Commercial Requirements for signalling of Accessibility Services in DVB

DVB Document C102

September 2022

Intellectual Property Rights

Please refer to the IPR policy of DVB Project available at: https://dvb.org/about/policies-procedures/

Foreword

DVB is an industry-led consortium of broadcasters, manufacturers, network operators, software developers, regulators and others from around the world committed to designing open, interoperable technical specifications for the global delivery of digital media and broadcast services. DVB specifications cover all aspects of digital television from transmission through interfacing, conditional access and interactivity for digital video, audio and data. DVB dominates the digital broadcasting environment with thousands of broadcast services around the world using DVB specifications. There are hundreds of manufacturers offering DVB-compliant equipment. To date, there are over 1 billion DVB receivers shipped worldwide.

Executive summary

The present document provides Commercial Requirements for an extension and revision of the DVB-SI, DVB-I and DVB-DASH specifications with regards to the signalling of accessibility services. Extended handling of accessibility features in HbbTV specifications will benefit from a complementary treatment on the DVB signalling side. In addition to this, a study of the named DVB specifications in their current version has revealed opportunities to improve consistency in terminology and fill gaps in signalling options.

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1. Introduction

The inclusion of signalling to denote availability of accessibility services has been an important part of DVB standards since their origin, but awareness of the importance of these services has increased over recent years. Furthermore, the EU has released its directive 2019/882 “on the accessibility requirements for products and services”.

In this context, it is important not only that accessibility services are available, but also that there are easy and transparent ways to discover and access them.

Standardisation work within the HbbTV Association (“HbbTV Accessibility Framework” – see below) has triggered DVB to consider signalling of HbbTV accessibility services and to re-visit the current accessibility signalling within DVB-SI and DVB-I.

These aspects have been covered by an initial report which has been prepared by a Taskforce of DVB CM-AVC and CM-I groups. In this report the current state of the art for signalling of such service features is assessed and some potential gaps are identified. Recommendations are made for ongoing work for consideration by the DVB Commercial Module.

1.1. Scope of the work on accessibility signalling

The work proposal on accessibility signalling (CM2130) which was approved by the DVB-CM sets the following scope which is quoted here for information:

Investigate and characterise any additional commercial requirements for solutions that:

- *Enable the availability of additional accessibility services to be signalled to viewers, where these services are available via the broadcaster’s HbbTV application of the corresponding broadcast service (e.g. when navigating a SI or DVB-I based channel list or EPG) or allow filtering for such services.*

- *Enable availability of accessibility services to be signalled in a DVB-I EPG, where these are available in DVB TS or DVB-DASH delivered linear services, reviewing and extending existing provision as appropriate.*

- *Enable availability of accessibility services to be signalled in a DVB SI EPG, where these are available in DVB TS broadcast delivered linear services, reviewing and extending existing provision as appropriate.*

- *Enable greater consistency of accessibility service operation and experience across broadcaster streamed VOD (HbbTV), streamed linear (DVB-I DVB-DASH) and traditional broadcast services, including consideration of any opportunity to achieve consistency of approach with the HbbTV Accessibility Framework for service provisioning based on terminal capabilities and user preferences.*

1.2. Scope of the HbbTV Accessibility Framework

The HbbTV Association has been extending their standard with an "Accessibility Framework" which they describe in a liaison letter dated 15th October 2021 to DVB as follows:

> "The core aim of this Accessibility Framework is to provide interfaces allowing better interoperability between accessibility features and related settings on the terminal side and such features implemented by the service provider within HbbTV applications. The main functionality of those interfaces is
>
> • to allow HbbTV applications to read accessibility preferences the user has set on the terminal level in order to activate and configure accessibility features on the HbbTV application level
>
> • to allow HbbTV applications to see which capabilities are available on the terminal side
>
> • to allow HbbTV applications asking the terminal to deactivate its accessibility features where the HbbTV application can offer such features in a better way (which the terminal may deny)"

The following accessibility features are covered by HbbTV in their framework:

Accessibility Feature
Subtitles
Dialogue Enhancement
Magnification UI
High Contrast UI
Screen Reader
Response to a User Action
Audio Description
In Vision Sign Language

In its liaison letter, HbbTV suggests that DVB might complement their work by enhancing DVB standards in a way that "DVB services could signal the availability of related HbbTV applications providing accessibility features". Thus, terminals could indicate such services by symbols or the like in their service list GUIs or could even allow to filter for such services. … If DVB would take up this approach, as a result, the HbbTV Accessibility Framework would be fully supported by DVB to provide a maximum level of interoperability between terminal and application behaviour."

