
HbbTV Forum Nederland

Specification for use of HbbTV in the Netherlands

Version 1.0 – Approved for Publication

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Contact: Rob Koenen, rob.koenen@tno.nl

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1 Introduction

This specification provides guidelines for interoperable use of HbbTV technology in the Dutch market. Its primary purpose is to specify which version(s) of the specification(s) published by the HbbTV Consortium are used in the Netherlands to achieve interoperability between services and end-user equipment like TVs and Set Top Boxes.

Adhering to this specification is voluntary, but terminals, services, apps and content can only claim compliance to this specification if they meet all applicable requirements given herein, whether direct or by reference to other specifications. Such other specifications include, but are not limited to, the HbbTV specification as published by ETSI [2].

This document does not provide an introduction to HbbTV; the reader is referred to the actual HbbTV specification [2] and other materials published by the HbbTV Consortium [16].

To allow equipment to be manufactured for use across several markets, this document has been kept as close as possible to other national HbbTV specifications. Notably, it has been based on the French TNT 2.0 Specification [4], making adjustments where appropriate and applicable. Use of that specification is with the kind permission of the HD Forum.

This document seeks to avoid any duplication of requirements that are present in the HbbTV specification [2] itself.

Words and terms with initial capital letters are defined in Section 4.1, or in the HbbTV Specification [2], unless noted otherwise.

Where a device includes other features than only the reception and display of broadcast or HbbTV related content, this document only applies when presenting content delivered over the broadcast channel, or when presenting broadband content that was selected through an HbbTV application. A non-exclusive list of features which are outside the scope of this document include offering access to content on the home network (e.g. via DLNA), access to networks other than those carrying broadcast programming, and access to the open internet.

1.1 *Use of keywords in this document*

When underlined, the keywords "must", "must not", "required", "shall", "shall not", "should", "should not", "recommended", "may", and "optional" in this document should be interpreted as in RFC 2119 [1].

2 Version History

<i>Version</i>	<i>Date</i>	<i>Changes</i>
1.0	1 May 2013	Version approved for publication

3 References

3.1 Normative References

- [1] S. Bradner, *Key words for use in RFCs to Indicate Requirement Levels*, IETF RFC 2119, March 1997, <http://www.ietf.org/rfc/rfc2119.txt>.
- [2] European Telecommunications Institute (ETSI), *ETSI TS 102 796 version 1.2.1, (2012-11), Hybrid Broadcast Broadband TV*, November 2012.
- [3] HbbTV Association, *Errata to ETSI TS 102 796 version 1.2.1, (2012-11), if and when published*.
- [4] HD Forum, *TNT 2.0 Terminal Specification, version 1.1*, July 9, 2012, last accessed at <http://www.hdforum.fr/sites/default/files/tnt-2-0-terminal-specification-v1-1.pdf>
- [5] Marlin Developer Community, *Marlin – Simple Secure Streaming Specification, Version 1.1*, March 2012 (Can be downloaded from <http://www.marlin-community.com/> after registration as part of the Marlin Broadband bundle)
- [6] Marlin Developer Community, *Marlin Integration to Hybrid Broadcast Broadband TV, Version 1.0.0, Final* (Can be downloaded from <http://www.marlin-community.com/> after registration as part of the Other Specifications and Guidelines bundle)
- [7] Marlin Developer Community, *Marlin Adaptive Streaming, Simple Profile, version 1.0*, July 2011 (Can be downloaded from <http://www.marlin-community.com/> after registration as part of the Marlin Broadband bundle)
- [8] Microsoft, *Microsoft PlayReady*, <http://www.microsoft.com/playready/default.aspx>
- [9] Microsoft, *PlayReady Documentation CHM file*, version 2.0 (Made available by Microsoft to PlayReady licensees)
- [10] Microsoft, *PlayReady Format Specification*, included in MSPR1, version 2.0 (Made available by Microsoft to PlayReady licensees)
- [11] Microsoft, *PlayReady Integration to HbbTV Specification, version 1.0* (Made available by Microsoft to PlayReady licensees)
- [12] Microsoft, *DASH Content Protection using Microsoft PlayReady, version 1.1*, 28 February 2013, last accessed from <http://www.microsoft.com/playready/documents/>
- [13] MPEG, *ISO/IEC 23009-1:2012 Information technology – Dynamic Adaptive Streaming over HTTP (DASH) – Part 1: Media presentation description and segment formats*
- [14] MPEG, *ISO/IEC 23001-7:2012: Information technology – MPEG systems technologies – Part 7: Common encryption in ISO base media file format files*
- [15] Open IPTV Forum, *OIPF Release 1 Specification Volume 5 Version 1.2 – Declarative Application Environment*

