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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

IPTV multimedia services and applications for IPTV –
General aspects

Accessibility profiles for IPTV systems

Recommendation ITU-T H.702

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Recommendation ITU-T H.702

Accessibility profiles for IPTV systems

Summary

Recommendation ITU-T H.702 defines three profiles for accessibility features in Internet protocol television (IPTV) systems, with increasing levels of support. The Basic profile provides an entry-level support of accessibility, whereas the Main profile provides the widest range of features; the Enhanced profile provides the middle level support between the Basic profile and the Main profile. Accessibility information is information such as captions, sign language streams and audio description that are sent separately from video contents to IPTV terminal devices. By defining the above profiles, persons with disabilities can choose more easily the terminal devices that have the functions they need.

History

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Introduction

This Recommendation defines three profiles for accessibility features in Internet protocol television (IPTV) systems, with increasing levels of support. The Basic profile provides an entry-level support of accessibility, whereas the Main profile provides the widest range of features. Beyond 2020, the Main profile should be available in all IPTV terminal devices that are considered fully accessible.

Recommendation ITU-T H.702

Accessibility profiles for IPTV systems

1 Scope

This Recommendation describes the functions for displaying accessibility information such as caption, sign language and audio description that is sent separately from video contents to Internet protocol television (IPTV) terminal devices. They are categorized by support levels, which are defined as profiles. By defining profiles, users can choose more easily the terminal devices that have the functions they desire.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- [ITU-T F.791] Recommendation ITU-T F.791 (2015), *Accessibility terms and definitions*.
- [ITU-T H.720] Recommendation ITU-T H.720 (2008), *Overview of IPTV terminal devices and end systems*.
- [ITU-T H.721] Recommendation ITU-T H.721 (2015), *IPTV terminal devices: Basic model*.
- [ITU-T H.760] Recommendation ITU-T H.760 (2009), *Overview of multimedia application frameworks for IPTV services*.
- [ITU-T H.761] Recommendation ITU-T H.761 (2014), *Nested context language (NCL) and Ginga-NCL*.
- [ITU-T H.762] Recommendation ITU-T H.762 (2011), *Lightweight interactive multimedia environment (LIME) for IPTV services*.
- [ITU-T H.763.1] Recommendation ITU-T H.763.1 (2010), *Cascading style sheets for IPTV services*.
- [ITU-T H.764] Recommendation ITU-T H.764 (2012), *IPTV services enhanced script language*.
- [ITU-T H.765] Recommendation ITU-T H.765 (2015), *Packaged IPTV application (widget) service*.
- [ITU-T H.780] Recommendation ITU-T.780 (2012), *Digital signage: Service requirements and IPTV-based architecture*.
- [ITU-T Y.101] Recommendation ITU-T Y.101 (2000), *Global Information Infrastructure terminology: Terms and definitions*.
- [ITU-T Y.1901] Recommendation ITU-T Y.1901 (2008), *Requirements for the support of IPTV services*.
- [ITU-T Y.1910] Recommendation ITU-T Y.1910 (2008), *IPTV functional architecture*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 access service [ITU-T F.791]: Additional accessibility features intended to make primary audiovisual content accessible to users with specific impairments or preferences or in specific environmental contexts of use. Examples of common access services are captioning subtitling, audio description and sign language interpretation. Metadata is often available in an EPG to allow a user to be able to determine the access services available.

3.1.2 application [ITU-T Y.101]: A structured set of capabilities, which provide value-added functionality supported by one or more services.

3.1.3 audio captioning [ITU-T F.791]: Audio captioning is a function that provides captions that are read aloud and reflected as speech. Audio captioning may also be called "audio subtitles" or "spoken subtitles" in the case of foreign language dialogue. It can also be used to designate audio content of an audiovisual work or sequence in any language along with action is read aloud by a human or a specific apparatus that converts the text into speech.

3.1.4 audio description [ITU-T F.791]: Also known as 'video description' and 'described video'. The service provides additional audible narrative, interleaved with the dialogue, which describes the significant aspects of the visual content of audiovisual media that cannot be understood from the main soundtrack alone.

3.1.5 captions/captioning [ITU-T F.791]: Captions provide a real-time on-screen transcript of the dialogue as well as any sound effects. This service can be provided by means of either textual or graphical supplementary content. The captions and the dialogue are usually in the same language. The service is primarily to assist users having difficulty hearing the sound.

