UHD in HbbTV specifications

Klaus Merkel, rbb

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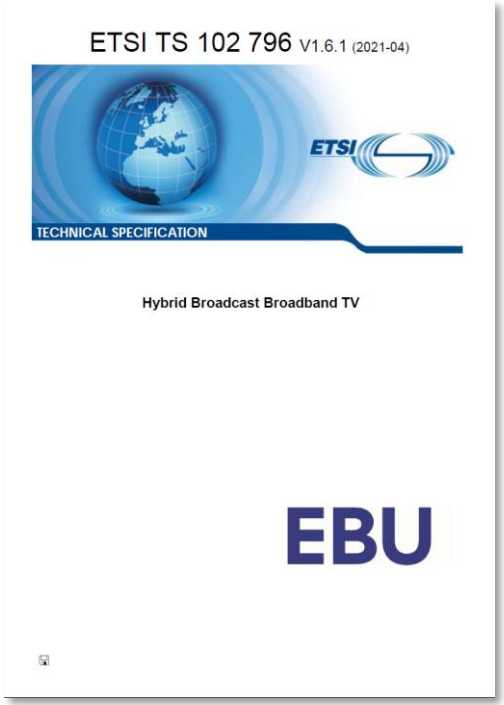
UHD in HbbTV specifications

HbbTV specification

- provides a powerful toolbox
- toolbox growing over HbbTV versions
- does not predefine any concrete type of service
- leaves it completely to service providers to build attractive and useful services
- **is not a driver for the usage of new codecs or video features**
- **but cares to make new codecs or video features that become common in the market available for usage within HbbTV apps by integrating them into its toolbox**



Development of video features in HbbTV specifications

Coding Formats		Container Formats		
		MPEG2-TS	MP4 progr.	DASH/MP4
H.264	x	SD	SD	SD
	HEVC	HD	HD	HD
x		x	UHD	UHD
		x	x	UHD/HDR/HFR

HbbTV-Version	ETSI-Publication
HbbTV 1.0	2010
HbbTV 1.5	2012
HbbTV 2.0.1	2016
HbbTV 2.0.2	2018
HbbTV 2.0.3	2021

HbbTV specifications

- development towards DASH as single container format
- discontinuation of older codecs and container formats
- no new codecs or significant video features in 2.0.3 and 2.0.4

What does HbbTV related to UHD in its specs?

the HbbTV specification

- has only a very small section dealing with actual video profiles (less than 1 of 320 pages in HbbTV 2.0.3)
- aligns for all details with general DVB market by referring to
  - the "DVB-DASH" profile (ETSI TS 103 285)
  - the "Video codec profiles for DVB DASH" (Annex L.2 of ETSI TS 101 154)
    [HEVC Main 10 Profile up to level 5.1 (HFR:5.2) / Progressive / up to 3840 x 2160]
- mandates that
  "for each of the technologies ..., terminals supporting the broadcast IRD from ETSI TS 101 154 ... ***shall*** also support the related DASH requirement"
  → HbbTV makes UHD support mandatory depending on support in broadcast ("conditionally mandatory")
- defines how HbbTV applications can read UHD/HDR/HFR capabilities on the current TV device
- defines bitrates (incl. audio and subtitles) to be supported by terminals, namely:
  - *39 Mb/s if the terminal does support UHD video but does not support HFR video.*
  - *51 Mb/s if the terminal supports UHD HFR video.*

Broadcast capabilities reflected to DASH capabilities

Table 9a: Mapping from broadcast requirements to DASH requirements

Broadcast IRD requirement from ETSI TS 101 154 [14]	Related DASH Requirement	Labels in XML capabilities
HEVC UHDTV IRD	hevc_uhd player conformance point as defined in clause L.2 of ETSI TS 101 154 [14] (see note 1)	HEVC_UHD_25, HEVC_UHD_30
HEVC HDR UHDTV IRD using HLG10	hevc_uhd_hlg10 player conformance point as defined in clause L.2 of ETSI TS 101 154 [14] (see note 1)	HEVC_UHD_25, HEVC_UHD_30 (see note 2)
HEVC HDR UHDTV IRD using PQ10	hevc_uhd_pq10 player conformance point as defined in clause L.2 of ETSI TS 101 154 [14] (see note 1)	HEVC_UHD_25, HEVC_UHD_30 (see note 2)
HEVC HDR HFR UHDTV IRD using HLG10	hevc_uhd_hfr_hlg10 player conformance point as defined in clause L.2 of ETSI TS 101 154 [14] (see note 1)	HEVC_UHD_HFR_25, HEVC_UHD_HFR_30 (see note 2)
HEVC HDR HFR UHDTV IRD using PQ10	hevc_uhd_hfr_pq10 player conformance point as defined in clause L.2 of ETSI TS 101 154 [14] (see note 1)	HEVC_UHD_HFR_25, HEVC_UHD_HFR_30 (see note 2)

[excerpt from HbbTV 2.0.2/2.0.3]

Capabilities as visible by HbbTV applications

the HbbTV specification defines [section 10.2.4] how to indicate supported video profiles for UHD/HDR/HFR towards HbbTV applications:

