a href="#">11.4.2 No disruption of accessibility features</a></p> <p>Where software provides a user interface it shall not disrupt those documented accessibility features that are defined in platform documentation except when requested to do so by the user during the operation of the software.</p>	
<p><a href="#">502.3 Accessibility Services</a>. Platform software and software tools that are provided by the platform developer shall provide a documented set of accessibility services that support applications running on the platform to interoperate with assistive technology and shall conform to 502.3. Applications that are also platforms</p>	<p><a href="#">11.3.2.1 Platform accessibility service support for software that provides a user interface</a></p> <p>Platform software shall provide a set of documented platform services that enable software that provides a user interface running on the platform software to</p>	

Section 508	EN 301 549	Comments
<p>shall expose the underlying platform accessibility services or implement other documented accessibility services.</p>	<p>interoperate with assistive technology.</p> <p>Platform software should support requirements 11.3.2.5 to 11.3.2.17 except that, where a user interface concept that corresponds to one of the clauses 11.3.2.5 to 11.3.2.17 is not supported within the software environment, these requirements are not applicable. For example, selection attributes from 11.3.2.14 (Modification of focus and selection attributes) may not exist in environments that do not allow selection, which is most commonly associated with copy and paste.</p> <p><a href="#">11.3.2.2 Platform accessibility service support for assistive technologies</a></p> <p>Platform software shall provide a set of documented platform accessibility services that enable assistive technology to interoperate with software that provides a user interface running on the platform software.</p> <p>Platform software should support the requirements of clauses 11.3.2.5 to 11.3.2.17 except that, where a user interface concept that corresponds to one of the clauses 11.3.2.5 to 11.3.2.17 is not supported within the software environment, these requirements are not applicable. For example, selection attributes from 11.3.2.14 (Modification of focus and selection attributes) may not exist in environments that do not allow selection, which is most commonly associated with copy and paste.</p>	
<p><a href="#">502.3.1 Object Information.</a> The object role, state(s), properties, boundary, name, and description shall be programmatically determinable.</p>	<p><a href="#">11.3.2.5 Object information</a></p> <p>Where the software provides a user interface it shall, by using the services as described in clause 11.3.2.3, make the user interface</p>	



Section 508	EN 301 549	Comments
	elements' role, state(s), boundary, name, and description programmatically determinable by assistive technologies.	
<p><a href="#">502.3.2 Modification of Object Information</a>. States and properties that can be set by the user shall be capable of being set programmatically, including through assistive technology.</p>	<p><a href="#">11.3.2.16 Modifications of states and properties</a> When permitted by security requirements, software that provides a user interface shall, by using the services as described in clause 11.3.2.3, allow assistive technologies to programmatically modify states and properties of user interface elements, where the user can modify these items.</p>	
<p><a href="#">502.3.3 Row, Column, and Headers</a>. If an object is in a data table, the occupied rows and columns, and any headers associated with those rows or columns, shall be programmatically determinable.</p>	<p><a href="#">11.3.2.6 Row, column, and headers</a> Where the software provides a user interface it shall, by using the services as described in clause 11.3.2.3, make the row and column of each cell in a data table, including headers of the row and column if present, programmatically determinable by assistive technologies.</p>	
<p><a href="#">502.3.4 Values</a>. Any current value(s), and any set or range of allowable values associated with an object, shall be programmatically determinable.</p>	<p><a href="#">11.3.2.7 Values</a> Where the software provides a user interface, it shall, by using the services as described in clause 11.3.2.3, make the current value of a user interface element and any minimum or maximum values of the range, if the user interface element conveys information about a range of values, programmatically determinable by assistive technologies.</p>	
<p><a href="#">502.3.5 Modification of Values</a>. Values that can be set by the user shall be capable of being set programmatically, including through assistive technology.</p>	<p><a href="#">11.3.2.17 Modifications of values and text</a> When permitted by security requirements, software that provides a user interface shall, by using the services as described in 11.3.2.3, allow assistive technologies to modify values and text of user interface elements using the input methods of the</p>	

