

HbbTV Specification Errata 1

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1 Introduction

This document contains a set of identified and resolved errata to the HbbTV specification. It is a living document which will be updated based on experience of implementing receivers, services and tests. Further versions of this document will periodically be made publicly available via the www.hbbtv.org web site. Some time during 2012, the then current errata will be integrated in an updated version of TS 102 796 and the resulting specification submitted to ETSI for approval. For avoidance of doubt, the contents of this document have not been reviewed or approved by ETSI. Errata may be removed, modified or added as part of the process in ETSI.

2 Conventions

In this document, text quoted from other documents or to be added to other documents is indented. Fine-grained changes in text from other documents is shown using the underline and strikethrough convention.

3 Summary

The following table summarises the changes included in this document.

Reference	Short Description	Category	Clauses Impacted
94	External application authorization descriptor	Implementation	7.2.3.1
97	Changing the MIME type of an instantiated embedded object	Ambiguity	New A.2.9.
100	Video / broadcast and AV Control object colours	Ambiguity	9.1.1.1, A.2.4.1
102	Stream event listeners and state changes in the video/broadcast object	Ambiguity	8.2.1.1
104	Clarify format of XHR responseText on DSM-CC carousel Directories/Stream Event and DVB URL examples	Ambiguity	8.2.2
105	Clarification of valid syntax for application/oipfCapabilities property & method	Ambiguity	10.2.4
106	Clarification of subtitle support for broadband streaming	Ambiguity	7.2.1, 7.3
108	Clarification of security exception for APIs restricted to broadcast-related applications required	Ambiguity	A.1
110	Add reference to XML event description file	Editorial	8.2.1.1

Reference	Short Description	Category	Clauses Impacted
121	Permit either TLS 1.2 (RFC 5246) or TLS 1.0 (RFC2246) or 1.1 (RFC4346)	Implementation	2.1, 7.3.2.3
123	Precedence between A.2.1 and 6.2.2.7	Ambiguity	A.2.1
124	Use of “Partially obscured” in 10.1.2	Ambiguity	10.1.2
125	Behaviour of video and audio for a stopped video/broadcast object	Ambiguity	A.2.4.1
127	Intrinsic events and DSMCC stream events	Error	8.2.1.3
128	Application visibility in the AIT	Ambiguity	7.2.3.1
129	Failure to start an application	Ambiguity	6.2.2.5.3
131	video presentation by the A/V control object	Ambiguity	10.1.3
132	app_id for trusted applications	Ambiguity	7.2.3.1
133	CI+ Usage	Ambiguity, Error	2.2, 8.2.3, 11.4.1, 11.4.2, A.1
136	Execution timing of GetComponent() function	Ambiguity	A.1
137	Restriction when using the AVC Baseline Profile	Implementation	7.3.1.3
138	DAE reference error	Editorial	Many
139	PlayStateChangedEvent in HbbTV Spec	Editorial	Many
140	Editorial change of table 14 for font reference	Editorial	10.2.1
141	Http redirect and application boundaries	Ambiguity	6.3
142	Clarification about setChannel()	Ambiguity	A.1
143	Clarify that both HTTP and HTTPS are supported	Ambiguity	6.3, 7.2.3.2
144	Version.macro should be version.micro	Editorial	7.2.3.1
145	Clarify what “fail” means	Ambiguity	A.2.4.2
146	Access to ProgrammeCollection	Ambiguity	A.1
147	Fixing conditions under which broadcast-independent applications can become broadcast-related	Error	6.2.2.6
148	Calling setChannel() with a null parameter	Ambiguity	A.2.4.1

Reference	Short Description	Category	Clauses Impacted
149	video/broadcast state transitions triggered by external events	Ambiguity	A.2.4.1
151	broadcast-indepenent applications and tuning failures	Ambiguity	A.2.4.2
152	Remove security restrictions to create embedded objects	Ambiguity	A.1
158	Clarification on using the keyset object	Editorial	10.2.2
159	Clarification on HTTP range header	Ambiguity	7.3.2.1
160	Clarification on HTTP redirect methods	Ambiguity	New section 7.3.2.5
161, 183	Require to store cookies in persistent memory	Ambiguity	10.2.1
163	Clarification on HTTP progressive streaming for live content	Ambiguity	7.3.2.1
165	Clarification on equivalent fonts	Ambiguity	10.2.1
166, 303	What to do after Application loading via DSMCC fails	Error	6.2.2.2, 6.2.2.3
167	Error reporting for application failure	Ambiguity	6.2.2.4, 6.2.2.5, new A.2.10
168	Supported character set	Ambiguity	10.2.1
184	video/broadcast object's setVolume/getVolume methods should be NI	Implementation	A.1
185	Use of a Single PID for AIT Signalling	Implementation	7.2.3.1
186	Clarification of Deferred Association Tag Support	Implementation	7.2.2
188	Description of addStreamEventListener method	Ambiguity	8.2.1.1
191	property 'Name' of StreamEvent	Editorial	8.2.1.2
197	Restrict application domain to not more than one FQDN	Error	6.3
200	onPlayPositionChanged	TBD	A.1
206	Open IPTV Forum Errata	Ambiguity	2.1, 7.3.1.4, A.1, A.2.1

Reference	Short Description	Category	Clauses Impacted
214	AV Control automatic transition clarification	Ambiguity	A.2.5
215	AV Control queue clarification	Ambiguity	A.2.5
217	Mismatch between some VK key codes and W3C spec	Error	10.2.2, A.1, new A.2.11
224	No application started from recorded broadcast content	Ambiguity	6.2.2.1
228	HE-AAC Container Format Clarification	Ambiguity	7.3.1.1
232	AIT Updates	Ambiguity	6.2.2.3
238	Capabilities for CI+ and DRM	Ambiguity	10.2.4, A.1
244	charCode defined as both included and not included	Ambiguity	A.1
253	Incorrect references into the OIPF DAE specification	Editorial	9.1.1.2, 9.1.2
254	Incorrect application type	Error	7.2.3.2
255	Missing text for ApplicationSpecificDescriptor	Error	7.2.3.2
256	Typo in Annex A	Editorial	A.1
257	When audio stops ...	Ambiguity	A.2.1
260	ISMA reference	Error	2.1
273, 385	URL Entry	Ambiguity	5.3.5, 6.2.2.6, 6.2.3, 10.2.3.1
275	Identical carousels and the org_id	Editorial	6.3
291	Broadcast parental access control	Ambiguity	10.2.6.1
294	XHR's responseText for DSMCC Directory and Stream Event	Ambiguity	8.2.2
301	Broadcast event subscriptions	Ambiguity	8.2.1.1
308	DLNA MP4 File Format Restrictions	Implementation	7.3.1.2
315	Alignment of broadcast video and the application plane	Ambiguity	10.1.2
349	Default background colour	Error	5.3.3.1, 10.1.1
350	Use of DVB URL to start applications	Ambiguity	9.2