3.2 *Informative References*

[16] HbbTV Consortium, <http://www.hbbtv.org>

4 Acronyms and Definitions

4.1 Definitions

Hybrid Terminal Terminal supporting delivery of A/V content both via broadband and via broadcast operating in HbbTV mode. (The present specification provides the normative requirements for Hybrid Terminals)

4.2 Acronyms

DASH Dynamic Adaptive Streaming over HTTP, as defined by MPEG
DRM Digital Rights Management
DVB Digital Video Broadcast, <http://www.dvb.org>
ETSI European Telecommunications Standards Institute, <http://www.etsi.org>
HbbTV Hybrid Broadcast Broadband Television
KID Key ID
MPEG Moving Picture Experts Group, ISO/IEC JTC1 SC29 WG11
UI User Interface

5 HbbTV Specification

The Hybrid Terminal shall follow the requirements of the HbbTV Specification version 1.5, as published by ETSI as [2], including any errata [3].

6 Support for Digital Rights Management

The Hybrid Terminal shall support content protection according to Annex B of the HbbTV specification [2], and it shall support MPEG common encryption as further specified in Annex B.2 of [2] and in [14].

6.1 DRM Interoperability

Said Annex B of [2] does not specify any systems for key management (DRM Systems). Because the HbbTV Forum Nederland wishes to provide a consistent customer experience, in which interactive content provided to HbbTV terminals can be guaranteed to play even when such content is protected, the following applies in addition:

In order to achieve interoperability in services that distribute encrypted content in the context of this specification Hybrid Terminals shall implement at least one of the following systems:

- Marlin Simple Secure Streaming (MS3);
- PlayReady.

This list may be extended in future versions of this specification.

If the Hybrid Terminal supports Marlin in combination with HbbTV, this Hybrid Terminal shall support Marlin Simple Secure Streaming as per [5], [6], and [7].

If the Hybrid Terminal supports PlayReady in combination with HbbTV, it shall support Microsoft PlayReady as per [10] (as included in [9]) and [11]. Signalling support for PlayReady to the HbbTV application shall use the CA System ID as provided in [11]. The format and values to be used (including SystemID) for PlayReady signalling in MPEG-DASH formatted content shall follow [12] and [10].

The Hybrid Terminal may always support additional DRM systems; in this case, it is recommended that these support MPEG Common Encryption as referenced in Annex B of [2], in addition to any other encryption/packaging format scheme that such a DRM system may employ. Integration with such additional DRM systems is not specified in the present document.

Service Providers that wish to distribute protected content in compliance with this specification shall make their content available in such a way that all compliant Hybrid Terminals can decode and play the content.

6.2 Long Period Key Rotation

6.2.1 Introduction (informative)

Long period key rotation means changing the encryption key(s) used to encrypt the media fragments in an MPEG DASH [13] representation at a low update frequency. Typically, this means a key update every few hours, on the order of 6 or more hours. This is not about supporting high-frequency key changes with group key mechanisms as defined in the Common Encryption specification (CENC, [14]), nor trying to reproduce the frequency update of control word as typically done in broadcast DVB services.

The use case for key rotation is mainly for linear channels, where stream duration is not related to an asset boundary. In that case, a Hybrid Terminal may stream across a point in time where the encrypted fragments may need to change encryption key(s).

6.2.2 Updating KIDs

Note: Words in Initial Caps in this subsection are defined in [13]

The Hybrid Terminal shall support long period key rotation, where each period of a stream may use new KIDs.

KID changes shall be signaled by using a change of Period, as defined in [13]. During a single period, the KID(s) associated with the media fragments shall always stay the same and shall all be signalled via the default_KID field of the TrackEncryptionBox located in the sample description of each track.

To allow automatic update of Periods, the MPD for the stream shall signal MPD@type="dynamic", to indicate to the terminal that it needs to update the MPD when it reaches the end of available periods and/or based on the duration signaled in MPD@minimumUpdatePeriod.

For the avoidance of doubt, the sample group mechanism defined in [14] is not used to signal a change of KID for the media samples, and the support of sample groups is not required.

The Hybrid Terminal is not required to support any other forms of key rotation; such other forms are optional.

6.2.3 Key windows

Each Period of the stream has its own KID(s) and associated media encryption keys.

When a terminal requests the license that will entitle it to obtain the media decryption keys necessary to decrypt the media fragments, the DRM license server can deliver not only the key(s) for the current Period, but also for one or more upcoming Periods (for example, the next and next-next Period). By thus doing, the terminal does not need to acquire a new license when it reaches the end of the current Period, or subsequent Periods, until it reaches the last Period for which it has obtained keys.

Should the terminal reach a point in time past the last Period in the window of keys returned by the license server (which would be quite a long time after starting the stream), the terminal shall raise an onDRMRightsError event (as defined in [15]) to the application.