NOTE – Subtitles are the transcription of spoken words, while captions include spoken words plus any meaningful sound whose perception is important to understand the content of the audiovisual program.

3.1.6 close/open accessibility services [ITU-T F.791]: All accessibility services – audio description, audio subtitling, captioning, and sign language – may have the possibility of being elective by the end user. If this is the case, it is closed. If it cannot be selected by the user it is an open service.

3.1.7 content [ITU-T H.780]: A combination of audio, still image, graphic, video or data.

3.1.8 sign language [ITU-T F.791]: A sign language (also called signed language or simply visual signing) is a natural language which, instead of acoustically conveyed sound patterns, uses manual communication with the hands, facial expressions and body language to convey meaning.

3.1.9 terminal device (TD) [ITU-T Y.1901]: An end-user device which typically presents and/or processes the content, such as a personal computer, a computer peripheral, a mobile device, a TV set, a monitor, a VoIP terminal or an audiovisual media player.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 accessibility medium: The media stream containing accessibility information, such as audio stream with audio description, text stream with closed captions, and video stream with sign language interpretation.

3.2.2 accessibility service: Same as access service (see clause 3.1.1).

3.2.3 caption box: Opaque or translucent rectangle area in which caption is placed.

3.2.4 profile: A set of capabilities for accessibility to be implemented in an IPTV end system.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

CSS	Cascading Style Sheets
DOM	Document Object Model
EPG	Electronic Program Guide
HE	Head End
HTTP	Hypertext Transfer Protocol
IPTV	Internet Protocol Television
ITA	IPTV Terminals with Accessibility enhancements
PWD	Persons With Disabilities
TV	Television
VOD	Video on Demand

5 Conventions

In this Recommendation:

- The keywords "is required to" indicate a requirement which must be strictly followed and from which no deviation is permitted, if conformance to this Recommendation is to be claimed.
- The keywords "is prohibited from" indicate a requirement which must be strictly followed and from which no deviation is permitted, if conformance to this Recommendation is to be claimed.
- The keywords "is recommended" indicate a requirement which is recommended but which is not absolutely required. Thus, this requirement need not be present to claim conformance.
- The keywords "is not recommended" indicate a requirement which is not recommended but which is not specifically prohibited. Thus, conformance with this Recommendation can still be claimed even if this requirement is present.
- The keywords "can optionally" indicate an optional requirement which is permissible, without implying any sense of being recommended. This term is not intended to imply that the vendor's implementation must provide the option and the feature can be optionally enabled by the network operator/service provider. Rather, it means the vendor may optionally provide the feature and still claim conformance with this Recommendation.

Requirements in "Optionality" column in tables are identified using the following conventions [ITU-T Y.1901]:

- Mandatory requirement is identified to R;
- Recommended requirement is identified to RR;
- Optional requirement is identified to OR.

6 Background

The United Nations Convention on the Rights of Persons with Disabilities (PWD) was adopted by the United Nations General Assembly on 13 December 2006, and was put into effect in 2007. This convention requires the ratifying countries to ensure that persons with disabilities enjoy full equality under the law. It also explicitly requires them to make provisions for information accessibility of the PWD in some ways.

Television (TV) is a one-way device to receive information. From PWD's viewpoint, sufficient accessibility information is not provided. In the case of Internet protocol television (IPTV) terminal devices [ITU-T H.720], with multimedia application frameworks [ITU-T H.760] such as [ITU-T H.761] and [ITU-T H.762], it is possible to easily add a variety of accessibility information on the video. Furthermore, IPTV terminal devices that support [ITU-T H.721] can display the accessibility information based on [ITU-T H.761] or [ITU-T H.762] without special devices.

IPTV has the following benefits:

- a) It can, in principle, be seen anywhere in the world, as it is based on IP and there are international standards.
- b) It provides easy interface for PWDs and persons with specific needs that allows them to access multimedia content without any special training.
- c) It is currently available on IPTV terminals in the open retail market and it has potential abilities to provide accessibility features without any special devices.

In order to spread IPTV services, enhanced with accessibility functions, standardization of IPTV terminals with accessibility enhancements (ITA) is important. It means that the interoperability, conformance and defining profiles of these terminals are required.

7 Accessibility service

7.1 Overview

Accessibility services are additional accessibility features intended to make primary audiovisual content accessible to users with specific impairments or preferences, or in specific environmental contexts. Examples of common accessibility services are captioning, audio description and sign language interpretation.