Reference	Short Description	Category	Clauses Impacted
351	User-Agent examples	Error	7.3.2.4
352	Textual service identifier in DVB URL	Ambiguity	9.2
353	Clarify behaviour of stream events with video/broadcast state changes	Ambiguity	8.2.1.1, A.2.4.2
354	Video plane transparency	Ambiguity	10.1.2
356	The video/broadcast object stop method and broadcast-independent applications	Error	A.2.4.2
357	References to 6.2.2.7	Error	6.2.2.6
358	XML-AIT lifecycle on manual service change	Ambiguity	6.2.2.2
360	Resolutions greater than 1280x720	Ambiguity	10.2.1
370	Usage of the video/broadcast extension for recording and time shift	Ambiguity	6.2.2.4, 7.2.3.1, A.1, A.2.4.3
391	Reference to figure 13	Editorial	5.3.4
397	data_broadcast_id descriptor	Ambiguity	7.2.3.1
398	Object carousel caching	Ambiguity	7.2.5.1
401	Typo in reference to TS 102 809	Editorial	7.2.3.1
402	Impact of linking outside application domain on broadcast AV	Ambiguity	6.3
441	Encoding of numbers in XML	Ambiguity	2.1, 9.3.1
598	Tables in 7.3.1.1	Editorial	7.3.1.1

Key to categories

Ambiguity	Feature where different implementations may behave in different ways. This includes under-specified features as well as inconsistencies within the specification.
Editorial	Purely editorial change
Error	Clear technical error in the specification. Cannot be implemented as written.
Implementation	Feature removed, simplified or modified in order to simplify implementation and testing.

4 Technical Changes to TS 102 796

4.1 Clause 2 – References

4.1.1 Permit either TLS 1.2 (RFC 5246) or TLS 1.0 (RFC2246) or 1.1 (RFC4346)

The following additional normative references shall be added;

- [21] IETF RFC 2246 : "The Transport Layer Security (TLS) Protocol Version 1.0".
- [22] IETF RFC 4346 : "The Transport Layer Security (TLS) Protocol Version 1.1".
- [23] IETF RFC 5746 : "Transport Layer Security (TLS) Renegotiation Indication Extension".

4.1.2 CI+ Usage

Informative reference i.3 (ETSI TS 102 757) shall be removed.

4.1.3 Open IPTV Forum Errata

The following text shall be added to clause 2.1.

- [24] OIPF Release 1 IPTV Solution V1.1 Errata 1 [2010-07-27]

NOTE: Available at <http://www.oipftv.tv/downloads.html>.

NOTE: The Open IPTV Forum have published OIPF Release 1 IPTV Solution V1.1 Errata 2 [2011-03-10]. This is being reviewed and will be included to some extent in a subsequent version of the present document. This errata 2 includes changes which are not backwards compatible.

Any references in the text of this document to the OIPF specifications (references [1], [2], [4], [5] and [19]) shall take into account the errata in the relevant sections of the OIPF Release 1 IPTV Solution V1.1 Errata [24].

4.1.4 URL Entry

The following additional informative reference shall be added;

- [i.5] W3C, "How to Add a Favicon to your Site",
<http://www.w3.org/2005/10/howto-favicon>

4.1.5 Encoding of numbers in XML

The following additional normative reference shall be added;

- [25] XML Schema Part 2: Datatypes Second Edition

NOTE: Available at <http://www.w3.org/TR/xmlschema-2/>

4.2 Clause 6 – Service and Application Model

4.2.1 Failure to start an application

In clause 6.2.2.5.3, the second bullet point shall be changed as follows;

Available only through broadband: the terminal shall not display an error message for applications which were either unless the application was launched as autostart (e.g. following a channel selection or AIT update) or which were launched by another application.

4.2.2 Http redirect and application boundaries

In clause 6.3, the following paragraph relating to application boundaries shall have references to HTTP re-directs added as follows;

Documents loaded from outside the application domain shall be untrusted, for example documents loaded in an <iframe> element or documents loaded as a result of following a link or an HTTP redirect. Following a link or an HTTP redirect from outside the application domain back inside the application domain shall restore the trust level to the original trust level of the application.

4.2.3 Clarify that both HTTP and HTTPS are supported

In clause 6.3, “or HTTPS” shall be added to the following sentence as shown.

For applications loaded via HTTP or HTTPS, the application domain is the "fully qualified domain name" (FQDN) of the first page of the application in the absence of an application_boundary_descriptor.

4.2.4 Fixing conditions under which broadcast-independent applications can become broadcast-related

In section 6.2.2.6, in the second bulleted list, the first item shall be modified as follows;

The broadcast-independent application has an org_id and app_id (whether obtained was initially referenced through a broadcast AIT or an XML AIT)~~(and hence has an org_id and an app_id).~~

4.2.5 Restrict application domain to not more than one FQDN

In clause 6.3, the following additional paragraph shall be inserted between the one starting with “If an application_boundary_descriptor is present in the AIT” and the one starting with “The current application domain can be left by launching a new application”;

The terminal shall ignore any application_boundary_descriptor or applicationBoundary elements that attempt to extend the application domain where this would result in the application domain including entries for more than one FQDN.

4.2.6 No application started from recorded broadcast content

The following shall be added at the end of the first bulleted list in clause 6.2.2.1;

- Starting applications in response to the playback of recorded or downloaded content is not supported.

4.2.7 AIT Updates

The following text shall be added after the figure in clause 6.2.2.3.

In the above figure, the following clarifications shall apply;

1. For the purposes of deciding whether an application is already running or is still signalled, only the `organization_id` and `application_id` fields from the AIT shall be used. Other information (e.g. the URL of the first page) shall not be used.

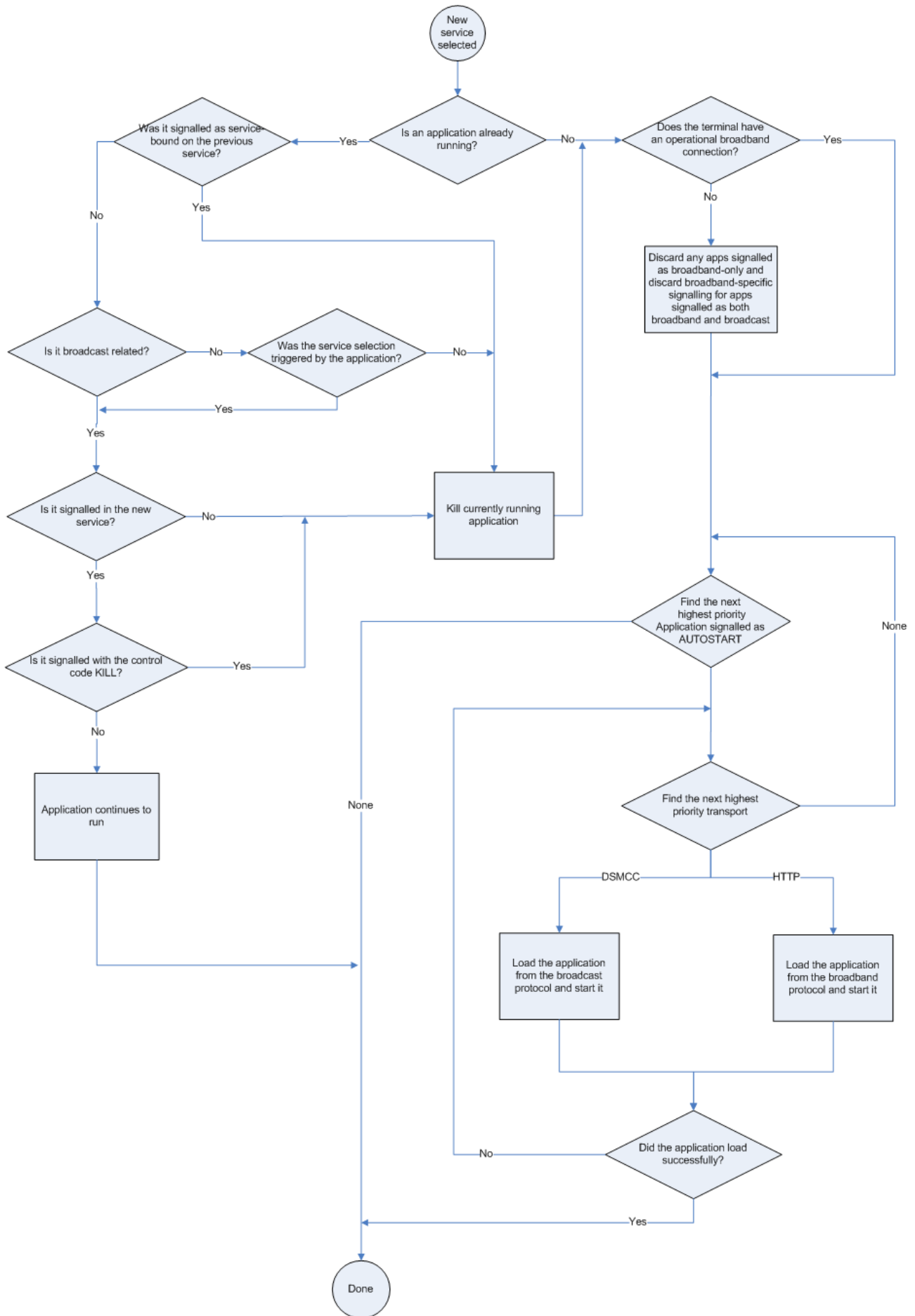
2. Other than `organization_id` and `application_id`, the only other field in the AIT which is relevant when the AIT is updated is the application control code. Changes in other fields shall be ignored for already running applications.

