

# INTERNATIONAL STANDARD

Audio, video and multimedia systems and equipment – Digital television  
accessibility – Functional specifications

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INTERNATIONAL  
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The text of this standard is based on the following documents:

CDV	Report on voting
100/2640/CDV	100/2795/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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# AUDIO, VIDEO AND MULTIMEDIA SYSTEMS AND EQUIPMENT – DIGITAL TELEVISION ACCESSIBILITY – FUNCTIONAL SPECIFICATIONS

## 1 Scope

This document specifies a set of principles and considerations for digital television products in support of older people and persons with disabilities in addition to mainstream users. The effect of following the principles and considerations as set out in this document is to ensure that the widest range of users can access, understand and use digital television products. These principles and considerations cover four main user profiles such as individuals with hearing impairments, individuals with sight impairments, individuals with mobility impairments and individuals with cognitive impairments.

This document applies to consumer solutions whose primary function is to receive digital television, such as integrated digital televisions, set top boxes, digital television recorders and equivalent products and devices (see Annex D). All these solutions are referred to as digital television solutions throughout this document. The standard does not cover solutions that support digital television as a secondary function (for instance gaming consoles or computers with digital receiver cards). However, much of the content also provides for future solutions and/or implementations. This document does not cover delivery, unpacking, secure installation on a stand or wall mounting or first time connection of the power and signals.

## 2 Normative references [standards.iteh.ai](http://standards.iteh.ai)

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62731:2013, *Text-to-speech for television – General requirements*

ISO 7001:2007, *Graphical symbols – Public information symbols*

ISO 24500:2010, *Ergonomics – Accessible design – Auditory signals for consumer products*

ISO 24501:2010, *Ergonomics – Accessible design – Sound pressure levels of auditory signals for consumer products*

ISO 24503:2011, *Ergonomics – Accessible design – Tactile dots and bars on consumer products*

## 3 Terms, definitions and abbreviated terms

### 3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 3.1.1

#### **access service**

additional or alternative content associated with a television programme, intended to make the programme accessible to specific users

EXAMPLE Audio/video description for blind and partially sighted people, captioning/subtitling for deaf and hard of hearing people and/or for delivery to different language audiences, signed programmes for sign language users, etc.

### 3.1.2

#### **high definition**

##### **HD**

video resolution, typically in the range of 720 to 1 080 vertical lines

### 3.1.3

#### **standard definition**

##### **SD**

video resolution, typically in the range of 480 to 576 vertical lines

### 3.1.4

#### **electronic program guide**

##### **EPG**

on screen application that provides users with scheduling information for current and upcoming programming

### 3.1.5

#### **safe area**

area of the television picture that can be seen on the great majority of television screens

Note 1 to entry: See ST 2046-1:2009, RP 218-2002, and FCC 79.101 (12).

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### 3.1.6

#### **text-to-speech**

##### **TTS**

solution that converts textual content to the audible content speech, often implemented with a speech synthesizer system

### 3.1.7

#### **audio description**

##### **AD**

verbal depiction of key visual elements in media and live productions

Note 1 to entry: See 6.2.2.

### 3.1.8

#### **high visibility interface**

user interface that allows the user to change the presentation rules in order to improve visibility

### 3.1.9

#### **wand remote control**

remote control that moves an on screen pointer by aiming it at the screen

### 3.1.10

#### **companion device**

device connected to a digital television solution with the intention to provide a connected experience and interactivity across both

Note 1 to entry: Such devices include a smartphone, tablet or laptop.

Note 2 to entry: Also known as “second screen (device)” or “secondary device”.

### 3.1.11

#### **smartphone**

mobile phone with additional advanced features commonly found on computers, with Internet access in addition to the voice channel and with the ability to install applications to extend and customise its properties and abilities

### 3.1.12

#### **companion screen app**

companion screen application

application running on a companion device, interacting with a digital television solution and providing access to the same or additional content and/or programme guides

### 3.1.13

#### **Internet protocol**

##### **IP**

principle communications protocol that essentially establishes the Internet

### 3.1.14

#### **Internet protocol television**

##### **IPTV**

digital television product that receives programming over the Internet or from a source that uses IP to deliver video

### 3.1.15

#### **application programming interface**

##### **API**

specification for software to use and interact with a system or platform

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### 3.2 Abbreviated terms

AD	Audio Description
API	Application Programming Interface
ASR	Automatic Speech Recognition
EPG	Electronic Program Guide
FCC	Federal Communications Commission
HbbTV	Hybrid Broadcast Broadband TeleVision
HD	High Definition
IP	Internet Protocol
IPTV	Internet Protocol Television
NFC	Near Field Communication
SD	Standard Definition
SPL	Sound Pressure Level
TTS	Text-To-Speech
UI	User Interface
USB	Universal Serial Bus
WPS	Wi-Fi Protected Setup
xHCI	eXtensible Host Controller Interface

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## 4 General

### 4.1 Overview

This document covers solutions that provide access to linear broadcast as well as those that offer on-demand/catch-up broadcast over Internet protocol. It also covers hybrid devices, sometimes referred to as connected TV solutions.