Other examples of accessibility services, for example Web content accessibility, can be found in [b-W3C WCAG2.0].

7.2 Architecture

Figure 1 shows the architecture of how to get the accessibility medium within a derivative of the IPTV architecture (defined in [ITU-T Y.1910]). Caption, sign language and audio description are delivered by the accessibility medium server functions. End-users can display the accessibility medium on terminal devices (TDs) by using the accessibility medium terminal functions.

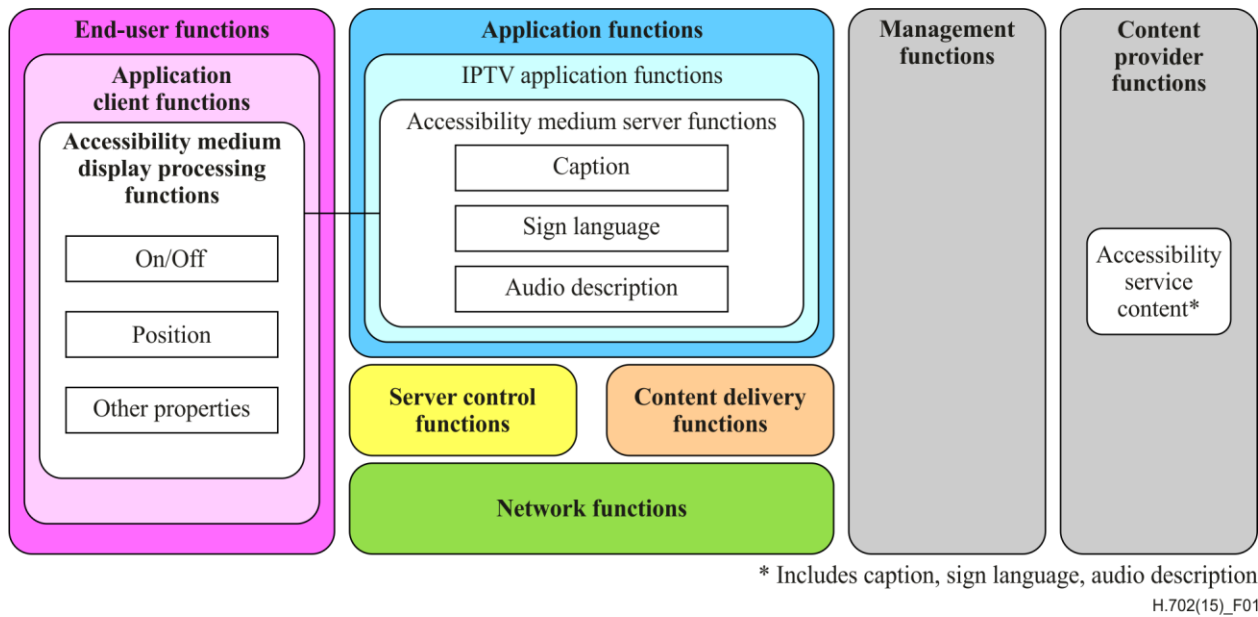


Figure 1 – Functional blocks of accessibility service

It is expected that application client functions be implemented by multimedia application frameworks such as ITU-T H.760, Ginga-NCL [ITU-T H.761], LIME [ITU-T H.762], ITU-T H.763.1, ITU-T H.764 and ITU-T H.765. An example described with LIME is given in Appendix I.

7.3 Required functions

This Recommendation organizes the functions that satisfy the following four general requirements and divides these functions into the following four components to define the profiles:

- 1) ITA is recommended to support synchronization of streams in accessibility medium (e.g., caption, sign language, audio description) with the main video content.
- 2) ITA is recommended to support optionality of accessibility information (e.g., to turn on/off displaying).
- 3) ITA is recommended to support changes in media positioning (e.g., to change the position of caption and sign language, or to change the spatial location of audio description).
- 4) ITA is recommended to support changes in media properties (e.g., audio volume, text scrolling, font size, font colour, video frame rate).

A requirement that recommends ITA to support personalized profiles according to user preferences and letting the user choose among the functionalities of the supported profile is for future study.

The capabilities of caption, sign language and audio description are described in Table 1.

NOTE – Audio captioning is implemented by using audio description.