NOTE: As a result of the above, changes to fields in the AIT other than `organization_id`, `application_id` and application control code will only take effect for newly started applications. In order for those changes to effect an already running application, the application needs to exit and re-start. It is up to the broadcaster and/or application provider to arrange for this to happen.

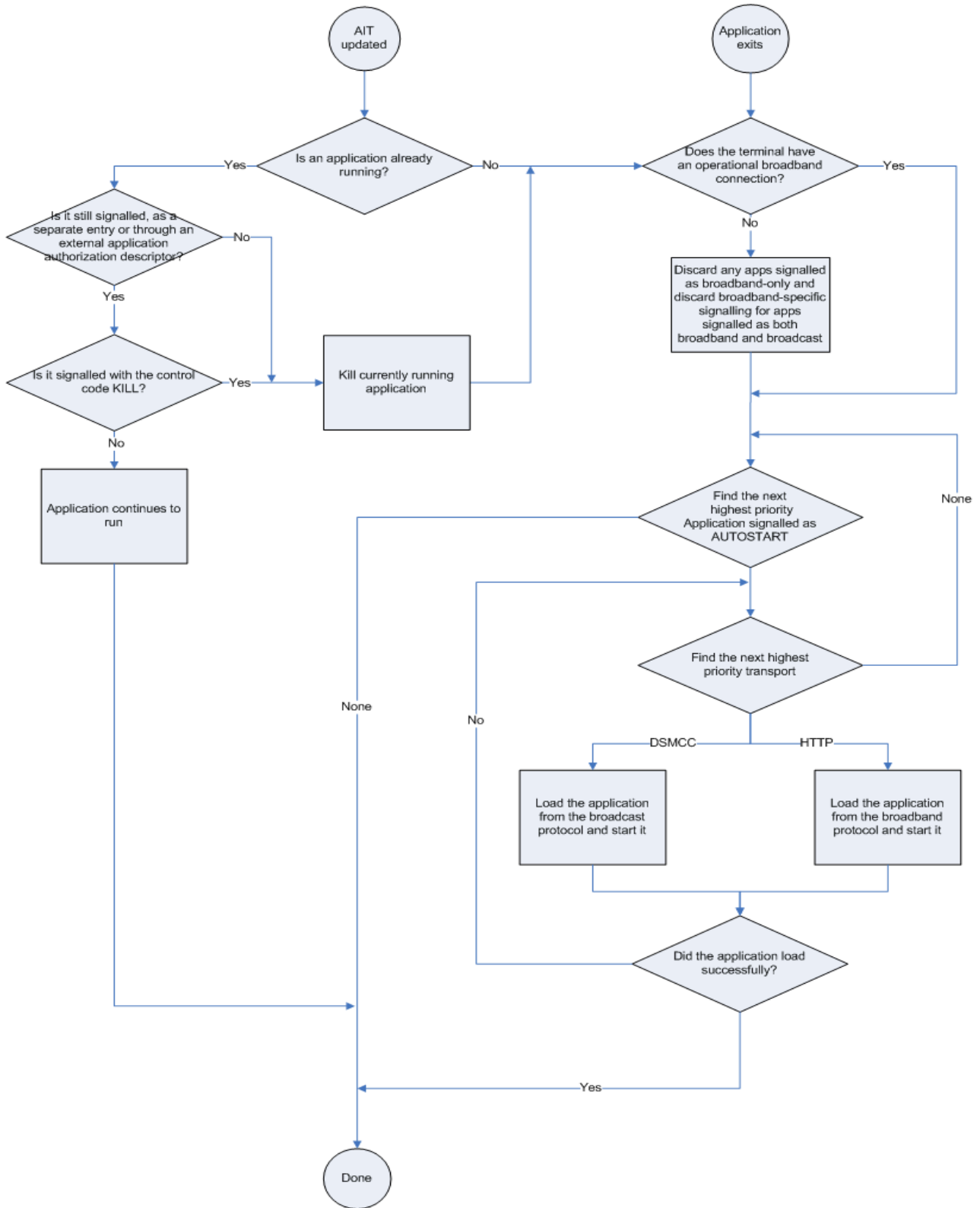
NOTE: A change in the version number of an AIT subtable is an indication to the terminal to retrieve a new version of the AIT. It does not imply or require any changes in the content of the AIT itself. For example, adding an application to the AIT would be an update to the AIT without changing the AIT entries for any existing applications.

4.2.8 What to do after Application loading via DSMCC fails

In clause 6.2.2.2, figure “Behaviour when selecting a broadcast service” shall be revised as follows;



In clause 6.2.2.3, figure “Behaviour while a broadcast service is selected” shall be revised as follows;



4.2.9 Error reporting for application failure

The last paragraph of clause 6.2.2.5.3 shall be modified as follows;

If the application cannot ultimately be loaded from either broadcast or broadband, ~~an error shall be returned if the~~ and the application was launched by a call to createApplication(), an ApplicationLoadError shall be dispatched. Once the initial page of an application has been successfully loaded, the present document does not specify how terminals should behave if a page from that application subsequently fails to load.

The following text shall be added at the end of clause 6.2.2.4;

When one application requests a second application be started, the first application shall continue to run until the initial HTML document of the second application has been loaded - i.e. until after an ApplicationLoadError event would be generated (if any listener was registered). Only then shall the first application be stopped.