Note that content related aspects of digital television are not solely a property of the digital television solution used by people to consume linear or on-demand content. This document does not cover authoring requirements for content producers. It does set out functionality needed in digital television solutions to enable accessible content to be delivered to the end user.

### 4.2 Objective

The intent of this document is to assist designers of digital television equipment in such a way that they are able to develop solutions that are accessible to users with a wide range of abilities.

### 4.3 Summary

This subclause provides overall guidance for the use of this document. Annex E provides additional background information on accessibility of digital television equipment.

Clauses 5 to 8 present accessibility guidelines grouped by ability. These are:

- Accessibility related to auditory perception,
- Accessibility related to visual perception,
- Accessibility related to mobility,
- Accessibility related to cognitive abilities.

Annex F provides additional information about user profiles related to these abilities.

Annex A to Annex D, Annex G and Annex I summarize the guidelines presented in Clauses 5 to 8. However, the information in these annexes is grouped by implementation area, combining the guidelines from the various ability types. These summaries should be of particular use to those responsible for specific subsections of digital television equipment. These areas are:

- Annex A – (informative) Remote controls and buttons;
- Annex B – (informative) On screen display;
- Annex C – (informative) Content;
- Annex D – (informative) External devices;
- Annex G – (informative) Guidance on use of colours;
- Annex I – (informative) Future access .

Annex E – (informative) background describes design solutions and functionalities so that they can be accessed, understood and used by the widest range of users.

Annex F – (informative) user profile outline gives a brief overview of the main user groups that are affected by accessibility barriers in Digital Television products.

Annex H – (informative) includes a table that illustrates how different abilities, characteristics and preferences as well as environmental factors and context of use impact usage.

Annex J – (informative) includes a list of some items covered by video accessibility requirements in the US.

#### 4.4 Principles

Designers of accessible digital television equipment should follow the principles listed below.

- Consider accessibility features early in the design cycle.
- Make accessibility features configurable and readily enabled or disabled.
- Support multiple modes of operation in order to enhance accessibility related to multiple abilities.
- Deliver functional equivalency such that users can experience all content and perform all tasks where feasible.
- Make user interfaces easy to use and to comprehend with attention to clarity, consistency, efficiency, resilience, and responsiveness.
- Evaluate accessibility features before development ends, including the testing of extreme use cases.

See Clause E.4 for more information.

#### 4.5 Considerations

When designing accessible digital television equipment, the following points should be considered.

- Digital television users have a wide range of abilities. The level of specific abilities varies and any given user might have a combination of limitations.
- User abilities are not static. Personal abilities often change due to illness, injury, aging, or viewing and/or listening conditions.
- Television content is viewed on a variety of device types in various settings.
- Televisions can be used regularly by a group of people, such as a family, so the accessibility needs of users of the equipment may change from moment to moment.
- Services can provide a varying level of accessibility features. A variety of access services might be offered.
- A variety of external devices designed to enhance accessibility are available in the marketplace.
- There are many global regions and jurisdictions. Each might have unique social norms, product expectations, and specific regulatory requirements.

See Clause E.3 for more information.

### 5 Accessibility related to auditory perception

#### 5.1 Overview

Access services, such as closed captioning, spoken subtitles and subtitles, as well as sign language are described as well as the user interface recommendations that primarily assist users having difficulty hearing sound.

#### 5.2 Essential functions

##### 5.2.1 List of functions

Digital television receivers should:

- a) where a traditional, button based remote control is provided, have dedicated "subtitles" and "closed captions" on/off buttons on the remote control. The solution can consist of the substitution of a remote control button by menu-operation;
- b) allow end users to change the on/off setting for each access service while viewing or playing content;
- c) inform the user of the availability of access services for the programme they are currently viewing and for other content in any content guide(s)/browser(s), where possible;
- d) inform the user when they are changing to a content source for which an enabled access service is available;
- e) maintain the choice of enabled/disabled access services across channel changes/content changes, source devices and across power on/standby cycles;
- f) allow end users to select a default on/off setting for each access service supported;
- g) support the same control mechanisms for the access service on/off state independent of content origin or type. For instance, dedicated access services buttons on the remote control should work for all types of content supported by the receiver (and, for example, not just for linear broadcast content).