Table 1 – Capabilities of caption, sign language and audio description

Accessibility medium	Capabilities
Caption	Turn on/off overlaid caption
	Change the direction of displaying text between horizontal and vertical
	Change the transition effect of the caption text between cut and scroll
	Select from multiple captions

Table 1 – Capabilities of caption, sign language and audio description

Accessibility medium	Capabilities
	Change font size of the caption text
	Change font style of the caption text
	Change font colour of the caption text
	Change caption position from overlaid (on-screen) or off-screen
	Change the background colour of caption box
	Change the size of caption box
	Synchronize caption with video
	Synchronize caption with the main video during the playback mode including slow motion
	Automatically generate multiple captions with speech recognition
	Display caption to different display devices
	Change display speed of the caption text
	Hold the language setting of a caption when multiple captions are supported (Function of holding the language setting. When a user changes channels, the user can get the same language caption as in the previous channel)
Sign language	Turn on/off overlaid sign language
	Select from multiple sign languages
	Change video size of sign language
	Change video position of sign language
	Change the background colour of sign language video
	Synchronize sign language video with the main video
	Synchronize sign language video with the main video during the playback mode including slow motion
	Automatically generate synthesized sign language interpretation
	Avoid covering important information of original main video with sign language video
	Hold the language setting of sign language when multiple sign languages are supported
	Turn on/off audio description
Audio description	Synchronize audio description with the main video
	Adjust volume of audio description
	Adjust sound quality of audio description
	Synchronize audio description with the main video during the playback mode including slow motion
	Avoid interfering original main audio with audio description
	Select from multiple audio descriptions
	Hold the language setting of audio description when multiple audio descriptions are supported
	Read letters and description of button on the screen

These functions are recommended to be implemented separately, as well as in combination (e.g., caption and sign language).

8 Profiles

As it is difficult to implement all the functions described in the previous clause at once, this Recommendation defines profiles. To achieve the required functions of these profiles, both terminal and transmitting devices that send accessibility information (e.g., captions) need to meet the requirements of each profile.

- a) **Basic profile:** Supports only the closed-captioning function. With an ITA that implements this profile, a user can display captions overlaid on the main video. A user can select a caption from multiple captions (e.g., select French caption from English and French captions). A user can switch a display direction of caption text between horizontal and vertical and can change the transition effect of the caption text between cut and scroll. A user can change font size, font colour, position of caption text, as well as the background colour and size of its caption box, where appropriate.
- b) **Enhanced profile:** In addition to the functions of the Basic profile, a user can change font style of caption text. When changing channels, ITA holds the language setting of caption (e.g., when a French caption has been selected, even when a user changes the channel, the caption language remains French). This profile includes sign language and audio description functions too. With an ITA that implements this profile, a user can display sign language overlaid on the main video. A user can select sign language from multiple sign languages (e.g., select French sign language from English and French sign languages). A user can change size and position of sign language. This profile allows users to play audio description along with the main video. A user can adjust the volume of audio description and can select audio description from multiple audio descriptions. This profile includes the functions of information accessibility for real-time transmitting video, but does not include strict synchronization.
- c) **Main profile:** In addition to the functions of Enhanced profile, this profile includes the function of adding accessibility information to the recorded and on-demand video, even when the original video is fast-forwarded or rewound. ITA that implements this profile can display caption, sign language and audio description synchronized with the main video. When the main video is paused, caption, sign language and audio description are paused too. The ITA can hold sign language and audio description settings.

8.1 Details of profiles

This clause describes the required specifications of each profile.

8.1.1 Basic profile

8.1.1.1 It is required that the basic accessibility profile for IPTV system can turn on and off overlaid captions. (R-1)

8.1.1.2 It is required that the basic accessibility profile for IPTV system can change the direction of displaying text between horizontal and vertical. (R-2)

8.1.1.3 It is required that the basic accessibility profile for IPTV system can change the transition effect of the caption text between cut and scroll (and bidirectional) (R-3)

8.1.1.4 It is required that the basic accessibility profile for IPTV system can select from multiple captions. (R-4)

8.1.1.5 It is required that the basic accessibility profile for IPTV system can change font size of the caption text. (R-5)

8.1.1.6 It is required that the basic accessibility profile for IPTV system can change font colour of the caption text. (R-6)