4.2.10 Identical carousels and the org_id

In clause 6.3, the text (in common with TS 102 809) between;

Two object carousels shall be considered identical if, in the PMTs of the respective services, either of the following hold:

and

- The carousel_identifier_descriptor for the carousels are identical in both services (so the carousels have the same carousel_id and boot parameters).

Shall be removed and replaced with the following;

The requirements for two carousels to be identical shall be as defined in clause B.2.10 of TS 102 809 [3].

NOTE: For carousels delivered via different transport streams, the terminal compares the two carousel_ids. The use of the broadcaster's organization_id in the 24 MSBs of the two carousel_ids is a means to obtain unique carousel_ids and is not visible to the terminal.

4.2.11 URL Entry

In clause 6.2.2.6, the second bullet point in the first bulleted list shall be revised as shown;

- Optionally fFrom a terminal specific application like an Internet TV Portal or following manual URL input as described in clause 5.3.5.

4.2.12 References to clause 6.2.2.7

In clause 6.2.2.6, the two instances of “Access to broadcast resources shall be lost as described in clause 6.2.2.7” shall be replaced with “Access to broadcast resources shall be lost and the object shall transition to the unrealized state”.

4.2.13 Impact of linking outside application domain on broadcast AV

In clause 6.3, immediately after the paragraph beginning “Documents loaded from outside the

application domain shall be untrusted”, the following note shall be added.

NOTE: An application being broadcast-related or broadcast-independent is not impacted by this change in trust level.

4.2.14 Usage of the video/broadcast extension for recording and time shift

The following text shall be added to the end of clause 6.2.2.4.

If the terminal initiates time-shifting of the currently selected broadcast service, an application may get out of sync with the presentation of the audio-video components of this service. An HbbTV application shall be terminated if it is not safe to run it on a time-shifted broadcast service. An application is safe to run in time shift mode, if it is signaled in the AIT with an `applicaton_recording_descriptor` and both the `trick_mode_aware_flag` and the `time_shift_flag` set to ‘1’ as described in clause 7.2.3.1. If an application is killed due to a broadcast service being time-shifted, the procedure defined in clause 6.2.2.2 for selecting an autostart application to run shall be followed except that only applications that are time-shift safe shall be considered.

After starting time-shift a terminal shall:

- dispatch a `RecordingEvent` to signal a state change to state 11 “time-shift mode has started” of the PVR state machine
- update the `recordingState`, `playPosition` and `playSpeed` properties of the video/broadcast object

After stopping time-shift a terminal shall:

- dispatch a `RecordingEvent` to signal a state change to state 0 “unrealized” of the PVR state machine

The present document defines two implementation options for support of applications when video is time-shifted - depending on whether the terminal can or cannot maintain synchronization between applications and the A/V components of a service. Which of these two options is implemented by a terminal is indicated by the `timeShiftSynchronized` property.

When a terminal can maintain synchronization between applications and the A/V components of a service, all of the following shall apply;

- DSMCC stream event descriptors shall be recorded with the A/V components keeping the timing relation and shall be delivered during playback of the time-shift
- The AIT shall be monitored, any changes shall take effect preserving the correct timing with respect to the A/V components
- The service information shall be recorded with the A/V components keeping the timing relation and the properties of the video broadcast object (e.g. programmes, AVComponent as defined in clause 7.13.4 of the OIPF DAE

specification [1])) changes at the proper time of the playback of the time-shift

- The `timeShiftSynchronized` property shall be set to true (see clause A.2.4.3)

If a terminal is not able to maintain synchronization between applications and the A/V components of a service

- The application may receive some (or all) broadcast resources from the live broadcast signal instead of the time shift playback.
- It shall set the `timeShiftSynchronized` property to false

Note: when an application accesses service information or receives stream events, it may check if it is synchronized with the A/V component of the service by reading the values of the properties `recordingState` and `timeShiftSynchronized`.

4.3 Clause 7 – Formats and Protocols

4.3.1 External application authorization descriptor

In clause 7.2.3.1 “Broadcast signalling”, in Table 5 “Supported application signalling features”, the row for “5.3.5.7 External application authorization descriptor” shall be “NI” not “M”.

4.3.2 Clarification of subtitle support for broadband streaming

Clause 7.2.1 shall be modified as follows;

7.2.1 System, video, and audio and subtitle formats

The present document does not contain any requirements for system, video, ~~and audio~~ and subtitle formats for the broadcast channel.

These requirements are defined by the appropriate specifications for each market where the terminals are to be deployed.

In clause 7.3, Table 8: “System, video and audio formats” shall have an extra column and note added as follows;

Table 1: System, video and audio formats

System Format	Video Format	Audio Format	Subtitle format	MIME Type
TS	AVC_SD_25 AVC_HD_25	HEAAC E-AC3 (see note1)	See note2.	video/mpeg
MP4	AVC_SD_25 AVC_HD_25	HEAAC E-AC3 (see note1)	Not defined in the present document.	video/mp4
NOTE1: Terminals shall support E-AC3 for the broadband channel when it is supported for the broadcast channel. Otherwise it is not included.				
NOTE2: Terminals shall support the same subtitle formats for the broadband channel as are supported for the broadcast channel.				

4.3.3 Permit either TLS 1.2 (RFC 5246) or TLS 1.0 (RFC2246) or 1.1 (RFC4346)

The following changes shall be made to clause 7.3.2.3;

HTTP as defined in RFC 2616 [7] and HTTP over TLS as defined in RFC 2818 [8] ~~and RFC 5246 [9]~~ shall be supported for transporting application files over broadband. TLS 1.2 (RFC 5246 [9]) should be supported for HTTP over TLS, if not then TLS 1.1 (RFC4346 [22]) should be supported instead and if neither of those is supported then then TLS 1.0 (RFC 2246 [23]) shall be supported instead.

NOTE: TLS 1.2 provides a much higher security level than TLS 1.0 and 1.1 so manufacturer are recommended to support it. Note also that TLS 1.0 and 1.1 are obsoleted by the TLS 1.2 specification. It is expected that future versions of the present document will require support for TLS 1.2 and omit the possibility of only supporting TLS 1.0 or 1.1.

When using HTTP over TLS the server may send a client certificate request during the TLS handshake as defined in RFC 2818 [8]. The TLS stack implementation shall support negotiation and delivery of client certificates to the server as defined in RFC 5246 [9], RFC 4346 [22] and RFC 2246 [21]. The client certificate shall comply with RFC 5280 [10]. The provision of these certificates is outside the scope of the present document as explained in clause 11.3.

The terminal shall support the default cipher suite of TLS as defined by clause 9 in RFC 5246 [9] or RFC 2246 [21] or RFC 4346 [22] as appropriate.

In order to fix a known vulnerability in SSL and TLS renegotiation, the terminal shall support the Renegotiation Indication Extension as specified in RFC 5746 [23].

4.3.4 Application visibility in the AIT

In clause 7.2.3.1, in table 5: “Supported application signalling features”, in the row for “5.2.6 Application visibility”

- The status shall be changed to “M/NI”
- The notes column shall contain “VISIBLE_ALL shall be signalled. Values other than VISIBLE_ALL are not included in the present document.”