7 User Interface Functionality

7.1 *Optional Per-Channel Deactivation of HbbTV Feature*

The Hybrid Terminal may include a menu option to allow the end-user to activate or deactivate the HbbTV feature on a per-channel basis. If this menu option is supported, it shall be set to “active” for all channels by default.

7.2 *Visual Signalling of HbbTV Application*

The user interface displayed on channel change is the responsibility of the terminal manufacturer. However, when changing a channel, the presence of broadcast-related HbbTV services may be indicated to the consumer in the user interface.

Note: this information would be provided in addition to a channel number, channel name, current program, “stereo audio”, etc.

If the Hybrid Terminal follows this recommendation, this information shall also be presented whenever this type of channel information is requested by the user, e.g., when pressing the “INFO” button or equivalent.

7.3 *UI Focus*

The UI of the Hybrid Terminal may temporarily “gain focus” and use certain keys that are in use by a HbbTV application currently running. This may be when the terminal requires the user to interact with the system user interface, for example a dialogue box saying “You have lost your broadband connection. Press RED to close this message”.

8 HbbTV Browser Environment

8.1 *Capability Signalling*

The xmlCapabilities property of the application/oipfCapabilities object shall provide the DRMSystemID of any DRM(s) supported by the terminal, as defined in section 9.3.10 of [14].

8.2 *Audiovisual continuity*

It is the responsibility of both the terminal implementation and the application implementation to ensure that starting and stopping of applications does not cause any audiovisual discontinuities when such applications do not affect the broadcast video.

8.3 *Synchronisation*

A “do it now” event as referenced in Section 7.2.4 of [2] should start to be executed by the terminal in less than 2 seconds.

This duration shall be measured between the “do-it-now” event occurring in the Transport Stream at the input of the terminal, and the call to the corresponding function being registered with “addStreamEventListener”.

8.4 *Reliability*

Service Providers shall take every precaution necessary to ensure that their applications conform to the specifications and do not use any non-specified extensions. It is expected that HbbTV applications are properly tested before being deployed. To preserve a positive perception of interactivity by the end user, it is also important that the HbbTV software implementation is robust against faulty applications and low resource availability.

Therefore it is expected that terminal manufacturers take every precaution necessary to prevent an HbbTV application from altering or crashing the software stack in the Hybrid Terminal, including under at least the following conditions¹:

1. An application is opened and closed by the user 20 times consecutively
2. The user changes the program selection before the application has been completely loaded, whether from broadcast or broadband.
3. The terminal downloads, or attempts to download an XML, HTML, or media file, which has been truncated.
4. A broadband application download is prematurely interrupted by a TCP connection reset, or a sustained packet loss.

¹ These conditions are a verbatim copy from the TNT 2.0 specification [4].

5. A broadcast application download is prematurely interrupted by a carousel removal on the broadcast side.
6. The terminal attempts to download an initial HTML page, with a file size of 100MB (for the avoidance of doubt, it is not required that such a page can be properly loaded and rendered)
7. An application attempts to carry out operations requiring more memory than the receiver has available. (For example, creation and initialisation of an arbitrarily large array)
8. The browser raises exceptions that are not explicitly caught by the application
9. An application enters an infinite loop (including infinite recursion)

In all of these cases the terminal shall remain responsive to channel change requests.

During the execution of an application, the exit function (see 8.5) shall terminate the application in all circumstances.

8.5 *Exit Function*

The “EXIT or TV or comparable button” as listed in Table 12 of [2] of Section 10.2.2 shall be supported by the Hybrid Terminal. Its role shall be to terminate the currently running HbbTV application, as described in section 6.2.2.1 of [2] as “Directly by the end-user”.

Note: Exiting a broadcast-related application will result in the autostart application of the current channel re-starting from the beginning. It does not offer the possibility to exit from HbbTV. The option provided in Section 7.1 may offer such a possibility.

9 Content Streaming

9.1 Trick Mode Support

The Hybrid Terminal shall allow the HbbTV application to control the Play, Pause, Stop, Fast Forward and Fast Rewind keys as defined in [2].

Note: this will enable the service provider to disable trick modes when required.

HbbTV applications should respond to presses of the Play, Pause, Stop, Fast Forward and Fast Rewind keys when playing broadband content. If no functionality is associated with a certain key, the application should provide suitable feedback to the user.

10 Terminal and Application Security

10.1 Terminal Security

This specification does not impose any specific requirement on the security of the hardware design and the software part of a Hybrid Terminal, but a Hybrid Terminal shall be compliant with the compliance and robustness rules of any supported DRM solution, which may impact the overall design and manufacturing of the terminal.

10.2 HbbTV Application Security (informative)

The authentication of a Broadcast-Related Application (as defined in [2]) is implicit, as it is considered difficult for unauthorized parties to insert an application in a broadcast signal.

Authentication and trust of Broadcast-Independent Applications (as defined in [2]) is out of scope of this specification.