1.3. Findings of the initial report on accessibility signalling

The initial report on accessibility signalling (CM2136r1) has been prepared by a Taskforce of DVB CM-AVC and CM-I groups in March/April 2022. Its main findings & conclusions are listed below.

1.3.1. Findings & conclusions related to DVB-SI

One fundamental issue with the SI specification is an inconsistency in terminology of accessibility features and their details. These inconsistencies need to be resolved to enable a proper analysis of the overall consistency and completeness of signalling options.

Both aspects should be addressed by a clarification of terminology and subsequent check of overall consistency and completeness of signalling options. A gap analysis should be undertaken.

Critical gaps for achieving the objective must be closed in a new version of the DVB SI specification and/or guideline document.

1.3.1. Findings & conclusions related to DVB-I

Excerpts of the DVB-I specification listed in the report show that the relevant specifications have inconsistencies between the levels “content guide” – “service list” – “manifest” with regards to terminology (e.g. “subtitles” vs “captions”) and also with regards to the accessibility features covered (e.g. “signer” only addressed on the guide level).

Also on the same level, there are inconsistencies due to terminology between features covered by different encoding technologies and even errors for format agnostic signalling (“audio description” vs “dialogue enhancement”).

Clarification of terminology should be undertaken and on that basis consistent tables for the format agnostic mpd signalling should be developed containing all relevant features.

Further, in DVB-I there is no signalling defined for the use case of Dialogue Enhancement or Clean Audio.

1.3.1. Findings & conclusions related to HbbTV

There are no means provided by any DVB-SI/DVB-I signalling today which would allow the signalling in DVB-SI/DVB-I of accessibility features provided within HbbTV applications for use alongside the linear programmes or On Demand offerings in DVB-I.

2. References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, DVB cannot guarantee their long-term validity.

[1]	ETSI TS 103 777	Digital Video Broadcasting (DVB); Service Discovery and Programme Metadata for DVB-I
[2]	ITU-R Recommendation BT.2100-1 (06/2017)	Image parameter values for high dynamic range television for use in production and international programme exchange
[3]	DVB CM-AVC0413r3	CM-AVC Study Mission Report; “HDR Enhancements to DVB UHD-1 Phase 2”
[4]	HbbTV v2.0.4	Not yet published
[5]		

3. Definitions and conventions

3.1. Terms

For the purposes of the present document, the following terms apply:

3.2. Abbreviations

For the purposes of the present document, the following abbreviations apply:

DVB CM	DVB Commercial Module
DVB TM	DVB Technical Module

3.3. Conventions

Commercial Requirement tagging scheme:

Req x. [y].z.	Name	Status	Priority	Use case
Numeric requirement ref. x = section y = subsection(s) z = sequence number This is a unique id within the document that could be used to refer to a requirement within a specific version of this document. Note that this id. is not strictly coupled to the particular requirement, could vary across different versions of this document		This status field can have the following states: **Draft** = work in progress **Complete** = completed and agreed in task force **Agreed** = agreed within CM-AVC/CM-I **Accepted** = accepted by CM	This field is the associated priority set by the CM to the requirement. 1➔ Must have 2➔ Recommended to have 3➔ Nice to have	Identifies the use cases that relate to this commercial requirement, if applicable. [UC]

For the purpose of this document, the following normative conventions are used in the Commercial Requirements text:

Convention	Meaning
shall enable	The functionality shall be specified but its support is optional.
shall support	The functionality shall be specified and its support is mandatory.
should enable	The functionality is recommended to be specified and its support is optional.
should support	The functionality is recommended to be specified and supported.
may enable	The functionality may be specified and if it is then its support is optional, and it shall not have any weight in the selection or exclusion of any particular solution.
may support	The functionality may be specified and if it is then its support is recommended but it shall not have any weight in the selection or exclusion of any particular solution.
shall not preclude	The functionality shall not be prevented.
should not preclude	It is recommended not to prevent the functionality.