Terminals that support HEVC UHD video as defined in clause 7.3.1.3 shall include the following video profiles:

```
<video_profile name="MP4_HEVC_UHD_25_HEAAC_EBUTTD" type="video/mp4" transport="dash"
               sync_tl="dash_pr"/>
<video_profile name="MP4_HEVC_UHD_25_HEAAC_EBUTTD" type="video/mp4" />
```

Terminals that support HDR for broadband delivered video according to ETSI TS 103 285 [45] shall include a `video_profile` element for each combination of video codec, audio codec, HDR technology and transport protocol supported with HbbTV. Each such `video_profile` element shall include a `hdr` attribute each as defined in clause A.2.15. For example:

```
<video_profile name="MP4_HEVC_UHD_25_HEAAC_EBUTTD" type="video/mp4" transport="dash"
               sync_tl="dash_pr" hdr="urn:dvb:dash:bitstream:video:hdr_pq10" />
<video_profile name="MP4_HEVC_UHD_25_E-AC3_EBUTTD" type="video/mp4" transport="dash"
               sync_tl="dash_pr" hdr=" urn:dvb:dash:bitstream:video:hdr_pq10"/>
<video_profile name="MP4_HEVC_UHD_25_HEAAC_EBUTTD" type="video/mp4" transport="dash"
               sync_tl="dash_pr" hdr="urn:dvb:dash:bitstream:video:hdr_hlg10" />
<video_profile name="MP4_HEVC_UHD_25_E-AC3_EBUTTD" type="video/mp4" transport="dash"
               sync_tl="dash_pr" hdr="urn:dvb:dash:bitstream:video:hdr_hlg10"/>
```

what does HbbTV related to UHD beyond its specs?

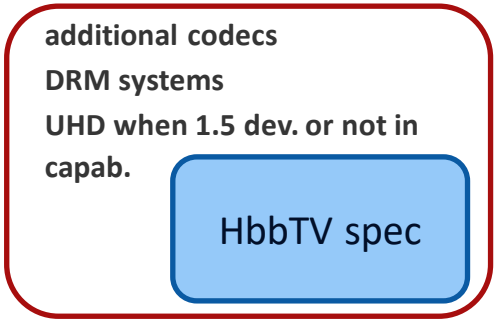
provide terminal tests!

- some 75 approved tests dealing with UHD content in the latest test suite release 2022-1
- test cases cover many practical use cases beyond just simple playback of UHD content (overlays, seeking accuracy, switching behaviour of many kinds) - check out this doc (2 test examples below): https://www.hbbtv.org/wp-content/uploads/2022/04/HbbTV-testcases-2022-1-HbbTV_only.pdf
- test suite (incl. test streams) can be licensed also by broadcasters as a reference for content encoding and application development

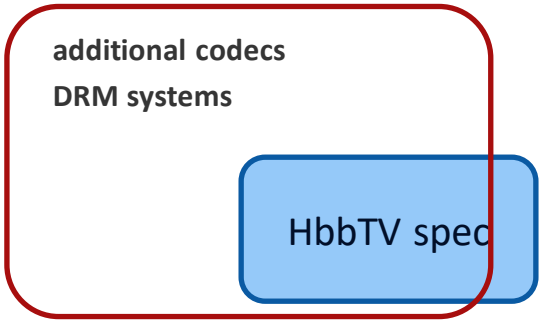
Test Id	Vers	Title	Approved	Assertion
org.hbbtv_UHD-PQ10-AC4-0010	2	HTML5 static video element displaying DASH PQ10 HEVC, Main 10, Level 5.1, 50 FPS video and AC-4 audio content at matching framerate	TRUE	When the terminal loads an HbbTV Application including an HTML5 media object which references a static MPD defining a stream containing AC-4 audio and HEVC-encoded 3840x2160p PQ10 HDR format video content with BT.2020 colour space, both @50fps, the media shall be correctly presented by the terminal and the playback shall be smooth and contain no decoding artifacts.
org.hbbtv_UHD-PQ10-ADINS0001	3	HTML5 mid-roll advert insertion, DASH PQ10 HEVC, Main 10, Level 5.1 and AVC_HD_25	TRUE	Content is presented without artefacts or glitches when a currently playing HTML5 media element referencing DASH PQ10 HEVC, Main 10, Level 5.1 media is paused, and a second HTML5 media element with DASH with HE-AAC/AVC_HD_25 media is played in its entirety, and then the playing of the previous DASH media is resumed.

HbbTV spec vs actual device capabilities

in practice devices ...



... may provide more features than HbbTV forsees



... or also fail to be completely functional

UHD Plugfest 2022

The Digital TV Group (DTG) and Deutsche TV-Plattform (DTVP) are delighted to announce that our joint UHD Plugfest is back after a two-year Covid hiatus!

Registration is now open for our 12th UHD Plugfest, which will take place in London from June to 28-30 this year.

Building on the success of our previous Plugfests in London and Berlin, this event provides a fantastic, controlled platform for all participants to work towards interoperability in providing excellent user experience.

The three-day event will cover HDMI/HDCP, USB, HDR, HFR, 4K/8K video content including NGA, and HbbTV, and is open to all relevant technical teams interested in testing their products/software/content from an interoperability perspective.

https://dtg.org.uk/event/dtg-dtvp-12th-uhd-plugfest/

Thank you for your attention!

Klaus Merkel, rbb <klaus.merkel@rbb-online.de>