Section 508	EN 301 549	Comments
	platform, where a user can modify these items without the use of assistive technology.	
<p><a href="#">502.3.6 Label Relationships</a>. Any relationship that a component has as a label for another component, or of being labeled by another component, shall be programmatically determinable.</p>	<p><a href="#">11.3.2.8 Label relationships</a> Where the software provides a user interface it shall expose the relationship that a user interface element has as a label for another element, or of being labelled by another element, using the services as described in clause 11.3.2.3, so that this information is programmatically determinable by assistive technologies.</p>	
<p><a href="#">502.3.7 Hierarchical Relationships</a>. Any hierarchical (parent-child) relationship that a component has as a container for, or being contained by, another component shall be programmatically determinable.</p>	<p><a href="#">11.3.2.9 Parent-child relationships</a> Where the software provides a user interface it shall, by using the services as described in clause 11.3.2.3, make the relationship between a user interface element and any parent or children elements programmatically determinable by assistive technologies.</p>	
<p><a href="#">502.3.8 Text</a>. The content of text objects, text attributes, and the boundary of text rendered to the screen, shall be programmatically determinable.</p>	<p><a href="#">11.3.2.10 Text</a> Where the software provides a user interface it shall, by using the services as described in clause 11.3.2.3, make the text contents, text attributes, and the boundary of text rendered to the screen programmatically determinable by assistive technologies.</p>	
<p><a href="#">502.3.9 Modification of Text</a>. Text that can be set by the user shall be capable of being set programmatically, including through assistive technology.</p>	<p><a href="#">11.3.2.17 Modifications of values and text</a> When permitted by security requirements, software that provides a user interface shall, by using the services as described in 11.3.2.3, allow assistive technologies to modify values and text of user interface elements using the input methods of the platform, where a user can modify these items without the use of assistive technology.</p>	

Section 508	EN 301 549	Comments
<p><a href="#">502.3.10 List of Actions</a>. A list of all actions that can be executed on an object shall be programmatically determinable.</p>	<p><a href="#">11.3.2.11 List of available actions</a> Where the software provides a user interface it shall, by using the services as described in clause 11.3.2.3, make a list of available actions that can be executed on a user interface element, programmatically determinable by assistive technologies.</p>	
<p><a href="#">502.3.11 Actions on Objects</a>. Applications shall allow assistive technology to programmatically execute available actions on objects.</p>	<p><a href="#">11.3.2.12 Execution of available actions</a> When permitted by security requirements, software that provides a user interface shall, by using the services as described in clause 11.3.2.3, allow the programmatic execution of the actions exposed according to clause 11.3.2.11 by assistive technologies.</p>	
<p><a href="#">502.3.12 Focus Cursor</a>. Applications shall expose information and mechanisms necessary to track focus, text insertion point, and selection attributes of user interface components.</p>	<p><a href="#">11.3.2.13 Tracking of focus and selection attributes</a> Where software provides a user interface it shall, by using the services as described in clause 11.3.2.3, make information and mechanisms necessary to track focus, text insertion point, and selection attributes of user interface elements programmatically determinable by assistive technologies.</p>	
<p><a href="#">502.3.13 Modification of Focus Cursor</a>. Focus, text insertion point, and selection attributes that can be set by the user shall be capable of being set programmatically, including through the use of assistive technology.</p>	<p><a href="#">11.3.2.14 Modification of focus and selection attributes</a> When permitted by security requirements, software that provides a user interface shall, by using the services as described in clause 11.3.2.3, allow assistive technologies to programmatically modify focus, text insertion point, and selection attributes of user interface elements where the user can modify these items.</p>	
<p><a href="#">502.3.14 Event Notification</a>. Notification of events relevant to user interactions, including but not limited to, changes in</p>	<p><a href="#">11.3.2.15 Change notification</a> Where software provides a user interface it shall, by using the</p>	