4.3.5 app_id for trusted applications

In clause 7.2.3.1, in Table 5 “Supported application signalling features”, the notes for the row “5.2.3 Application identification” shall be extended with the following:

Applications signalled with an application_id in the range of unsigned application shall be started as untrusted. Applications signalled with an application_id in ranges other than signed and unsigned are outside the scope of this specification. If not otherwise required by other specifications, these applications shall not be started and discarded by the platform"

4.3.6 Restriction when using the AVC Baseline Profile

In clause 7.3.1.3, the following text shall be deleted.

with the following modifications:

- AVC baseline profile @ level 2 shall also be supported.

4.3.7 Clarify that both HTTP and HTTPS are supported

In clause 7.2.3.2, “or HTTPS” shall be added to the following sentence as show.

The XML file shall be delivered with HTTP or HTTPS using the "application/vnd.dvb.ait+xml" MIME type as defined in clause 5.4 of TS 102 809 [3].

4.3.8 Version.macro should be version.micro

In clause 7.2.3.1, in table 5 “Supported application signalling features”, in the row for 5.2.5 “Platform profiles”, “version.macro” shall be “version.micro”.

4.3.9 Clarification on HTTP range header

In clause 7.3.2.1, the first sentence shall be extended as follows;

Unicast streaming using HTTP 1.1 shall be supported as defined in clause 5.2.2.2 of the OIPF protocols specification [4] with the addition that the ~~range~~Content-Range header shall be supported in seek operations thus allowing the application to seek to any arbitrary position within the streaming video without the need of downloading the complete video first.

4.3.10 Clarification on HTTP redirect methods

A new clause 7.3.2.5 shall be added as follows;

HTTP redirects as defined in [HTTP] in response to a HTTP request shall be supported as described in this clause.

- The terminal SHALL support responses with a status code of “302 Found” and “307 Temporary Redirect” by using the temporary URL given in the Location field.
- The terminal SHALL support at least one redirection.

4.3.11 Clarification on HTTP progressive streaming for live content

In clause 7.3.2.1, the following additional paragraph shall be added between the current first and second paragraphs.

HTTP chunked transfer coding shall be supported as defined by section 3.6.1 of RFC2616 [7].

4.3.12 Incorrect application type

In clause 7.2.3.2, in Table 7 ”Contents of XML AIT for Broadcast-independent applications”, the row for “applicationDescriptor/type” shall read as follows;

applicationDescriptor/ type/OtherApp	Shall be " application/vnd.hbbtv.x html+xml " for Hybrid Broadcast Broadband TV applications.	Mandatory. Mime types other than " application/vnd.hbbtv.xhtml +xml " are outside the scope of the present document.
---	---	--

4.3.13 Missing text for ApplicationSpecificDescriptor

In clause 7.2.3.2, in Table 7 "Contents of XML AIT for Broadcast-independent applications", the row for "applicationSpecificDescriptor" shall be modified as follows;

applicationSpecificDescriptor/ <u>OtherDescriptor</u>	Shall be HBBTVApplicationSpecificD escriptor as defined by the present document.	For future use.
--	---	-----------------

4.3.14 Open IPTV Forum Errata

In clause 7.3.1.4, the following changes shall be made to the final bullet point;

The terminal shall use metadata, where provided, to control the stereo down-mix from multichannel audio, and shall use it, or pass it through, when providing bitstream output. Such metadata may be provided as described in the OIPF Media Formats specification [2] ~~clause 4.6.8.3 of ISO/IEC 14496-3 [14], annex C of TS 101 154 [15] and clause 6.8 of TS 102 366 [16].~~

4.3.15 Clarification of Deferred Association Tag Support

The following text shall be added to clause 7.2.2.

The use of the `deferred_association_tags_descriptor` for the purpose of referencing an elementary stream (TS 102 809 section B.3.1.1 and B.3.2) is not required by the present document. However this signalling may be present in a broadcast transport stream and acted upon by receivers that support this. Consequently, authors/broadcasters/operators should not expect this signalling to be ignored if it is present in the broadcast transport stream.

If elementary streams present in other services are to be referenced, then that elementary stream will also be required to be present in the current services PMT.

The use of the `deferred_association_tags_descriptor` to support the `BIOP_PROGRAM_USE` tap (TS 102 809 section B.3.1.2) is required by the present document.

4.3.16 Clarification of HE-AAC Container Format

The following text shall be added after table 9;

NOTE: The HEAAC pure audio media format implies carriage of HE-AAC audio inside the MP4 system format container.

4.3.17 DLNA MP4 File Format Restrictions

In the first paragraph of clause 7.3.1.2, the reference to the MP4 file format and to TS 102 366 shall be deleted. The following new text shall be inserted after that paragraph.

The MP4 File Format shall comply with clause 4 of the OIPF Media Formats specification [2] and the following additions:

- For E-AC3 it shall comply with TS 102 366 [16] in addition
- The size of the moov box should not exceed 2.5 MByte
- Note: Large moov boxes will slow down start up times especially for broadband connections with a small bandwidth
- The largesize field may be used. The size of a box should not exceed 4GByte.

4.3.18 User-Agent Examples

In clause 7.3.2.4, the two examples of user-agent strings shall be replaced with the following;

User-Agent: HbbTV/1.1.1 (+PVR+DL; Sonic; TV44; 1.32.455; 2.002;)

User-Agent: HbbTV/1.1.1 (;;;;;)

4.3.19 Use of a Single PID for AIT Signalling

In clause 7.2.3.1, in table 5 “Supported application signalling features”, in the row for clause 5.3.4 of TS 102 809, the first paragraph in the Notes cell shall be replaced with the following;

A maximum of one PID per service shall be used to carry the AIT sub-table defined by the Hybrid Broadcast Broadband TV application type.

4.3.20 data_broadcast_id descriptor

In clause 7.2.3.1, in table 5 “Supported application signalling features”, in the row for clause 5.3.5.2 of TS 102 809, an extra sentence shall be inserted as shown.

The value to be used for the data_broadcast_id field of the data_broadcast_id_descriptor for Hybrid Broadcast Broadband TV carousels shall be 0x0123. The id_specific_data are not defined. By supporting this optional feature, terminals can reduce the time needed to mount a carousel.

4.3.21 Object carousel caching

The following extra sentence shall be added to the end of the 1st paragraph in section 7.2.5.1.

Additionally a terminal may read and cache and monitor several carousels in parallel in order to decrease the loading time as experienced by the user.

4.3.22 Usage of the video/broadcast extension for recording and time shift

In clause 7.2.3.1, in table 5: “Supported application signalling features”, in the row for “5.3.5.4 Application recording descriptor”, the status column shall contain “M/NI” and the Notes column shall contain the following;

Support of the application_recording_descriptor is mandatory when the terminal has support for time-shift. Otherwise it is not included.

The semantics of the application_recording_descriptor for HbbTV are clarified below this

table.

The following text shall be added after the table;

The semantics of `application_recording_descriptor` are as follows

- Applications that are safe to run in time-shift including trickmode shall set the `trick_mode_aware` flag and the `time_shift_flag` to '1'.
- The `scheduled_recording_flag` is not included.
- If applications are signalled with `trick_mode_aware` set to '0' the `timeshift_flag` shall be ignored.
- The `dynamic_flag` and `av_synced_flag` shall be used as defined by [TS102809]
- `initiating_replay_flag` is not included.
- `label_count`, `label_length`, `label_char`, and `storage_properties` are not included.
- Applications shall list broadcasted data components in the component tag list. The elementary stream carrying the AIT does not need to be listed.

