

## Document History

Version	Date	Description	Author
v1.0	27 June 17	Published version	Tim Diprose

## Introduction

Freeview plans to consolidate all specifications for STB's, PVRs, and TVs for satellite and terrestrial devices into one document in time for development of 2019 models however we have updates required for 2018 models so have released this addendum to our current specifications listed below.

Included in this addendum are items that support the evolution of content (HD over Satellite, UHD over IP) and experience (HbbTV 2, Guide).

Addendum items reference a part from the published spec and the updated description. New items have (new) next to the reference. Items that are no longer required or are now optional are shown with a strikethrough.

As of 25 July 2017 v9.2 HbbTV of the test suite is available and will be used for 2018 certification testing.

## Existing Freeview Specifications

- [Freeview DTT Transmission Rules 3.0](#) | updated September 2014
- [Freeview DTT iDTV Specification v3.0](#) | updated September 2014
- [Freeview DTT DTR Specification v3.0](#) | updated September 2014
- [Freeview DTT Receiver Specification v3.0](#) | updated September 2014
- [Freeview DTH Satellite Transmission Rules v1.8](#) | updated May 2014
- [Freeview DTH Satellite DTR and Specification v1.01](#)

## Satellite (DTH)

### [Freeview DTH Satellite DTR and Specification v1.01](#)

The following items are changed in Receiver Profile

Category	Reference item	Updated Description	Status
Broadcast Video	3.1	H264 MPEG-4 AVC (ISO/IEC 14496 Part 10) Level 4 - 1080i25, 720p50, and 1080p25 and SD 576i25 required	Mandatory
Broadcast Video	3.11 (new)	H265 HEVC. D-book 9 ref 22.3.1.2, 1080p50, 720p50, and 1080p25 required	Optional
IP Video	3.13 (new)	For UHD devices, HEVC encoded HD/UHD video over IP using MPEG-DASH 13.4.2/3 of D-book 9	Mandatory
Audio	3.2	MPEG-4 HE AAC v1 (ISO/IEC 14496 part 3) level 4	Mandatory
Audio	3.3	Dolby Digital Plus or E-AC-3 ETSI TS 102 366	Mandatory
Subtitles	3.5	ETSI EN 300 743 V1.3.1 (rev 7 HD amendment)	Mandatory
<del>Teletext</del>	<del>3.7</del>	<del>Teletext now optional</del>	Not required
<del>Teletext</del>	<del>3.8</del>	<del>MHEG digitext now optional</del>	Not required
<del>AFD</del>	<del>3.12</del>	<del>AFD (Automatic Format Descriptor) now optional</del>	Not required
Modulation	4.11	DVB-S2 8PSK demodulation ETSI (EN 302307)	Mandatory
Transponder	4.15	<p>The Freeview DTH network is made up of Freeview specific transponders as well as transponders related to different networks, specifically, SkyNZ.</p> <p>The Freeview Network_ID is 0x2F</p> <p><b>Freeview Transponders with N_ID=0x2F</b></p> <p>1) Freq : 12.456H GHz , S.R: 22.500Msys/s, FEC: 3/4, <del>Vertical</del> horizontal polarisation                  2) Freq : 12.483H GHz, S.R: 22.500Msys/s, FEC: 3/4, <del>Vertical</del> horizontal polarisation</p> <p><b>Sky Transponder with N_ID=0xA9</b></p> <p>3) Freq: 12.519H Ghz S.R: 22.500Msys/s FEC:3/4 horizontal</p>	Mandatory