Section 508	EN 301 549	Comments
the component's state(s), value, name, description, or boundary, shall be available to assistive technology.	services as described in 11.3.2.3, notify assistive technologies about changes in those programmatically determinable attributes of user interface elements that are referenced in requirements 11.3.2.5 to 11.3.2.11 and 11.3.2.13.	
<a href="#">502.4 Platform Accessibility Features.</a> Platforms and platform software shall conform to the requirements in ANSI/HFES 200.2, Human Factors Engineering of Software User Interfaces — Part 2: Accessibility (2008) (incorporated by reference, see 702.4.1) listed below:	See A-F, below.	
A. Section 9.3.3 Enable sequential entry of multiple (chorded) keystrokes;	<a href="#">5.9: Simultaneous user actions</a> Where ICT uses simultaneous user actions for its operation, such ICT shall provide at least one mode of operation that does not require simultaneous user actions to operate the ICT.	Section 508 specifically mentions keystrokes; whereas EN 301 549 is broader in scope and must include keystrokes.
B. Section 9.3.4 Provide adjustment of delay before key acceptance;	<a href="#">5.7: Key repeat</a> Where ICT with key repeat is provided and the key repeat cannot be turned off: a) the delay before the key repeat shall be adjustable to at least 2 seconds; and b) the key repeat rate shall be adjustable down to one character per 2 seconds.	
C. Section 9.3.5 Provide adjustment of same-key double-strike acceptance;	<a href="#">5.8: Double-strike key acceptance</a> Where a keyboard or keypad is provided, the delay after any keystroke, during which an additional key-press will not be accepted if it is identical to the previous keystroke, shall be adjustable up to at least 0,5 seconds.	Section 508 requires that timing be adjustable up to 2 seconds, whereas EN 301 549 requires time adjustable up to 0.5 seconds.
D. Section 10.6.7 Allow users to choose visual alternative for audio output;	Not applicable.	No corresponding provision in EN 301 549. Some aspects addressed in EN 301 549 sections <a href="#">5.1.5</a> ,

Section 508	EN 301 549	Comments
		<a href="#">7.1.1</a> , <a href="#">7.1.2</a> , <a href="#">7.3</a> , <a href="#">11.2.1.2</a> , <a href="#">11.2.1.3</a> and <a href="#">11.2.1.5</a> .
E. Section 10.6.8 Synchronize audio equivalentents for visual events;	Not applicable.	No corresponding provision in EN 301 549. Some aspects addressed in EN 301 549 sections <a href="#">5.1.3</a> , <a href="#">7.2.2</a> and <a href="#">11.3</a> .
F. Section 10.6.9 Provide speech output services; and	Not applicable.	No corresponding provision in EN 301 549. Interoperability with assistive technology addressed in EN 301 549 <a href="#">11.3</a> .
G. Section 10.7.1 Display any captions provided.	<a href="#">7.1.1 Captioning playback</a> Where ICT displays video with synchronized audio, it shall have a mode of operation to display the available captions. Where closed captions are provided as part of the content, the ICT shall allow the user to choose to display the captions.	

### 503 Applications

Section 508	EN 301 549	Comments
<a href="#">503.2 User Preferences</a> . Applications shall permit user preferences from platform settings for color, contrast, font type, font size, and focus cursor.	<a href="#">11.5: User preferences</a> Where software provides a user interface it shall provide sufficient modes of operation that use user preferences for platform settings for colour, contrast, font type, font size, and focus cursor except for software that is designed to be isolated from its underlying platforms.	
<a href="#">503.3 Alternative User Interfaces</a> . Where an application provides an alternative user interface that functions as assistive technology, the application shall use platform and other industry standard accessibility services.	<a href="#">11.3.2.4 Assistive technology</a> Where the ICT is assistive technology it shall use the documented platform accessibility services.	
<a href="#">503.4 User Controls for Captions and Audio Description</a> . Where ICT displays video with synchronized audio, ICT shall provide user controls for closed captions	<a href="#">7.1.1 Captioning playback</a> Where ICT displays video with synchronized audio, it shall have a mode of operation to display the available captions. Where closed	

Section 508	EN 301 549	Comments
and audio descriptions conforming to 503.4.	captions are provided as part of the content, the ICT shall allow the user to choose to display the captions.	
<p><a href="#">503.4.1 Caption Controls</a>. Where user controls are provided for volume adjustment, ICT shall provide user controls for the selection of captions at the same menu level as the user controls for volume or program selection.</p>	<p><a href="#">7.3: User controls for captions and audio description</a> Where ICT primarily displays materials containing video with associated audio content, user controls to activate subtitling and audio description shall be provided to the user at the same level of interaction (i.e. the number of steps to complete the task) as the primary media controls.</p>	
<p><a href="#">503.4.2 Audio Description Controls</a>. Where user controls are provided for program selection, ICT shall provide user controls for the selection of audio descriptions at the same menu level as the user controls for volume or program selection.</p>	<p><a href="#">7.3: User controls for captions and audio description</a> Where ICT primarily displays materials containing video with associated audio content, user controls to activate subtitling and audio description shall be provided to the user at the same level of interaction (i.e. the number of steps to complete the task) as the primary media controls.</p>	