4.3.23 Tables in 7.3.1.1

In clause 7.3.1.1, the following changes shall be made;

The sentence just before table 8 shall be changed to:

Table 8 defines the subset of the combinations of system, video and audio formats specified in the OIPF Media Formats specification [2] that shall be supported.

The sentence just before table 9 shall be changed to:

Table 9 defines the subset of audio formats specified in the OIPF Media Formats specification [2] that shall be supported for audio-only services and audio clips.

The title of table 9 shall be changed to:

Table 9: Formats for audio-only services and audio clips

4.4 Clause 8 – Browser Application Environment

4.4.1 Stream event listeners and state changes in the video/broadcast object

In clause 8.2.1.1 “Adding and removing stream event listeners”, the description of the method “void `addStreamEventListener(String targetURL, String eventName, EventListener listener)`” shall be changed as follows;

Add a listener for the specified DSM-CC stream event.

~~When the event is found, a `StreamEvent` event with "`StreamEvent`" type shall be dispatched and passed to the event listener.~~

When a broadcaster transmits an identical instance of the MPEG private data section carrying an stream event descriptor (including the version number), only one StreamEvent event shall be dispatched.

When a broadcaster transmits different events using the same event name id (i.e. with different version numbers), one StreamEvent event shall be dispatched for each different stream event descriptor received.

An event shall also be dispatched in case of error.

~~When a broadcaster transmits an identical instance of the MPEG private data section carrying an event (including the version number), only one event shall be dispatched. When a broadcaster transmits different events using the same event name (i.e. with different version numbers), one event shall be dispatched for each different event received.~~

Listeners can only be added while the video/broadcast object is in the Presenting or Stopped states. Calls to this function when the video/broadcast object is in another state shall have no effect.

The terminal shall automatically unregister all listeners on the video/broadcast object in the following cases:

- A transition to the Unrealized state (e.g. when becoming broadcast-independent)
- A transition to the Connecting state that is due to a channel change

Listeners are not unregistered when transitioning to the Connecting state due to a transient error that does not result in a change of channel.

4.4.2 Clarify format of XHR responseText on DSM-CC carousel Directories/Stream Event and DVB URL examples

In clause 8.2.2, table 11 “Values of the responseText and responseXML properties” shall be modified as follows;

DSM-CC object	URL example	responseText	responseXML
File	/weather/data.xml	Returns the “text response entity body” as defined in XMLHttpRequest [12].	If the file has the extension “.xml”, returns the “XML response entity body” as defined in XMLHttpRequest [12]. <u>Otherwise, returns null.</u>
Directory	/weather	Comma-separated list of <u>names (File name, Stream Event name or Directory name) of all objects in the directory. These names shall not include path information.</u>	null
Stream Event	/weather/main/streamEvt1	Comma-separated list of <u>names of all events in the Stream Event object.</u>	null

Also in clause 8.2.2, the examples shall be modified with the following additional text;

Examples of `dvb:` URLs that may be used with the `XMLHttpRequest` object are:

`/weather/data.xml` (absolute path from the root of the carousel of the current page)

`../weather/data.xml` (relative path to the current page)

`dvb://1..1.B8/weather/data.xml` (0xB8 is the component tag)

4.4.3 Intrinsic events and DSMCC stream events

Clause 8.2.1.3 shall be removed

4.4.4 CI+ Usage

Clause 8.2.3 and all sub-clauses shall be removed.

4.4.5 property 'Name' of StreamEvent

In clause 8.2.1.2, in the descriptions of the properties, the “Name” property shall be called “name” to match with the signature definition.

4.5 Clause 9 – System Integration

4.5.1 Video / broadcast and AV Control object colours

In clause 9.1.1.1, the second line shall be modified and a new third line added as follows;

- Stopping playback shall cause the video ~~plane to be made transparent~~ and the audio to stop.
- When not presenting video, the AV Control object shall be rendered as an opaque black rectangle.

4.5.2 Textual service identifier in DVB URL

The following text shall be added to clause 9.2;

Support for DVB URLs including the textual service identifier is not required in the present document.

4.5.3 DVB URL and Starting Applications

The text in clause 9.2 relating to the DVB URL shall be modified as follows;

The dvb: URL scheme as included in TS 102 809 [3] shall be supported as follows:

- It shall be possible to use dvb: URLs including path_segments to refer to DSM-CC file objects and to DSM-CC stream event objects signalled in the current service. It shall be possible to append to URLs referring to DSM-CC file objects an optional query string or anchor, e.g. to pass parameters to an application. The ‘?’ and ‘#’ characters shall not be used in the name of a DSM-CC file object that is part of an HbbTV application.
- It shall be possible to use dvb: URLs referring to applications signalled in the current service as defined in table 4 of TS 102 851 [11] and optionally appended anchors with the Application.createApplication() method. Use of dvb: URLs referring to applications from another service will cause createApplication() to fail as if the initial page could not be loaded. Parameters and anchors assigned to this DVB URL shall be parsed and attached to the application location URL signalled inside the corresponding AIT as follows:
 - If both URLs contain parameters, the parameters of the DVB application URL are appended to application location URL using an ampersand sign ‘&’. The terminal shall not check for and merge duplicates in the parameter lists.
 - If both URLs contain an anchor, the anchor of the DVB application URL takes precedence and overwrites the one in the application location URL
 - The window.location.href property shall take the value of the resulting URL, including any parameters. An anchor shall be available in the window.location.hash property and parameters in the window.location.search property.

Examples for a resulting URL include:

- URL signaled in the AIT: <http://www.example.com/app1?param1=value1>

createApplication URL: dvb://current.ait/1.1?param2=value2#foo

Resulting URL: <http://www.example.com/app1?param1=value1¶m2=value2#foo>

- URL signaled in the AIT: <http://www.example.com/app1?param1=value1#test>

createApplication URL: dvb://current.ait/1.1#foo

Resulting URL: http://www.example.com/app1?param1=value1 #foo

- The application is signaled in a DSMCC Carousel with a Component Tag of 4 and a Base URL of /index.php?param1=value1 and the current service location is dvb://1.2.3

createApplication URL: dvb://current.ait/1.1?param2=value2#foo

Resulting URL: dvb://1.2.3.4/index.php?
param1=value1¶m2=value2#foo

4.5.4 Encoding of numbers in XML

The following text shall be added to clause 9.3.1.

For the XML schema defined in clause 8.2 of TS 102 809 [3] the following restrictions shall apply.

The value of the stream_event_id attribute of the type StreamEventType shall represent a positive/unsigned integer with a maximum value of 65535. The lexical representation of the value shall be as defined by clause 3.3.23 “unsignedShort” of [25]

The value of the component_tag attribute of the type DsmccObjectType shall represent a positive/unsigned integer with a maximum value of 255. The lexical representation of the value shall be as defined by clause 3.3.24 “unsignedByte” of [25]

4.6 Clause 10 – Capabilities

4.6.1 Use of “Partially obscured” in 10.1.2

In section 10.1.2, the following paragraph shall be updated as shown;

Depending on the Z index of the video/broadcast object with respect to other HTML elements (regardless of whether the object is in "fullscreen mode" or not), presented opaque video may fully or partially ~~obscure~~overlap other HTML elements with a lower Z index, and may in turn be fully or partially ~~obscured~~overlapped by HTML elements with a higher Z index.