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Category	Reference item	Updated Description	Status
		<p>polarisation. (Currently has unencrypted Prime, Prime+1, Edge TV and Bravo plus 1)</p> <p>The receiver must be able to tune to these and any transponders referenced within the Freeview NIT in both vertical and horizontal polarisations.</p>	
	4.18	<p>On the initial scan the receiver shall perform an automatic scan based on the Freeview NIT information found on the "home transponder" at 12.483GHz. It shall find all transport streams and services referenced within the NIT and shall tune in to the correct DVB structure, channel coding, modulation. However the receiver shall only display services that are referenced in the regional Freeview BAT selected by the user during initial setup. Services not listed within the regional BAT shall not be displayed.</p> <p>In addition to an automatic search it shall be possible to perform a manual search where the tuning parameters are entered manually. New channels shall be added to the service list. No duplicated channels, nor encrypted channels shall be displayed in the service list.</p>	Mandatory
OTA	5.0	<p>Receivers without Network capability required to support broadcast OAD.</p> <p>Receivers with Network capability required to support NWDL.</p>	Mandatory
EPG	6.8	HbbTV 8-day EPG replaces the MHEG-5 EPG	Mandatory
EIT	6.8.1 (new)	Support EIT schedule as per DTT spec ref 6.8	Mandatory
Huffman compression	6.8.2 (new)	Support Huffman compression as per DTT spec ref 6.9	Mandatory
Content protection	7.1	HDCP now required on digital outputs for HD broadcast	Mandatory
<del>Cables</del>	<del>8.2</del>	<del>Analog cables and RF cable for loop through not required</del>	Not required
Outputs	9.1	Primary output is HDMI and remove requirements for analog output	Mandatory
<del>Outputs</del>	<del>9.2</del>	<del>Analog outputs now optional</del>	Not required

Category	Reference item	Updated Description	Status
Outputs	<del>9.3</del>	<del>TV SCART removed</del>	Not required
Outputs	9.4	HDMI v1.4 or newer is mandatory	Mandatory
Outputs	<del>9.8</del>	<del>Loop through now optional</del>	Not required
Keypad	9.11	EPG / Guide button launches the HbbTV Guide.  The coloured buttons will launch the HbbTV interactive application when broadcast.  When internet connected set VK_GUIDE to 0x458 as per OIPF-T1-R2_Specification-Volume-5-Declarative-Application-Environment [CEA]2014-A. See extended Guide instructions below	Mandatory
Middleware	10.4	<del>MHEG-5 now optional</del>	Not required
Middleware	10.5 (new)	HbbTV 2.0.1 -. Manufacturers shall implement the mandatory requirements of ETSI standard TS 102 796 V1.4.1 except for the features listed below listed as optional.	Mandatory
HbbTV	11.13 (new)	HbbTV 2.0.1 -. Manufacturers shall implement the mandatory requirements of ETSI standard TS 102 796 V1.4.1 except for the features listed below listed as optional.	Mandatory
HbbTV DRM	11.13.1	Receivers with HbbTV middleware shall implement a DRM solution consisting of at a minimum, either Microsoft Playready or Marlin. A receiver may implement both or additional DRM solutions such as Apple's FairPlay etc if they so choose. MPEG CENC shall also be supported.	Mandatory
MPEG DASH	11.13.2 (new)	MPEG DASH - Annex E of TS 102 796 V1.4.1: ISO/IEC 23009-1 [29]	Mandatory
MPEG CENC	11.13.3 (new)	MPEG CENC: ISO/IEC 23001-7 [30].	Mandatory
Smart tile	11.13.4 (new)	Launch the Freeview On Demand app from home page or smart hub as per Broadcast independent applications 5.3.5 of TS 102 796 V1.4.1	Mandatory
Ad insertion	11.13.5	Section 9.6 of TS 102 796 v1.4.1 describes the mandatory	Mandatory