## 504 Authoring Tools

Section 508	EN 301 549	Comments
<p><a href="#">504.2 Content Creation or Editing</a>. Authoring tools shall provide a mode of operation to create or edit content that conforms to Level A and Level AA Success Criteria and Conformance Requirements in WCAG 2.0 (incorporated by reference, see 702.10.1) for all supported features and, as applicable, to file formats supported by the authoring tool. Authoring tools shall permit authors the option of overriding information required for accessibility.</p>	<p><a href="#">11.6.2 Accessible content creation</a> Authoring tools shall enable and guide the production of content that conforms to clauses 9 (Web content) or 10 (Non-Web content) as applicable.</p>	
<p><a href="#">504.2.1 Preservation of Information Provided for Accessibility in Format Conversion</a>. Authoring tools shall, when</p>	<p><a href="#">11.6.3 Preservation of accessibility information in transformations</a></p>	

Section 508	EN 301 549	Comments
converting content from one format to another or saving content in multiple formats, preserve the information required for accessibility to the extent that the information is supported by the destination format.	If the authoring tool provides restructuring transformations or re-coding transformations, then accessibility information shall be preserved in the output if equivalent mechanisms exist in the content technology of the output.	
<a href="#">504.2.2 PDF Export</a> . Authoring tools capable of exporting PDF files that conform to ISO 32000-1:2008 (PDF 1.7) shall also be capable of exporting PDF files that conform to ANSI/AIIM/ISO 14289-1:2016 (PDF/UA-1) (incorporated by reference, see 702.3.1).	See comments.	No corresponding provision in EN 301 549, but 11.6.3 covers the same requirement without specifying PDF.
<a href="#">504.3 Prompts</a> . Authoring tools shall provide a mode of operation that prompts authors to create content that conforms to Level A and Level AA Success Criteria and Conformance Requirements in WCAG 2.0 (incorporated by reference, see 702.10.1) for supported features and, as applicable, to file formats supported by the authoring tool.	<a href="#">11.6.4 Repair assistance</a> If the accessibility checking functionality of an authoring tool can detect that content does not meet a requirement of clauses 9 (Web content) or 10 (Documents) as applicable, then the authoring tool shall provide repair suggestion(s).	
<a href="#">504.4 Templates</a> . Where templates are provided, templates allowing content creation that conforms to Level A and Level AA Success Criteria and Conformance Requirements in WCAG 2.0 (incorporated by reference, see 702.10.1) shall be provided for a range of template uses for supported features and, as applicable, to file formats supported by the authoring tool.	<a href="#">11.6.5 Templates</a> When an authoring tool provides templates, at least one template that supports the creation of content that conforms to the requirements of clauses 9 (Web content) or 10 (Documents) as applicable shall be available and identified as such.	

## Chapter 6 Support Documentation and Services

### 602 Support Documentation

Section 508	EN 301 549
<a href="#">602.2 Accessibility and Compatibility Features</a> . Documentation shall list and explain how to use the accessibility and compatibility features required by Chapters 4 and 5. Documentation shall include accessibility features that are built-in and accessibility features that provide compatibility with assistive technology.	<a href="#">12.1.1 Accessibility and compatibility features</a> Product documentation provided with the ICT whether provided separately or integrated within the ICT shall list and explain how to use the accessibility and compatibility features of the ICT.