4.6.2 video presentation by the A/V control object

A new clause 10.1.3 shall be inserted as follows;

10.1.3 Interaction with the AV Control object

When an AV Control object is presenting video:

- When the AV Control object is not in "full-screen mode", any video being presented shall be scaled and positioned to fit the AV Control object preserving the aspect ratio as defined in Table 14 “Minimum terminal capabilities”. Any part of the AV control

object which does not contain video shall be black.

- When the AV Control object is in "full-screen mode", presented video shall be scaled to fit the logical video plane. The terminal may further scale and/or position video, for example to remove black bars.
- Depending on the Z index of the AV Control object with respect to other HTML elements (regardless of whether the object is in "fullscreen mode" or not), presented opaque video may fully or partially overlap other HTML elements with a lower Z index, and may in turn be fully or partially overlapped by HTML elements with a higher Z index. As a result of this, video may appear to be presented in a plane other than the logical video plane. The present document is intentionally silent about the mechanism used by terminals to achieve this behaviour.

4.6.3 Clarification on using the keyset object

The following note shall be added to the end of clause 10.2.2.

NOTE: Applications must set the NAVIGATION bit of the keyset object even if the navigation keys are only used for focus based navigation (including the CSS nav-* properties) and not used in javascript event handlers.

4.6.4 Require to store cookies in persistent memory

In clause 10.2.1, the following additional row shall be added to table 14 "Minimum terminal capabilities".

Cookie support	Cookies with an expiry date shall be stored in persistent memory. Terminals shall respect the expiry date of the cookie. The requirements on size and number of cookies defined in clause 9.1 of the OIPF DAE specification [1] shall be supported.	
----------------	---	--

4.6.5 URL Entry

The following additional text shall be added to the end of clause 10.2.3.1.

For the presentation of applications on manufacturer portals or in favourite lists the terminal may use a title and an icon specified in the HTML head section and the URL of the initial page of the application.

- The application name is defined by the HTML title element
- The application may have multiple title elements to provide a name in different languages using the lang attribute.
- The linking to an application icon is done by an HTML link element with the following attributes. See also [i.5]
 - rel – shall have the value 'icon'
 - type – shall contain the mime type of the image format
 - href – shall be the URL of the image

- The image format and mime types of the icon shall be as defined in section 7.1.1
- An application may have multiple icons for different aspect ratios, e.g. 4 by 3 and square. It is recommended that an application provides at least one icon with a square aspect ratio.

4.6.6 Supported character set

In clause 10.2.1, in table 14 “Minimum terminal capabilities”, in the row “Supported proportional font”, the 4 references to the Tiresias screenfont shall have “ v8.03” added.

4.6.7 Broadcast parental access control

In clause 10.2.6.1, text shall be inserted as follows;

Terminals shall support parental access control for the broadcast channel as required for the markets in which the products are to be sold or deployed. The details of this are outside the scope of the present document. Typically the end user may have to enter the appropriate PIN in order to obtain access to TV content above the parental rating threshold. The following shall apply if access to broadcast TV content is blocked as a result:

4.6.8 Clarification of valid syntax for application/oipfCapabilities property & method

The following changes shall be made to clause 10.2.4;

- 1) The clause shall be renamed to “Hybrid Broadcast Broadband TV reported capabilities and option strings”.
- 2) The following text shall be inserted at the start of the clause;

For the base level of features, the following XML text shall be used for the xmlCapabilities property of the application/oipfCapabilities embedded object:

```
<profilelist>
  <ui_profile name="OITF_HD_UIPROF+DVB_S+ " />
  <video_profile name="TS_AVC_SD_25_HEAAC" type="video/mpeg" />
  <video_profile name="TS_AVC_HD_25_HEAAC" type="video/mpeg" />
  <video_profile name="MP4_AVC_SD_25_HEAAC" type="video/mp4" />
  <video_profile name="MP4_AVC_HD_25_HEAAC" type="video/mp4" />
</profilelist>
```

“DVB_S” can be replaced by the appropriate string(s) for the supported broadcast delivery system(s).

Only the video format profiles supported for broadband shall be listed.

As mentioned in table 8, the terminal may also support E-AC3 audio, in which case the following entries in the list of supported video format profiles are appropriate:

```
<video_profile name="TS_AVC_SD_25_E-AC3" type="video/mpeg" />
<video_profile name="TS_AVC_HD_25_E-AC3" type="video/mpeg" />
<video_profile name="MP4_AVC_SD_25_E-AC3" type="video/mp4" />
<video_profile name="MP4_AVC_HD_25_E-AC3" type="video/mp4" />
```

- 3) The text “The strings defined in this clause shall be used to indicate which options are supported by a terminal. They shall be used in the HTTP User-Agent header for applications data retrieval through HTTP and as parameters of a JavaScript API to dynamically query the options supported by

the terminal.” shall be revised as follows;

The strings defined in table 16 shall be used to indicate which options are supported by a terminal. They shall be used:

- 1) in the HTTP User-Agent header for applications data retrieval through HTTP
- 2) in the ui_profile element’s name property of the xmlCapabilities property of the application/oipfCapabilities embedded object
- 3) as parameters of the hasCapability() method of the application/oipfCapabilities embedded object to dynamically query the options supported by the terminal.

4) The following text shall be added at the end of clause 10.2.4.

The support of the DRM feature shall be indicated using the <drm> element defined in Annex F of the OIPF DAE specification [1]. For example:

```
<drm DRMSystemID="urn:dvb:casystemid:12345">TS</drm>
```

The support of CI+ shall be indicated using the <drm> element defined in Annex F of the OIPF DAE specification [1] and providing the protectionGateways attribute with “ci+” string. For example:

```
<drm DRMSystemID="urn:dvb:casystemid:12345" protectionGateways="ci+">TS</drm>
```

4.6.9 Clarification on equivalent fonts

The following text shall be added to clause 10.2.1 immediate after table 14 “Minimum terminal capabilities”;

An equivalent font is one for which all the following are true:

- The line height of both fonts is the same.
- The widths of the glyphs for corresponding character points are the same in both fonts (where the character point is defined in both fonts).
- The kerning tables contain the same values for both fonts where both of the character points in the pair are present in both fonts.
- The appearance of the glyphs is visually similar.

4.6.10 Mismatch between some VK key codes and W3C spec

The following text shall be added to the end of Section 10.2.2 User Input;

Note that VK_* key codes are defined as properties of KeyEvent interface and do not have a “global” Javascript scope.

For example, if an application wants to check if a user pressed the “Enter” key, it should use Javascript like the following code fragment:

```
if(e.keyCode == KeyEvent.VK_ENTER)
  //handle the user input.
```

Furthermore constant values for VK_* key codes defined by CEA2014-A Annex F are OPTIONAL for this specification as clarified in Section A.2.11.

4.6.11 Alignment of broadcast video and the application plane

In clause 10.1,2 the paragraph “When the video/broadcast object is not in "full-screen mode", any

broadcast video being presented shall be scaled and positioned to fit the video/broadcast object. The area of the video plane not containing video shall be transparent.” shall be replaced with the following;

- When the video/broadcast object is not in "full-screen mode", any broadcast video being presented shall be scaled and positioned in the video/broadcast object in the following way:
 - if the video/broadcast object has the same aspect ratio as the video the four corners of the video shall match exactly the corners of the video/broadcast object
 - otherwise the video shall be scaled such that one side of the video fills the video/broadcast object fully without cropping the picture. The aspect ratio shall be preserved. Along the side where the video is shorter than the video/broadcast object, the video shall be centered. The area of the video plane not containing video shall be opaque black.