4. Commercial requirements

4.1. Overview (informative)

4.2-1 to 4.2-3 for DVB-I scenarios		
4.2-1	Accessibility via corresponding HbbTV app	
4.2-2	Accessibility via DVB-DASH service instance	
4.2-3	Accessibility via DVB-C/T2/S2 service instance	

4.2-4 to 4.2-5 for DVB C/T2/S2 scenarios		
4.2-4	Accessibility via corresponding HbbTV app	
4.2-5	Accessibility via DVB-C/T2/S2 service	

Other		
4.2-6	accessibility signalling in DVB DASH scenario	
4.2-7 to 4.2-12	additional signalling requirements	
4.3-1	timeline requirements	
4.4-1 to 4.4-2	V&V requirements	

4.2. Technology requirements (normative)

Req 4.2-1	Signalling in DVB-I for HbbTV accessibility services	Complete	1	UC1&2

DVB-I signalling [ETSI TS103770] shall include individual indication for availability of each of the following accessibility features via a corresponding HbbTV application:

Accessibility Feature
Subtitles
Dialogue Enhancement
Magnification UI
High Contrast UI
Screen Reader
Response to a User Action
Audio Description
In Vision Sign Language

Note: This is intended to enable DVB-I receivers to identify the availability of additional accessibility services provided by the broadcaster's HbbTV application.

Note: This set of features is described by the HbbTV accessibility framework defined in [4].

Req 4.2-2	Signalling in DVB-I for linear broadcast accessibility services	Complete	1	UC1&2

DVB-I signalling [ETSI TS103770] shall include individual indication for availability of each of the accessibility features listed in the Reference List according to Req 4.2-11 and transported via DVB-TS streams.

Note: This is intended to enable DVB-I receivers to identify the availability of accessibility services provided by the broadcaster's broadcast service instance.

Note: The listed features may be provided in different languages.

Req 4.2-3	Signalling in DVB-I for linear broadband accessibility services	Complete	1	UC1&2

DVB-I signalling [ETSI TS103770] shall include individual indication for availability of each of the accessibility features listed in the Reference List according to Req 4.2-11 and transported via DVB-DASH streams.

Note: This is intended to enable DVB-I receivers to identify the availability of accessibility services provided by the broadcaster's broadband service instance.

Note: The listed features may be provided in different languages.

Req 4.2-4	Signalling in DVB-SI for HbbTV accessibility services	Complete	1	UC1&2

DVB-SI signalling [ETSI EN300468] shall include individual indication for availability of each of the following accessibility features via a corresponding HbbTV application:

Accessibility Feature
Subtitles
Dialogue Enhancement
Magnification UI
High Contrast UI
Screen Reader
Response to a User Action
Audio Description
In Vision Sign Language

Note: This is intended to enable DVB-C/T2/S2 receivers to identify the availability of additional accessibility services provided by the broadcaster's HbbTV application corresponding to the broadcast service.

Note: This set of features is described by the HbbTV accessibility framework defined in [4].

Req 4.2-5	Signalling in DVB-SI for linear broadcast accessibility services	Complete	1	UC1&2

DVB-SI signalling [ETSI EN300468] shall include individual indication for availability of each of the accessibility features listed in the Reference List according to Req 4.2-11 and transported via DVB-TS streams.

Note: This is intended to enable DVB-C/T2/S2 receivers to identify the availability of accessibility services provided by the broadcaster's linear broadcast transmission.

Note: The listed features may be provided in different languages.

Req 4.2-6	Signalling in DVB-DASH for linear broadband accessibility services	Complete	1	UC1&2
DVB-DASH signalling [ETSI TS103285] shall include individual indication for availability of each of the accessibility features listed in the Reference List according to Req 4.2-11 and transported via DVB-DASH streams. Note: This is intended to enable DVB-DASH receivers to identify the availability of accessibility services provided by the broadcaster's linear broadband transmission. Note: The listed features may be provided in different languages.				