Section 508	EN 301 549
<p><a href="#">602.3 Electronic Support Documentation.</a> Documentation in electronic format, including Web-based self-service support, shall conform to Level A and Level AA Success Criteria and Conformance Requirements in WCAG 2.0 (incorporated by reference, see 702.10.1).</p>	<p><a href="#">12.1.2 Accessible documentation</a> Product documentation provided with the ICT shall be made available in at least one of the following electronic formats: a) a Web format that conforms to clause 9, or b) a non-web format that conforms to clause 10.</p>
<p><a href="#">602.4 Alternate Formats for Non-Electronic Support Documentation.</a> Where support documentation is only provided in non-electronic formats, alternate formats usable by individuals with disabilities shall be provided upon request.</p>	<p><a href="#">12.1.2 Accessible documentation</a> Product documentation provided with the ICT shall be made available in at least one of the following electronic formats: a) a Web format that conforms to clause 9, or b) a non-web format that conforms to clause 10.</p>

### 603 Support Services

Section 508	EN 301 549
<p><a href="#">603.2 Information on Accessibility and Compatibility Features.</a> ICT support services shall include information on the accessibility and compatibility features required by 602.2.</p>	<p><a href="#">12.2.2 Information on accessibility and compatibility features</a> ICT support services shall provide information on the accessibility and compatibility features that are included in the product documentation.</p>
<p><a href="#">603.3 Accommodation of Communication Needs.</a> Support services shall be provided directly to the user or through a referral to a point of contact. Such ICT support services shall accommodate the communication needs of individuals with disabilities.</p>	<p><a href="#">12.2.3 Effective communication</a> ICT support services shall accommodate the communication needs of individuals with disabilities either directly or through a referral point.</p>

### EN 301 549 Provisions Not Mapped to Section 508 Provisions Above

#### [5.1.3.10 Non-interfering audio output](#)

Where auditory output is provided as non-visual access to closed functionality, the ICT shall not automatically play, at the same time, any interfering audible output that lasts longer than three seconds.

#### [5.1.3.14 Spoken languages](#)

Where speech output is provided as non-visual access to closed functionality, speech output shall be in the same human language as the displayed content provided, except:

- a) 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;
- b) where the content is generated externally and not under the control of the ICT vendor, clause 5.1.3.14 shall not be required to apply for languages not supported by the ICT's speech synthesizer;
- c) for displayed languages that cannot be selected using non-visual access;
- d) where the user explicitly selects a speech language that is different from the language of the displayed content.

#### [5.1.3.15 Non-visual error identification](#)



Where speech output is provided as non-visual access to closed functionality and an input error is automatically detected, speech output shall identify and describe the item that is in error.

### [5.1.5 Visual output for auditory information](#)

Where pre-recorded auditory information is needed to enable the use of closed functions of ICT, the ICT shall provide visual information that is equivalent to the pre-recorded auditory output.

#### [5.1.6.1 Closed functionality](#)

Where ICT functionality is closed to keyboards or keyboard interfaces, all functionality shall be operable without vision as required by clause 5.1.3.

#### [5.1.6.2 Input focus](#)

Where ICT functionality is closed to keyboards or keyboard interfaces and where input focus can be moved to a user interface element, it shall be possible to move the input focus away from that element using the same mechanism, in order to avoid trapping the input focus.

### [6.2.1.1 RTT communication](#)

Where ICT supports two-way voice communication in a specified context of use, the ICT shall allow a user to communicate with another user by RTT.

#### [6.2.1.2 Concurrent voice and text](#)

Where the ICT, or set of ICT, provided to a user, supports two-way voice communication and enables a user to communicate with another user by RTT, it shall provide a mechanism to select a mode of operation allowing concurrent voice and text.

#### [6.2.2.1 Visually distinguishable display](#)

Where ICT has RTT send and receive capabilities, displayed sent text shall be visually differentiated from and separated from received text.

#### [6.2.2.2 Programmatically determinable send and receive direction](#)

Where ICT has RTT send and receive capabilities, the send/receive direction of transmitted text shall be programmatically determinable, unless the RTT has closed functionality.