- 8.1.1.7** It is required that the basic accessibility profile for IPTV system can change caption position of the caption text. (R-7)
- 8.1.1.8** It is required that the basic accessibility profile for IPTV system can change the background colour of caption box. (R-8)
- 8.1.1.9** It is required that the basic accessibility profile for IPTV system can change the size of background box. (R-9)
- 8.1.1.10** Basic accessibility profile for IPTV system can optionally change font style of the caption text. (OR-1)
- 8.1.1.11** Basic accessibility profile for IPTV system can optionally hold the language setting of captions when multiple captions are supported. (Function of holding the language setting. When a user changes channels, the user can get the same language caption as in the previous channel). (OR-2)
- 8.1.1.12** Basic accessibility profile for IPTV system can optionally synchronize captions with video. (OR-3)
- 8.1.1.13** Basic accessibility profile for IPTV system can optionally synchronize captions with the main video during the playback mode, including slow motion. (OR-4)
- 8.1.1.14** Basic accessibility profile for IPTV system can optionally automatically generate multiple captions with speech recognition. (OR-5)
- 8.1.1.15** Basic accessibility profile for IPTV system can optionally display captions to different display devices. (OR-6)
- 8.1.1.16** Basic accessibility profile for IPTV system can optionally change display speed. (OR-7)
- 8.1.1.17** Basic accessibility profile for IPTV system can optionally turn on/off overlaid sign language. (OR-8)
- 8.1.1.18** Basic accessibility profile for IPTV system can optionally select from multiple sign languages. (OR-9)
- 8.1.1.19** Basic accessibility profile for IPTV system can optionally change video size of sign language. (OR-10)
- 8.1.1.20** Basic accessibility profile for IPTV system can optionally change video position of sign language. (OR-11)
- 8.1.1.21** Basic accessibility profile for IPTV system can optionally synchronize sign language video with the main video during the playback mode, including slow motion. (OR-12)
- 8.1.1.22** Basic accessibility profile for IPTV system can optionally hold the language setting of sign language when multiple sign languages are supported. (OR-13)
- 8.1.1.23** Basic accessibility profile for IPTV system can optionally change the background colour of sign language video. (OR-14)
- 8.1.1.24** Basic accessibility profile for IPTV system can optionally automatically generate synthesized sign language interpretation. (OR-15)
- 8.1.1.25** Basic accessibility profile for IPTV system can optionally avoid covering important information of original main video with sign language video. (OR-16)
- 8.1.1.26** Basic accessibility profile for IPTV system can optionally turn on/off audio description. (OR-17)
- 8.1.1.27** Basic accessibility profile for IPTV system can optionally adjust volume of audio description. (OR-18)

- 8.1.1.28** Basic accessibility profile for IPTV system can optionally read letters and description of button on the screen. (OR-19)
- 8.1.1.29** Basic accessibility profile for IPTV system can optionally select from multiple audio descriptions. (OR-20)
- 8.1.1.30** Basic accessibility profile for IPTV system can optionally synchronize audio description with the main video during the playback mode, including slow motion. (OR-21)
- 8.1.1.31** Basic accessibility profile for IPTV system can optionally play in slow motion, pause-and-play. (OR-22)
- 8.1.1.32** Basic accessibility profile for IPTV system can optionally hold the language setting of audio description when multiple audio descriptions are supported. (OR-23)
- 8.1.1.33** Basic accessibility profile for IPTV system can optionally adjust sound quality of audio description. (OR-24)
- 8.1.1.34** Basic accessibility profile for IPTV system can optionally avoid interfering original main audio with audio description. (OR-25)

8.1.2 Enhanced profile

- 8.1.2.1** It is required that the Basic profile is a subset of the enhanced accessibility profile. (R-10)
- 8.1.2.2** It is required that the enhanced accessibility profile for IPTV system can change font style of the caption text. (R-11)
- 8.1.2.3** It is required that the enhanced accessibility profile for IPTV system can hold the language setting of caption when multiple captions are supported. (Function of holding the language setting. When a user changes channels, the user can get the same language caption as in the previous channel). (R-12)
- 8.1.2.4** It is required that the enhanced accessibility profile for IPTV system can turn on/off overlaid sign language. (R-13)
- 8.1.2.5** It is required that the enhanced accessibility profile for IPTV system can select from multiple sign languages. (R-14)
- 8.1.2.6** It is required that the enhanced accessibility profile for IPTV system can change video size of sign language. (R-15)
- 8.1.2.7** It is required that the enhanced accessibility profile for IPTV system can change video position of sign language. (R-16)
- 8.1.2.8** It is required that the enhanced accessibility profile for IPTV system can turn on/off audio description. (R-17)
- 8.1.2.9** It is required that the enhanced accessibility profile for IPTV system can adjust volume of audio description. (R-18)
- 8.1.2.10** It is required that the enhanced accessibility profile for IPTV system can read letters and description of button on the screen. (R-19)
- 8.1.2.11** It is required that the enhanced accessibility profile for IPTV system can select from multiple audio descriptions. (R-20)

