

## Minimum Requirements for HbbTV 2-Receivers in the German Market

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#### Deutsche TV-Plattform e.V.

c/o ZVEI - Zentralverband Elektrotechnik- und Elektronikindustrie e.V. • Lyoner Str.9 • 60528 Frankfurt/M.  
 Fon: 069 6302-260 • Fax: 069 6302-361 • Mail: [mail@tv-plattform.de](mailto:mail@tv-plattform.de) • [www.tv-plattform.de](http://www.tv-plattform.de)  
 Vorsitzender des Vorstands: Andre Prahel • Geschäftsführerin: Carine Lea Chardon  
 Amtsgericht Frankfurt • VR-Nr. 73VR9797

# 1 Introduction and Scope

The purpose of this document is to specify the minimum requirements for HbbTV devices for the market introduction of HbbTV 2 in Germany. The technical profile described here will be the basis of a number of new services which are planned by German broadcasters starting 2019 in addition to existing HbbTV services based on previous HbbTV versions.

The following Minimum Requirements are very closely aligned with the HbbTV 2.0.1 standard. It fully bases on this standard and points to several specification elements of specific criticality. Furthermore, it addresses some implementation topics which are not fully specified in the standard. Finally, the aspect of testing applications and devices is covered.

## 2 HbbTV specification topics

### 2.1 HbbTV specification version

The basis for service and device developments for a new generation of SmartTVs and other reception devices based on HbbTV 2 shall be at least the HbbTV 2.0.1 standard (ETSI TS 102 796 V1.4.1)<sup>1</sup>. In detail, the reference is this ETSI version including the changes by the HbbTV association in the version “Errata 3”<sup>2</sup> as published by HbbTV on 2018-02-16, or a later Errata version.

A potential adoption of new versions of the HbbTV standard for device generations beyond 2020 will be discussed in the Deutsche TV Plattform (DTVP) in 2019.

### 2.2 Critical specification elements

This section points to elements of the standard which have appeared to be critical in the past with regards to service functionality and implementations status on the devices. Specific care should be applied when implementing these elements.

Testing options are described in section 4.

#### 2.2.1 Cookies / Webstorage

Cookies and web storage are crucial elements for many personalized services. Malfunctions usually cannot be detected by the application itself and can thus lead to very bad user experience. So, storage has to be implemented in a robust way, e.g. with data surviving zapping to other channels, switching the device to standby and a complete disconnection from the power supply. Rules for timely writing into persistent storage have been added in section 4.8.5 of “Errata 3”.

Web storage has to work properly also for applications which are loaded from DSM-CC object carousel, regardless from the TV being connected to the internet or not. Relevant clarifications related to the URL/domain definitions in this case have been made in section 4.4.5 of “Errata 3”.

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<sup>1</sup> [ETSI, “TS 102 796 V1.4.1 - Hybrid Broadcast Broadband TV,” 2016.](#)

<sup>2</sup> [HbbTV, “Errata 3 to TS 102 796 V1.4.1,” 2018.](#)

Please note: In order to achieve compliance with the General Data Protection Regulation (GDPR) broadcasters must be able to reliably control the lifecycle of cookies when providing broadcast related HbbTV applications, e.g. for implementing the so-called “right of erasure” aka the “right to be forgotten”.

Please refer to section 3.1 of this document for local storage availability issues.

### **2.2.2 DVB DASH**

DASH will de facto be the main basic standard for any service using advanced video streaming. The most important features used in the context of DASH streaming will be the following and therefore shall be supported:

- Livestreaming
- selection of audio tracks (based on listing and selection of audio components of both A/V control object and HTML5 media element)
- EBU-TT-D subtitling (including control options from the application side like for audio)
- for on demand and live streams: delivering the correct timeline to HbbTV apps and media synchroniser
- multi period DASH supporting one consistent timeline with a continuous playPosition over all periods (HbbTV specification / sections 9.4.2 and 9.4.3)
- for livestreams: using MPD anchors (HbbTV specification / section E.4.5) to jump back to specific points in time

### **2.2.3 DSM-CC stream events**

DSM-CC stream events are used for a number of subtitling services and shall be implemented in a proper way. If an HbbTV application is implemented in a way that it immediately upon receiving a stream event draws a preloaded image or starts a a pre-buffered video (when using the HTML5 media element and no codec change is required) then the rendering of the image or the first frame of the video should be done 0 to 200 ms after displaying the broadcast video frame with the PTS value PTS<sub>x</sub>. Here, PTS<sub>x</sub> is the first video PTS value equal or bigger than the broadcast TS' PCR value at the position, where the stream event was inserted. Registration of stream events shall be possible both via a dvb:// URL and via a XML file on a web server (sections 8.2.1.1 and 9.2 of the HbbTV specification).