### [6.2.3 Interoperability](#)

Where ICT with RTT functionality interoperates with other ICT with RTT functionality (as required by [6.2.1.1](#)) they shall support at least one of the four RTT interoperability mechanisms described below:

- a) ICT interoperating over the Public Switched Telephone Network (PSTN), with other ICT that directly connects to the PSTN as described in Recommendation ITU-T V.18 [\[i.23\]](#) or any of its annexes for text telephony signals at the PSTN interface;
- b) ICT interoperating with other ICT using VOIP with Session Initiation Protocol (SIP) and using real-time text that conforms to RFC 4103 [\[i.13\]](#);
- c) ICT interoperating with other ICT using RTT that conforms with the IP Multimedia Sub-System (IMS) set of protocols specified in TS 126 114 [\[i.10\]](#), TS 122 173 [\[i.11\]](#) and TS 134 229 [\[i.12\]](#);
- d) ICT interoperating with other ICT using a relevant and applicable common specification for RTT exchange that is published and available. This common specification shall include a method for indicating loss or corruption of characters.

### [6.2.4 Real-time text responsiveness](#)

Where ICT utilises RTT input, that RTT input shall be transmitted to the ICT network supporting RTT within 1 second of the input entry.

#### [6.4: Alternatives to voice-based services](#)

Where ICT provides real-time voice-based communication and also provides voice mail, auto-attendant, or interactive voice response facilities, the ICT should offer users a means to access the information and carry out the tasks provided by the ICT without the use of hearing or speech.

#### [6.6: Alternatives to video-based services](#)

Where ICT provides real-time video-based communication and also provides answering machine, auto attendant or interactive response facilities, the ICT should offer users a means to access the information and carry out the tasks related to these facilities:

- a) for audible information, without the use of hearing;
- b) for spoken commands, without the use of speech;
- c) for visual information, without the use of vision

#### [8.3.2.1 Change in level](#)

Where there is a change in floor level that is integral to the ICT then it shall be ramped with a slope no steeper than 1:48.

#### [8.3.2.3.1 General](#)

Where the access space is integral to the ICT, at least one full side of the space shall be unobstructed.

#### [8.3.2.3.2 Forward approach](#)

Where the operating area is inside an alcove integral to the ICT, the alcove is deeper than 610 mm (24 inches), and where a forward approach is necessary, the dimension of the access space should be a minimum of 915 mm (36 inches) wide.

#### [8.3.2.3.3 Parallel approach](#)

Where the operating area is inside an alcove integral to the ICT, the alcove is deeper than 380 mm (15 inches), and where a parallel approach is possible, the dimension of the access space should be a minimum of 1 525 mm (60 inches) wide.

#### [8.3.5 Installation instructions](#)

Where an ICT is intended to be installed, instructions should be made available which outline a method to install the ICT in a manner that ensures that the dimensions of the integral spaces of the ICT conform to clauses 8.3.2 to 8.3.4.

#### [13.1.1 General \(informative\)](#)

Relay services enable users of different modes of communication e.g. text, sign, speech, to interact remotely through ICT with two-way communication by providing conversion between the modes of communication, normally by a human operator.

It is best practice to meet the applicable relay service requirements of ES 202 975 [[i.5](#)].

#### [13.1.2 Text relay services](#)

Where ICT is intended to provide a text relay service, the text relay service shall enable text users and speech users to interact by providing conversion between the two modes of communication.

### [13.1.3 Sign relay services](#)

Where ICT is intended to provide a sign relay service, the sign relay service shall enable sign language users and speech users to interact by providing conversion between the two modes of communication.

### [13.1.4 Lip-reading relay services](#)

Where ICT is intended to provide a lip-reading relay service, the lip-reading service shall enable lip-readers and voice telephone users to interact by providing conversion between the two modes of communication.

### [13.1.5 Captioned telephony services](#)

Where ICT is intended to provide a captioned telephony service, the captioned telephony service shall assist a deaf or hard of hearing user in a spoken dialogue by providing text captions translating the incoming part of the conversation.

### [13.1.6 Speech to speech relay services](#)

Where ICT is intended to provide a speech to speech relay service, the speech to speech relay service shall enable speech or cognitively impaired telephone users and any other user to communicate by providing assistance between them.

## [13.2: Access to relay services](#)

Where ICT systems support two-way communication and a set of relay services for such communication is specified, access to those relay services shall not be prevented for outgoing and incoming calls.

## [13.3: Access to emergency services](#)

Where ICT systems support two-way communication and a set of emergency services for such communication is specified, access to those emergency services shall not be prevented for outgoing and incoming calls.

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