Category	Reference item	Updated Description	Status
	(new)	<p>requirements to be supported to allow acceptable quality of transitions between the playback of HTML5 media elements. This will fulfil the broadcaster requirements for ad insertion, specifically the transition behaviour defined in Section 9.6.3 of TS 102 796 v.1.4.1. Note that the transition time quoted in Section 9.6.3 of TS 102 796 v.1.4.1 does not include the time for any key acquisition where DRM is in use.</p> <p>Section 9.6.7 of TS 102 796 v1.4.1 requires that receivers support transitions from a protected stream into an unprotected stream, and vice versa.</p>	
MediaSync	11.13.6 (new)	Multi-stream synchronisation 10.2.8 of TS 102 796 V1.4.1	Optional
MediaSync	11.13.6.1 (new)	MediaSync - Synchronising applications and content across devices - 10.2.8 of TS 102 796 V1.4.1 section 13	Optional
Companion Screen	11.13.7 (new)	<p>Companion screen - 8.2.6 of TS 102 796 V1.4.1</p> <ul style="list-style-type: none"> <li>• Application-to-Application Communication (see Section 14.5 of TS 102 796 [157])</li> <li>• Launching an HbbTV application from a Companion Screen (see Section 14.6 of TS 102 796 [157])</li> <li>• Discovering devices and their service endpoints (see Section 14.7 of TS 102 796 [157])</li> </ul>	Optional
User input	11.13.8 (new)	Section 10.2.2 of TS 102 796 v.1.4.1. Pointer events are defined in Section 10.2.2.2	Mandatory
CI Plus	11.13.9 (new)	CI Plus TS - Section 11.4 of 102 796 V1.4.1 HbbTV 2.0.1	Optional
File Delivery	11.13.10 (new)	File Delivery Protocol - Section 7.2.8 of 102 796 V1.4.1 HbbTV 2.0.1	Optional
File System	11.13.11 (new)	File System Acceleration - Section 7.2.7 of 102 796 V1.4.1 HbbTV 2.0.1	Optional
IP Live streaming	11.13.12 (new)	Live streaming using MPEG DASH - Section 7.3.2.1 of 102 796 V1.4.1 HbbTV 2.0.1	Mandatory

## Terrestrial (DTT)

[Freeview DTT Receiver Specification v3.0](#) | updated September 2014

[Freeview DTT DTR Specification v3.0](#) | updated September 2014

[Freeview DTT iDTV Specification v3.0](#) | updated September 2014

The following items are changed in Receiver Profile

Category	Reference item	Description	Update
Broadcast Video	3.1.1 (new)	H265 HEVC. D-book 9 ref 22.3.1.2, 1080p50, 720p50, and 1080p25 required	Optional
IP Video	3.1.2 (new)	For UHD devices, HEVC encoded HD/UHD video over IP using MPEG-DASH 13.4.2/3 of D-book 9	Mandatory
Broadcast Video	3.3	H264 MPEG-4 AVC (ISO/IEC 14496 Part 10) Level 4 - 1080i25, 720p50, and 1080p25 and SD 576i25 required	Mandatory
OTA	5.0	Receivers without Network capability required to support broadcast OAD.  Receivers with Network capability required to support NWDL.	Mandatory
Leads	<del>8.2</del>	<del>Composite, Component, and Stereo analog cables now optional</del>	Not required
Outputs	9.1	HDMI v1.4 or newer is mandatory	Mandatory
Outputs	<del>9.4</del>	<del>Analog Outputs now optional</del>	Not required
Outputs	<del>9.6</del>	<del>Analog Outputs now optional</del>	Not required
Keypad	9.11	EPG / Guide button launches the HbbTV Guide.  The coloured buttons will launch the HbbTV interactive application when broadcast.  When internet connected set VK_GUIDE to 0x458 as per OIPF-T1-R2_Specification-Volume-5-Declarative-Application-Environment [CEA]2014-A. See extended Guide instructions below	Mandatory
HbbTV	10.4	HbbTV 2.0.1 -. Manufacturers shall implement the mandatory requirements of ETSI standard TS 102 796 V1.4.1 except for the features listed below listed as	Mandatory