DSM-CC stream event monitoring shall continue while presenting broadband-delivered A/V (section 6.2.2.7 of the HbbTV specification).

### **2.2.4 DSM-CC object carousel**

DSM-CC object carousels are currently used for services and their importance may increase due to different reasons, such as autostart load and data protection issues. An HbbTV app should be started and the initial GUI drawn after a maximum of two cycle times of all resources initially needed for the application start plus 500 msec if the initial HTML page links to all required GUI components and a JavaScript also linked in the initial HTML page does only draw graphics and calls “application.show()”.

### **2.2.5 AIT signaling and transmission**

The PMT parsing for AITs shall be robust against PMT entries using application types different from HbbTV and robust against additional descriptors in the descriptor loop of the AIT entry (like the `protection_message_descriptor` as defined in section 9.3.3 of ETSI TS 102 809).

The AIT filtering shall take into account AITs consisting of more than one section (up to eight sections according to the standard) and it has to ignore sections of other table IDs than HbbTV ones (like authentication sections as defined in section 9.4.3 of ETSI TS 102 809 which could be transported on the same PID as the AIT).

The AIT parsing shall correctly interpret and execute the signaled priority order for applications which are available both via IP and DSM-CC, i.e. to respect the ordering of `transport_protocol_labels` as defined in section 5.3.5.3 of ETSI TS 102 809.

### **2.2.6 Prebuffering of AV content in the HTML5 media element**

The prebuffering of AV content in the HTML5 media element as defined in section 9.6.2 of the HbbTV specification shall be implemented in a way that all state transitions foreseen by the HbbTV specification are implemented and the events of the HTML5 media element are given to the HbbTV app in a timely manner but not before the related action actually took place. Specifically, the "ended" event at the end of a video presented by a HTML5 media element shall regard the timing constraints specified in section 4.7.4 of "Errata 3" of HbbTV 2.0.1 standard.

### **2.2.7 Integration of the video broadcast object**

When AV content is presented via the AV object or the HTML5 media element and the HbbTV application releases the player resources and then switches back to show the broadcast content by calling "bindToCurrentChannel" then

- the maximum time it takes until broadcast content is presented again should not exceed the maximum time between two I-Frames of the broadcast signal plus 200 msec if no codec change is required
- the video broadcast object shall send the event indicating the state change to "presenting" timely after the actual presentation starts but not before

### **2.2.8 HTML5 browser profile**

Animations will be of specific interest for broadcasters to make the UI/UX more attractive. Devices should support Level 2 according to section A.2.16 "Graphics performance" of HbbTV 2.0.

### **2.2.9 Media Synchronization and Companion Screen integration**

The integration of Media Synchronization and Companion Screen features is of particular interest for broadcasters.

As according to section 10.2.8 of ETSI TS 102 796 V1.4.1 multi-stream media synchronization shall be supported. The mandatory combinations of media type, systems layer, timeline and delivery protocol are shown in detail in Table 14 at section 10.2.8.4 of ETSI TS 102 796 V1.4.1. Which timelines shall be supported is outlined in section 13.4.2 of ETSI TS 102 796 V1.4.1 (see Table 18).

Also the integration of Companion Screen features shall be done for the full functional range defined as mandatory in HbbTV 2.0.1.

Some of the most relevant features will be used in specific test resources provided for the German market by Broadcasters.

### **2.2.10 User agent / XML capabilities**

The device shall indicate availability of features reliably and completely as foreseen by user agent (section 7.3.2.4 of the HbbTV specification) and the xmlCapabilities property of the application/oipfCapabilities embedded object (section 10.2.4 of the HbbTV specification).