Req 4.2-7	Consistency of accessibility signalling	Complete	1	UC1&2
The signalling required by Req 4.2-1 to Req 4.2-6 shall be format agnostic and mappings for format specific signalling (within DASH manifests or existing specific DVB-SI signalling) shall be available (broken mappings shall be fixed and missing mappings shall be defined). This is to ensure consistent definition of accessibility features within existing DVB signalling specifications. Observed terminology issues shall be fixed in underlying DVB specifications (i.e., DVB-SI Guidelines, DVB DASH and AVC specification, TV Anytime).				

Req 4.2-8	Service and event based signalling	Complete	1	UC1&2
The signalling required by Req 4.2-1 to Req 4.2-6 shall support both quasi-static signalling on a service level and signalling on an event level.				

Req 4.2-9	Backwards compatibility	Complete	1	UC1&2
New signalling required by Req 4.2-1 to Req 4.2-6 shall be added to revised DVB specifications in a backwards compatible way such that it doesn't impact existing IRDs.				

Req 4.2-10	Extensibility	Complete	1	UC1&2
The signalling required by Req 4.2-1 to Req 4.2-6 shall allow for future additions to the specified accessibility features list.				

Req 4.2-11	Reference list of Accessibility Features supported by DVB	Complete	1	UC1&2
A reference list of accessibility features shall be created denoting where existing DVB specifications support carriage in DVB-TS or DVB-DASH streams and provide signalling. This definition shall • include consistent terminology which can be applied across all DVB specifications • include detailed parameters which are relevant for the respective features • be independent from the technologies used to implement them • be independent from the technical transmission framework (DVB-Broadcast, DVB-I, …) • include all of the features addressed by the HbbTV Accessibility Framework • consider alignment with ETSI work on accessibility Note: This list may be provided in a separate document or annex.				

Req 4.2-12	Service discovery based on accessibility features.	Complete	1	UC1&2
The signalling required by Req 4.2-1 to Req 4.2-6 shall allow IRDs to discover services based on the accessibility features offered.				

4.3. Timeline requirements

Req 4.3-1	Timing for publication	Complete	1	NA
Updated specifications should be published within 12 months of approval of CRs.				

4.4. V&V requirements

Req 4.4-1	Test streams containing signalling	Complete	1	NA
MPEG2-TS and DVB-DASH test streams shall be created to exercise all new signalling defined (e.g. DVB-SI, DASH MPD) in order to meet the Reqs 4.2-4, 4.2-5 and 4.2-6 These streams shall include both service and event based signalling in order to meet Req 4.2-8				

Req 4.4-2	DVB-I metadata	Complete	1	NA
DVB-I service list and content guide metadata shall be created to exercise all new signalling defined in order to meet the Reqs 4.2-1, 4.2-2 and 4.2-3. These streams shall include both service and event based signalling in order to meet Req 4.2-8. Such metadata shall reference the test streams created on the basis of Req 4.3-1				

5. Expected technical work

5.1. Impact on existing specifications or need for new ones

All specification work to be done based on the commercial requirements in this document is well covered by the scope of current DVB-SI, DVB-I and DVB-DASH specifications. Therefore no new specifications will be needed.

The impact on the named existing specifications will be:

- Existing specification elements and related text will have to be revised or extended or equipped with additional notes to solve consistency issues or fix errors
- Additional specification elements will be needed to close gaps which have been identified in the process of having a set of accessibility features consistent across DVB specifications
- Additional specification elements will be needed to add signalling options for accessibility features delivered via HbbTV

6. Annex: Use cases (informative)

Tables below outline two informative example use-cases.