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Category	Reference item	Description	Update
		optional.	
HbbTV	11.4	HbbTV 2.0.1 -. Manufacturers shall implement the mandatory requirements of ETSI standard TS 102 796 V1.4.1 except for the features listed below listed as optional.	Mandatory
MPEG DASH	11.4.2 (new)	MPEG DASH - Annex E of TS 102 796 V1.4.1: ISO/IEC 23009-1 [29]	Mandatory
MPEG CENC	11.4.3 (new)	MPEG CENC: ISO/IEC 23001-7 [30].	Mandatory
Smart tile	11.4.4 (new)	Launch the Freeview On Demand app from home page or smart hub as per Broadcast independent applications 5.3.5 of TS 102 796 V1.4.1	Mandatory
Ad insertion	11.4.5 (new)	<p>Section 9.6 of TS 102 796 v1.4.1 describes the mandatory requirements to be supported to allow acceptable quality of transitions between the playback of HTML5 media elements. This will fulfil the broadcaster requirements for ad insertion, specifically the transition behaviour defined in Section 9.6.3 of TS 102 796 v.1.4.1. Note that the transition time quoted in Section 9.6.3 of TS 102 796 v.1.4.1 does not include the time for any key acquisition where DRM is in use.</p> <p>Section 9.6.7 of TS 102 796 v1.4.1 requires that receivers support transitions from a protected stream into an unprotected stream, and vice versa.</p>	Mandatory
MediaSync	11.4.6 (new)	MediaSync - Synchronising applications and content across devices - 10.2.8 of TS 102 796 V1.4.1 section 13	Optional
MediaSync	11.4.6.1 (new)	MediaSync - Synchronising applications and content across devices - 10.2.8 of TS 102 796 V1.4.1	Optional
Companion Screen	11.4.7 (new)	<p>Companion screen - 8.2.6 of TS 102 796 V1.4.1</p> <ul style="list-style-type: none"> <li>• Application-to-Application Communication (see Section 14.5 of TS 102 796 [157])</li> <li>• Launching an HbbTV application from a Companion Screen (see Section 14.6 of TS 102 796 [157])</li> </ul> <p>Discovering devices and their service endpoints (see</p>	Optional

Category	Reference item	Description	Update
		Section 14.7 of TS 102 796 [157])	
User input and focus	11.4.8 (new)	Section 10.2.2 of TS 102 796 v.1.4.1. Pointer events are defined in Section 10.2.2.2	Mandatory
CI Plus	11.4.9 (new)	CI Plus TS - Section 11.4 of 102 796 V1.4.1 HbbTV 2.0.1. Listed as M-C in Annex A	Optional
Content Download	11.4.10 (new)	File Delivery Protocol - Section 7.2.8 of 102 796 V1.4.1 HbbTV 2.0.1. Listed as M-D in Annex A	Optional
File System	11.4.11 (new)	File System Acceleration - Section 7.2.7 of 102 796 V1.4.1 HbbTV 2.0.1	Optional
IP Live Streaming	11.4.12 (new)	Live streaming using MPEG DASH - Section 7.3.2.1 of 102 796 V1.4.1 HbbTV 2.0.1	Mandatory



## Personal Video Recorder

Category	Reference	Description	Update
PVR	(new)	Support +PVR function in OIPF DAE specification [1]	Mandatory
PVR	(new)	Shall support the PVR features listed in Table A.1 of TS 102 796 [157], i.e. those features with status M-P.	Mandatory

## Instructions for Guide key setup

The following information is provided to assist Manufacturers with the custom solution for launching the Freeview Guide from the Guide key as per reference item 9.11 of the above addendum.

Related specification:

- OIPF-T1-R2\_Specification-Volume-5-Declarative-Application-Environment
- CEA 2014-A

## Summary

Application Keyset values are defined in the OIPF spec (see table 7.2.5.1 below). The Guide key is included in OTHER key events but is not included in the HbbTV spec.

To use the guide key outside of the HbbTV spec, the Freeview application will set otherkey mask for the guide key. The Application can set key mask using Keyset.setValue() function.

Manufacturers would need a modification to their software to include new key mask setting.

The value of 458 for the VK\_Guide key event is recommended based on CEA-2014 Annex F.

## 7.2.5 The Keyset class

The **Keyset** object permits applications to define which key events they request to receive. There are two means of defining this. Common key events are represented by constants defined in this class which are combined in a bit-wise mask to identify a set of key events. Less common key events are not included in one of the defined constants and form part of an array.

The supported key events indicated through the capability mechanism in section 9.3 SHALL be the same as the maximum set of key events available to the browser as indicated through this object

The default set of key events available to broadcast-related applications shall be none. The default set of key events available to broadcast-independent or service provider related applications which do not call **Keyset.setValue()** SHALL be all those indicated by the constants in this class which are supported by the OITF excluding those indicated by **OTHER**.