8.1.3 Main profile

- 8.1.3.1** It is required that the Enhanced profile is subset of the main accessibility profile. (R-21)
- 8.1.3.2** It is required that the main accessibility profile for IPTV system can synchronize captions with video. (R-22)

8.1.3.3 It is required that the main accessibility profile for IPTV system can synchronize caption with the main video during the playback mode, including slow motion. (R-23)

8.1.3.4 It is required that the main accessibility profile for IPTV system synchronize sign language video with the main video during the playback mode, including slow motion. (R-24)

8.1.3.5 It is required that the main accessibility profile for IPTV system hold the language setting of sign language when multiple sign languages are supported. (R-25)

8.1.3.6 It is required that the main accessibility profile for IPTV system synchronize audio description with the main video during the playback mode, including slow motion. (R-26)

8.1.3.7 It is required that the main accessibility profile for IPTV system play in slow motion, pause-and-play. (R-27)

8.1.3.8 It is required that the main accessibility profile for IPTV system hold the language setting of audio description when multiple audio descriptions are supported. (R-28)

8.1.3.9 It is required that the main accessibility profile for IPTV system adjust sound quality of audio description. (R-29)

Table 2 contains a summary of the above requirements.

Table 2 – Capabilities of profiles

Accessibility medium	Capabilities	Basic profile	Enhanced profile	Main profile
Caption	Turn on/off overlaid caption (R-1)	R	R	R
	Change the direction of displaying text between horizontal and vertical (R-2)	OR	R	R
	Change the transition effect of the caption text between cut and scroll (and bidirectional) (R-3)	OR	R	R
	Select from multiple captions (R-4)	R	R	R
	Change font size of the caption text (R-5)	R	R	R
	Change font colour of the caption text (R-6)	R	R	R
	Change caption position of the caption text (R-7)	R	R	R
	Change the background colour of caption box (R-8)	R	R	R
	Change the size of background box (R-9)	R	R	R
	Change font style of the caption text (OR-1) (R-11)	OR	R	R
	Hold the language setting of captions when multiple captions are supported (Function of holding the language setting. When a user changes channels, the user can get the same language caption as in the previous channel) (OR-2) (R-12)	OR	R	R
	Synchronize captions with video (OR-3) (R-22)	OR	OR	R
	Synchronize caption with the main video during the playback mode including slow motion (OR-4) (R-23)	OR	OR	R
	Automatically generate multiple captions with speech recognition (OR-5)	OR	OR	OR
	Display caption to different display devices (OR-6)	OR	OR	OR
	Change display speed (OR-7)	OR	OR	OR

Table 2 – Capabilities of profiles

Accessibility medium	Capabilities	Basic profile	Enhanced profile	Main profile
Sign language	Turn on/off overlaid sign language (OR-8) (R-13)	OR	R	R
	Select from multiple sign languages (OR-9) (R-14)	OR	R	R
	Change video size of sign language (OR-10) (R-15)	OR	R	R
	Change video position of sign language (OR-11) (R-16)	OR	R	R
	Synchronize sign language video with the main video during the playback mode including slow motion (OR-12) (R-24)	OR	OR	R
	Hold the language setting of sign language when multiple sign languages are supported (OR-13) (R-25)	OR	OR	R
	Change the background colour of sign language video (OR-14)	OR	OR	OR
	Automatically generate synthesized sign language interpretation (OR-15)	OR	OR	OR
	Avoid covering important information of original main video with sign language video (OR-16)	OR	OR	OR
Audio description	Turn on/off audio description (OR-17) (R-17)	OR	R	R
	Adjust volume of audio description (OR-18) (R-18)	OR	R	R
	Read letters and description of button on the screen (OR-19) (R-19)	OR	R	R
	Select from multiple audio descriptions (OR-20) (R-20)	OR	R	R
	Synchronize audio description with the main video during the playback mode including slow motion (OR-21) (R-26)	OR	OR	R
	Play in slow motion, pause-and-play (OR-22) (R-27)	OR	OR	R
	Hold the language setting of audio description when multiple audio descriptions are supported (OR-23) (R-28)	O	O	R
	Adjust sound quality of audio description (OR-24) (R-29)	O	O	R
	Avoid interfering original main audio with audio description (OR-25)	O	O	O
NOTE – "R" is mandatory requirement. "O" is optional requirement.				