NOTE While this document deals with the receiver features in support of access services, broadcasters and other content providers have a key role to play in this area too. Unless they provide the access services content, any receiver functions in support of these are void. There are at present significant differences in the availability of access services in different countries and regions.

### 5.2.2 Closed captioning

For many deaf and hard of hearing users, content might only be relevant if it is available with closed captioning that the receiver is capable of obtaining and rendering. Users of sign language could prefer to filter content with preference for those content assets that include in-vision signing (see also 5.2.4).

Captions provide a real-time on-screen transcript of the dialogue as well as some sound effects. Subtitles are the transcription of spoken words, while captions include spoken words plus symbols to indicate any meaningful sound whose perception is important to understand the content of the audiovisual program.

### 5.2.3 Subtitles

NOTE 1 Subtitles are called "closed captioning" in some regions.

Subtitles are a text representation of the dialogue or commentary in audio-visual content. They are usually rendered at the bottom of the picture. Subtitles can be provided in the same language as the audio content (supporting deaf and hard of hearing viewers and older people, and those for whom the audio language is not their native one or who have any other difficulty in following the spoken output) or, in another language, effectively providing a textual translation of the audio content.

NOTE 2 For DVB-based receivers, subtitle functionality is specified in ETSI EN 300 743.

### 5.2.4 (Open) Sign language

Many deaf and some severely hard of hearing people use sign language as their first language, especially where the hearing loss was acquired at birth or shortly thereafter. Sign language is a visual medium and many sign languages are distinct languages, not just gesture versions of the local spoken language. For these users, sign language may be provided in the form of an in-vision sign language interpreter. As this form of delivering the sign language within the main video stream is non-elective (usually referred to as open signing), there is no further support required from the receiver for rendering open signing.

Some on-demand systems will allow users to select an alternative content asset which has open signing in the video track as opposed to the default asset for the same content.

Where available, digital television solutions should ensure that at least one method exists to allow viewers to find and select such content. Examples of such methods are: searching and/or filtering the electronic programme guide by references to signed content; allowing users to reorder and/or filter channels in lists and/or programme guides so they can make channels with substantial signed content more prominently visible; use of a HbbTV application that redirects to signed content and/or programme versions. This is not an exhaustive list. Such functionality might need metadata handling to display an appropriate text message and/or symbol in content guides/browsers.

### 5.3 Additional functions

Special attention should be given to the visual feedback provided by menus. Many digital television products include some form of menu based user interface elements. As with all parts of the user interface, clarity is essential. Users need to know where they are, how to navigate and control the menu and which current settings are active. Users need to be able to identify and understand the menus. If users do not know how menus work, where they are or what to do, they will be confused, frustrated and often unable to use the product satisfactorily. Many functions of a digital television product are not accessible to users unless they are able to understand and use menus.

Lack of consistency (including inconsistent terminology) between the user interface and other components frequently confuse users. For example, confusion is likely if an on-screen hint instructs the user to press the return button to go back, yet the remote control the button carries only the '↔' symbol. Similarly, if it is not clear to users where in the menu they currently are or which current settings have been activated, this leads to confusion and frustration.

Most receivers provide menu based navigation for at least some operations. Menus may indicate the current position or selection in a menu clearly and unambiguously on screen and this may also be indicated in audible format. Where submenus or additional menu pages exist, this may be indicated visually, with a clear indication of where exactly in the hierarchy the current position is located. Receivers should provide visual feedback when pressing a remote control button.

## 6 Accessibility related to visual perception

### 6.1 Overview

This clause refers to audio feedback. While many users can benefit from this feature, for blind and partially sighted users, this feature can be essential to access and use the equipment.

### 6.2 Essential functions

#### 6.2.1 List of functions

In order to provide minimal usability, the following functions, if included in the equipment, should be made accessible<sup>1</sup>:

- Configuration–CC Control: Function that allows the user to enable or disable the display of closed captioning. (Or Subtitle Control);
- Configuration–CC Options: Function that allows the user to modify the display of closed caption data (e.g., configuration of the font size, font colour, background colour, opacity, etc.). (Or Subtitle Options);

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<sup>1</sup> From the US Federal Communications Commission (FCC), FCC 13-138, Appendix B.