### 7.2.5.1 Constants

Constant name	Numeric Value	Use
RED	0x1	Used to identify the VK_RED key event.
GREEN	0x2	Used to identify the VK_GREEN key event.
YELLOW	0x4	Used to identify the VK_YELLOW key event.
BLUE	0x8	Used to identify the VK_BLUE key event.
NAVIGATION	0x10	Used to identify the VK_UP, VK_DOWN, VK_LEFT, VK_RIGHT, VK_ENTER and VK_BACK key events.
VCR	0x20	Used to identify the VK_PLAY, VK_PAUSE, VK_STOP, VK_NEXT, VK_PREV, VK_FAST_FWD, VK_REWIND, VK_PLAY_PAUSE key events.
SCROLL	0x40	Used to identify the VK_PAGE_UP and VK_PAGE_DOWN key events.
INFO	0x80	Used to identify the VK_INFO key event.
NUMERIC	0x100	Used to identify the number events, 0 to 9.
ALPHA	0x200	Used to identify all alphabetic events.
OTHER	0x400	Used to indicate key events not included in one of the other constants in this class.

OIPF Vol.5 Keyset

**Table 2: Relevant remote control buttons or key events for the end user when using interactive applications**

Button or Key Event	Usage
TEXT or TXT or comparable button	Launches the digital teletext application and/or the standard teletext as described in clause 5.3.4.
red colour button	Usually displays or hides a broadcast-related autostart application.
3 additional colour buttons (green, yellow, blue)	Variable usage as defined by the application (typically short-cuts or colour-related functions).
4 arrow buttons (up, down, left, right)	Variable usage as defined by the application (typically focus movement or navigation through lists).
ENTER or OK button	Variable usage as defined by the application (typically selection of focused interaction elements or confirmation of requested actions).
BACK button	Variable usage as defined by the application (typically going back one step in the application flow).
2 program selection buttons (e.g. P+ and P-)	If available: selects the next or previous broadcast service in the internal channel list which may lead to the termination of the running application as described in clause 6. These functions remain active at all times while broadcast-related applications are running - see clause 6.2.2.2.
WEBTV or comparable button	If available: opens a menu providing access to broadcast-independent applications as described in clause 5.3.5.
EXIT or comparable button	Terminates a running broadcast-related application and returns to last selected broadcast service (see clause 6.2.2.3). A running broadcast-independent application is still terminated but what happens next is implementation dependent. For example, it may vary depending on how the terminated application was originally started.

**HbbTV 2.0.1 key events**

**7.2.5.2 Properties**

readonly Integer **value**

The value of the keyset which this DAE application will receive.

readonly Integer **otherKeys**[ ]

If the OTHER bit in the value property is set then this indicates those key events which are available to the browser which are not included in one of the constants defined in this class, If the OTHER bit in the value property is not set then this property is meaningless.

<OIPF Vol.5 Key>

## 7.2.5.3 Methods

Integer <b>setValue</b> ( Integer value, Integer otherKeys[ ] )		
Description	<p>Sets the value of the keyset which this DAE application requests to receive. Where more than one DAE application is running, the events delivered to the browser SHALL be the union of the events requested by all running DAE applications. Under these circumstances, applications may receive events which they have not requested to receive.</p> <p>The return value indicates which keys will be delivered to this DAE application encoded as bit-wise mask of the constants defined in this class.</p>	
Arguments	<i>value</i>	<p>The value is a number which is a bit-wise mask of the constants defined in this class. For example;</p> <pre>myKeyset = myApplication.privateData.keySet; myKeyset.setValue(0x00000013); myKeyset.setValue(myKeyset.INFO   myKeyset.NUMERIC);</pre>
	<i>otherkeys</i>	<p>This parameter is optional. If the value parameter has the OTHER bit set then it is used to indicate the key events that the application wishes to receive which are not represented by constants defined in this class.</p>

### CEA-2014

#### Annex F: Key codes (Normative)

```
const Number VK_INFO = 457;
const Number VK_GUIDE = 458;
const Number VK_TELETEXT = 459;
const Number VK_SUBTITLE = 460;
const Number VK_BACK = 461;
const Number VK_MENU = 462;
```