8.2 Requirement for transmitting device

It is recommended that the transmitting device transmits accessibility information according to the information provided by the terminal device and stores all accessibility information of contents on server.

Appendix I

An implementation method with ITU-T H.762

(This appendix does not form an integral part of this Recommendation.)

This clause shows a practical implementation method with [ITU-T H.762].

I.1 Terminal device

I.1.1 Basic profile

Category	Capabilities	Comment
Caption	Turn on/off overlaid caption	Turning on/off overlaid caption is implemented by changing cascading style sheets (CSS). As a prerequisite to retrieve caption, there should be a program server that returns program ID according to channel number and current time, and a caption server that saves the combination of caption ID, caption and program ID. Caption information will be added sequentially during live streaming programs. When programs on the air are changed unexpectedly, the program ID included in the caption information from the caption server needs to change, and then the captions of new programs will start to display at the next retrieving.
	Change the direction of displaying text between horizontal and vertical	Implemented by writing the corresponded enterprise content management (ecm) program to each of them.
	Select from multiple captions	Implemented by changing the transmitting program ID during hypertext transfer protocol (HTTP) communication for retrieving caption.
	Change font size of the caption text	Implemented by CSS and document object model (DOM) after retrieving caption. Switch CSS from {font-size: 10px} to {font-size: 20px}.
	Change font colour of the caption text	Implemented by changing CSS after retrieving caption. Switch CSS from {color-index: 7} to {color-index: 0}.
	Change caption position of the caption text	Implemented by changing CSS after retrieving caption. Switch CSS from {top: 0px; left: 0px} to {top: 100px; left: 100px}.
	Change the background colour of caption box	Implemented by changing CSS after retrieving caption. Switch CSS from {backgroundcolor-index: 7} to {backgroundcolor-index: 0}.
	Change the size of background box	Implemented by changing CSS after retrieving caption. Switch background div box's CSS from {width: 100px; height: 30px} to {width: 200px; height: 60px}.

I.1.2 Enhanced Profile

Category	Capabilities	Comment
Sign language	Turn on/off overlaid sign language	<p>Sign language video can be retrieved by adding the lines below to live streaming video source address of the sign language video.</p> <p>In the following example, <u>video source</u> specifies the URL of the video source.</p> <pre><object id="video" type="application/X-arib-mpeg2-tts" data="<u>video source</u>" style="top:0px;left:0px;width:960px; height:540px;" /></pre>
	Select from multiple sign languages	<p>Implement by changing retrieved video source of sign language.</p> <p>Example:</p> <p>In the following example, <u>video source</u> specifies the URL of the video source.</p> <pre><object id="video" type="application/X-arib-mpeg2-tts" data="<u>video source</u>" style="top:0px;left:0px;width:960px;:540px;" /></pre> <p>In case of selecting another sign language, change the video source.</p>
	Change video size of sign language	<p>Implement by changing CSS.</p> <p>Switch video object's CSS from {width:960px; height:540px} to {width:480px; height:270px}.</p>
	Change video position of sign language	<p>Implement by changing CSS.</p> <p>Switch video object's CSS from {top:0px; left:0px} to {top:100px; left:100px}.</p>
Audio descriptions	Turn on/off audio description	<p>Audio description can be retrieved by adding the following lines below to live streaming source address of the audio description.</p> <pre><object id="audio" type="audio/X-arib-aiff " data=" video source &protocol= protocol style="top:0px;left:0px;width:960px;height:540px;" /></pre> <p>Audio description may be overlaid with the main streamed audio.</p>
	Read letters and description of button on the screen	<p>This function can be implemented by using audio file.</p> <pre><div> <object id="5" class="button" type="image/X-arib-png" data="button <u>image file</u> " style="top:30px; nav-index:2;nav-up:1;nav-down:3;" onfocus="focus();" /> <object class="button" id="id" data="<u>audio file</u>" type="audio/X-arib-aiff" streamstatus="" /> </div></pre> <p>When focused to this button image, switch 'streamstatus' to 'start'.</p>