## **2.3 Additional specification elements**

This section lists features from HbbTV specifications besides the mandatory parts of the main specification. Their implementation is required for at least parts of the market.

### **2.3.1 IP video formats**

The support of HEVC is not mandatory in HbbTV 2 (as it may not be implemented for broadcast) but broadcasters expect HEVC video decoding to be available in all HbbTV 2.0 devices.

If a HbbTV device supports HDR in the broadcast mode it is highly recommend to integrate HDR support also at least with DASH playback capabilities (on demand and live) for HbbTV applications as defined in HbbTV 2.0.2<sup>3</sup>. Specifically, the HLG variant is of interest in this context. In the case of such integration the corresponding video profiles shall also be added to the xmlCapabilities, as in section 10.2.4 of the HbbTV specification 2.0.2.

## **3 HbbTV implementation topics**

This section specifies additional requirements which are not addressed by the HbbTV 2 standard but are related to implementations options of HbbTV.

### **3.1 Setup and GDPR**

If local persistent storage is deactivated this shall be reliably be detectable by the HbbTV application.

In the case of cookies, “navigator.cookieEnabled<sup>4</sup>” shall be supported and deliver a reliable feedback, i.e., if “true” then persistent storage of cookies shall be available and not only session cookies.

In the case of Webstorage, its availability for persistent storage shall be “in sync” with that of cookies. So if “navigator.cookieEnabled” is “true” this shall also indicate persistent webstorage to be available.

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<sup>3</sup> [ETSI TS 102 796 V1.5.1 - Hybrid Broadcast Broadband TV, 2018](#)

<sup>4</sup> <https://html.spec.whatwg.org/multipage/system-state.html#dom-navigator-cookieenabled>

## 3.2 DRM integration

The integration shall be done on the basis of the HbbTV DASH DRM Reference Application as provided by the HbbTV Association.

A runnable copy of the application can be found at

<http://refapp.hbbtv.org/production/catalogue/>

The source and documentation can be found in github at

<https://github.com/HbbTV-Association/ReferenceApplication> .

Documentation can be downloaded from here:

<https://www.hbbtv.org/wp-content/uploads/2018/11/HbbTV-MG-00472-002-DRM-Reference-Application-Explained.pdf>

## 3.3 Remote Control

The minimum keyset implemented physically on the remote control should be the four navigation keys, the "OK" key, the four colour keys and the "exit" and "back" keys. Except for the "exit" key all of them shall be made accessible to HbbTV applications if requested so by them (see section 10.2.2.1 of the HbbTV specification). While HbbTV apps are running, the "exit" key shall always terminate them.

# 4 Testing

## 4.1 HbbTV Test Suite

For testing devices manufacturers should primarily use the complete HbbTV Test Suite in its latest version available for the specified HbbTV version.

Annex A identifies tests specifically relevant for the features mentioned in sections 2.2 and 3 of this document. This Annex is informative and only meant as a recommendation. It has been compiled to make transparent how far the existing HbbTV Test Suite covers the technical functions specifically mentioned by the "Minimum Requirements ...". It does not define a complete test suite for the German market.

## 4.2 Market specific test resources

Broadcasters will provide in Q1/2019 a central web page linking to market specific test resources designed to cover those elements of the current document which are not sufficiently covered by the HbbTV Test Suite.

Manufacturers generally welcome testing resources from broadcasters on time for new product development - resources to be made available by June/July of each year in order to ensure implementation of a new HbbTV version or parts thereof for the next line-up.

### **4.3 Interoperability workshops**

Both broadcasters and manufacturers are encouraged to participate in the HbbTV interoperability workshops of the HbbTV Association conducted at IRT.

### **4.4 Manufacturer prenotation of new HbbTV services**

ARD has already a procedure in place to inform manufacturers about new HbbTV services to be launched and to provide pre-testing opportunities. It is regarded as useful that a similar procedure should be established by other broadcasters as well.

For prenotation of new services broadcasters will not have a joint communication platform. Deutsche TV-Plattform will organize an adequate way to inform manufacturers by a common mailing list or other means of communication.