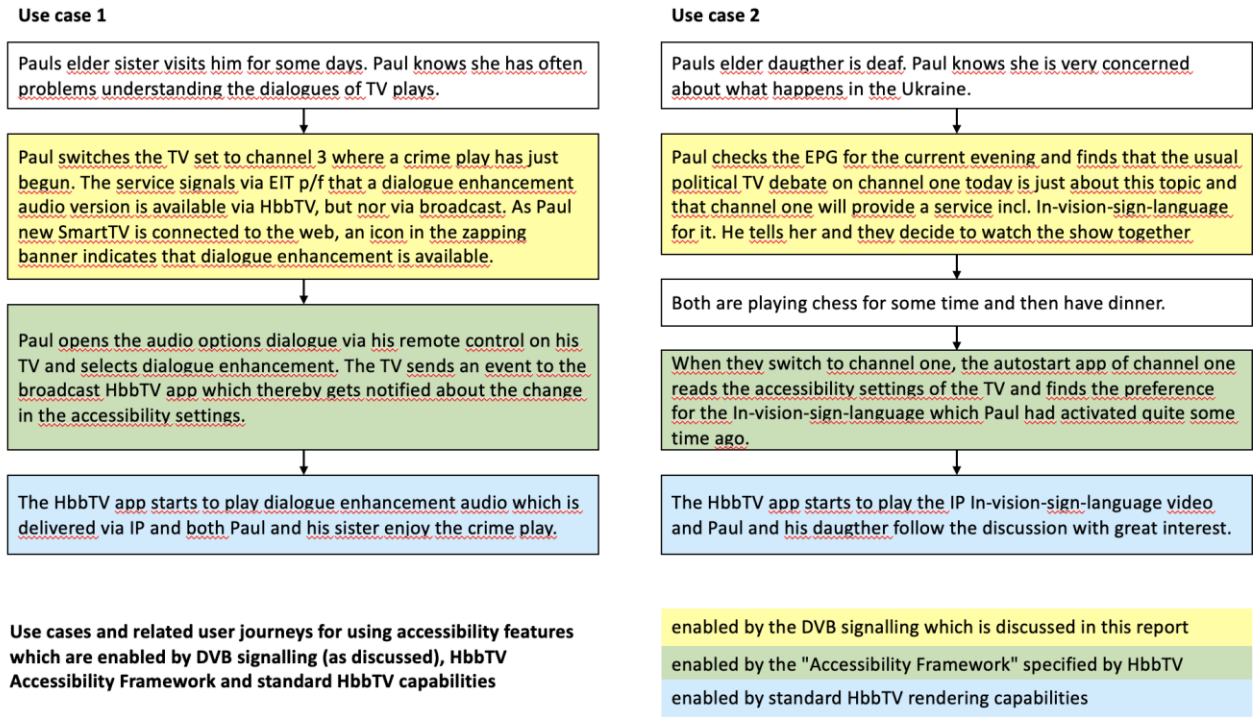
6.1. Use case 1 [Dialogue Enhancement]

Use Case Title	Dialogue Enhancement
Description	Paul's elder sister visits him for some days. Paul knows she often has problems understanding the dialogue of TV plays and wants to activate the accessibility service including dialogue enhancement that is provided for this program via HbbTV.
Pre-Conditions	• Paul switches the TV set to channel 3 where a crime play has just begun. • The service signals via EIT p/f that an audio version including dialogue enhancement is available via HbbTV, but not via broadcast. • As Paul new SmartTV is connected to the web, an icon in the zapping banner indicates that dialogue enhancement is available.
Extracted draft commercial requirements	The specification shall enable new signalling in DVB SI to denote the availability of Dialogue Enhancement in an associated HbbTV service.

6.2. Use case 2 [In Vision Sign Language]

Use Case Title	In Vision Sign Language
Description	Paul's elder daughter is deaf. Paul knows she is very concerned about what happens in the Ukraine.
Pre-Conditions	• Paul checks the EPG for the current evening and finds that the usual political TV debate on channel one today is about this topic and that channel one will provide a signer service for it. • He tells her and they decide to watch the show together • (After spending time on something completely different) they switch to channel one, and the HbbTV autostart app of channel one reads the accessibility settings of the TV and finds the user preference persistently stored on the device for the in-vision-sign-language setting which Paul had activated quite some time ago.
Extracted draft commercial requirements	The specification shall enable new signalling in DVB SI to denote the availability of In Vision Sign Language in an associated HbbTV service.

Sequencial illustration for the two example use-cases:



7. History

Ref	Month Year	Milestone
C102	September 2022	BlueBook publication (Internal document CM2160r1)