I.1.3 Main Profile

Category	Capabilities	Comment
Caption	Synchronize captions with video	In the case of [ITU-T H.762], in order to support this function, the following conditions need to be implemented: (1) The stream position of the video, as obtained by 'streamPosition()', needs to be returned when 'streamStatus' is 'play'. (2) The caption information from the transmitting device is required to return the corresponding time to be synchronized.
	Play in slow motion	In order to support this function, there is a need to support on head end (HE) side.
	Pause-and-play	In the case of [ITU-T H.762], this function can be implemented by using 'streamPosition()' and 'streamStatus'.
Sign language	Synchronize sign language with video	In the case of [ITU-T H.762], in order to support this function, the following conditions need to be implemented: (1) The stream position of the video, as obtained by 'streamPosition()', needs to be returned when 'streamStatus' is 'play'. (2) The sign language information from the transmitting device is required to return the corresponding time to be synchronized.
	Play in slow motion	In order to support this function, support is required on the server side.
Audio descriptions	Synchronize audio description with video	In the case of [ITU-T H.762], in order to support this function, the following conditions need to be implemented: (1) The stream position of the video, as obtained by 'streamPosition()', needs to be returned when 'streamStatus' is 'play'. (2) The audio description information from the transmitting device is required to return the corresponding time to be synchronized.
	Play in slow motion,	In order to support this function, support is required on the HE side.

Appendix II

Accessibility medium flow to ITA

(This appendix does not form an integral part of this Recommendation.)

Figure II.1 shows accessibility medium flow to ITA. In Figure II.1, case 1 shows that accessibility information, such as caption, sign language and audio description is multiplexed at the IPTV HE. Case 2 shows that accessibility information made by a third party is transmitted over IP to ITA, and then accessibility services are opened with Linear TV or video on demand (VOD) contents upon user selection. Some accessibility information is made simultaneously with audiovisual content. Others are made and stored in IPTV HE in advance.

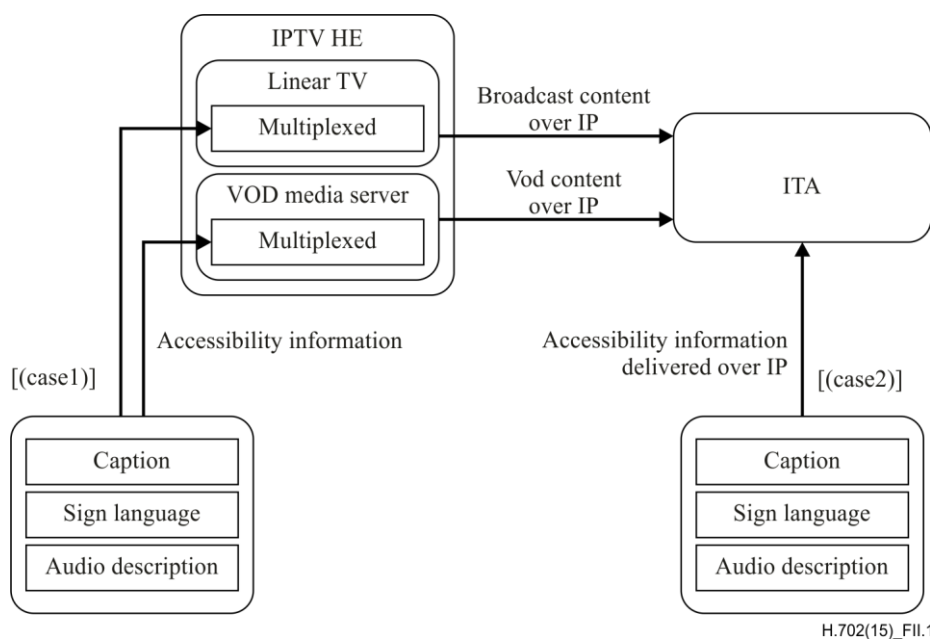


Figure II.1 – Accessibility medium flow to ITA

In case 2, retrieving caption information is, in practice, implemented via an HTTP connection to the caption transmitting server.

As a prerequisite to retrieve captions, there should be program server, which returns program ID according to channel number and current time, and a caption server, which saves the combination of caption ID, caption and program ID.

Caption information will be added sequentially during live streaming programs.

Retrieving caption information is, in practice, implemented via an HTTP connection to the caption transmitting server.

When displaying caption information, in practice, buffering is needed to retrieve captions and to display them sequentially.

Bibliography

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