4.6.12 Default Background Colour

In clause 10.1.1, the following paragraph shall be extended as shown;

The "Hybrid Broadcast Broadband TV application graphic plane" shall be used to display the Hybrid Broadcast Broadband TV application. This plane is on top of the subtitles plane in the logical display stack. The logical resolution of this plane is 1 280 pixels horizontally by 720 pixels vertically. The default background color of the browser rendering canvas (as defined in Section 2.3.1 of CSS2.1) is terminal specific. Applications should explicitly set the background of their <body> element using (for example) the “background-color” CSS rule or any equivalent construct.

4.6.13 Resolutions greater than 1280x720

In clause 10.2.1, in table 14 “Minimum terminal capabilities”, in the row “Screen resolution” shall be replaced with the following;

	Value	Characteristic
Hybrid Broadcast Broadband TV application graphic plane resolution	1280 pixels horizontally by 720 pixels vertically with a 16:9 aspect ratio.	The terminal shall have at least this graphics resolution. If it is physically higher than this then the resolution shall appear to the applications to be exactly 1280x720 pixels.

4.7 Clause 11 – Security

4.7.1 CI+ Usage

In clause 11.4.1, the following changes shall be made;

Terminals supporting CI+ for protected content via broadcast shall support the following mapping from the application/oipfDrmAgent embedded object to the CI+ protocol as defined by clause 4.2.3 ‘CI+ based Gateway’ of the OIPF CSP specification [5]:

- 4.2.3.1 Mandatory
- 4.2.3.2 Mandatory
- 4.2.3.3 Mandatory
- 4.2.3.4 Mandatory, except for ~~4.2.3.4.1.1.5-6-7, 4.2.3.4.1.1.9-10~~, 4.2.3.4.1.2 and 4.2.3.4.3 which are Not Included
- 4.2.3.5 N/A
- 4.2.3.6 Not Included
- 4.2.3.7 Mandatory using URI (Usage Rule Information) as defined in section 5.7 of CI Plus [13] if the PVR feature is supported otherwise Not Included, the PVR resource as defined in section 15 of CI Plus [13] is Not Included
- 4.2.3.8 Mandatory using URI (Usage Rule Information) as defined in section 5.7 of CI Plus [13] if the PVR feature is supported otherwise Not Included, the PVR resource as defined in section 15 of CI Plus [13] is Not Included
- 4.2.3.9 Not Included
- 4.2.3.10 N/A

Terminals supporting CI+ shall accept CI+ CICAMs that do not support the OIPF extensions defined by clause 4.2.3 ‘CI+ based Gateway’ of the OIPF CSP specification [5]. Specifically, the failure for any reason to set up the SAS connection with the Open IPTV Forum private host application ID shall not stop other CI+ functionality, that does not depend upon this connection, from working normally.

Terminals supporting an embedded CA solution should support a mapping from the application/oipfDrmAgent to the embedded CA system to provide the same functionality as defined above.

Clause 11.4.2 and all sub-clauses shall be removed.

4.8 Annex A – OIPF DAE Specification Profile

4.8.1 Clarify security exceptions for restricted APIs

The following changes shall be made to Table A.2 “Key to security column”;

1) the row for “broadcast-related” shall have the following text added to the description.

If other applications or web pages try to use this API, the terminal shall throw an error with the message property set to SecurityError (see clause 10.1.1 of the OIPF DAE specification [2]).

Note that for embedded objects, broadcast-independent applications may acquire instances of them without restrictions, either through the object factory or by using HTMLObjectElements. Security restrictions are enforced only when the application attempts to access properties or execute functions on the objects.

2) The row for “trusted” shall have the following text added to the description.

Note that for embedded objects, untrusted applications may acquire instances of them without restrictions, either through the object factory or by using HTMLObjectElements.

Security restrictions are enforced only when the application attempts to access properties or execute functions on the objects.

4.8.2 Media Resource Management

Clause A.2.1 shall be replaced with the following;

NOTE: This clause modifies clarifies clause 4.4.5 of the OIPF DAE specification [12].

The phrase “when the interrupting audio ends”, as used in this section, shall be interpreted as meaning when the AV Control object transitions to the finished or to the error or to the stopped state.

If insufficient resources are available to present the media, the attempt to play the media shall fail except for the specific cases of starting to play audio from memory (as defined in the OIPF DAE specification [1]) and suspension of access to broadcast resources (see clause 6.2.2.7 of the present document) both of which shall preempt the needed resources.

Scarce resources such as a media decoder are claimed following a call to the `bindToCurrentChannel()` method on a video/broadcast object in addition to the `nextChannel()` or `prevChannel()` methods.

4.8.3 CI+ Usage

In clause A.1, in table A.1 “Section-by-section profile of the OIPF DAE specification”;

- In the row for “Extensions to video/broadcast for DRM rights errors” (OIPF DAE reference 7.13.6), the “NI” shall be changed to “M-C, M-M” and a note added as follows - “Mandatory if either CI+ or DRM features is supported”.
- In the row for “Extensions to A/V object for parental rating errors”, “NI” shall be changed “M-M”.

4.8.4 Clarification about `setChannel()`

In clause A.1, in table A.1 “Section-by-section profile of the OIPF DAE specification”, in the row for clause 7.13.1 of the OIPF DAE specification, the reference to the optional `contentAccessDescriptorURL` parameter shall be changed from “is not included” to “may be ignored”.

4.8.5 Clarify what “fail” means

In clause A.2.4.2, in the third item in the bulleted list, “fail” shall be replaced as shown below;

The following methods shall always ~~fail~~ throw a “Security Error” (as defined in clause 10.1.1 of the OIPF DAE specification) : `getChannelConfig`, `bindToCurrentChannel`, `prevChannel`, `nextChannel`, `setVolume`, ~~and~~ `getVolume`, `addStreamEventListener` and `removeStreamEventListener`.

4.8.6 Access to ProgrammeCollection

In clause A.1, in table A.1 “Section-by-section profile of the OIPF DAE specification”, in the row for clause 7.16.3, “ProgrammeCollection”, the entry in the Security column shall be “broadcast-

related”.

4.8.7 Broadcast-independent applications and tuning failures

In the bulleted list in A.2.4.2, text shall be added to the first item as following;

- The following properties and methods shall have no restrictions: createChannelObject, playState, onChannelChangeSucceeded, onChannelChangeError, onPlayStateChange, width and height.

The last item in that bulleted list shall have a reference to the connecting state added as follows;

- The object shall always be in the unrealized or connecting states.

4.8.8 video/broadcast object's setVolume/getVolume methods should be NI

In clause A.1, in table A.1 “Section-by-section profile of the OIPF DAE specification”, the row for OIPF clause 7.13.1 shall have the following text added;

The setVolume() and getVolume() methods are not included.

4.8.9 OnPlayPositionChanged

In clause A.1, in table A.1 “Section-by-section profile of the OIPF DAE specification”, in the row for OIPF clause 7.14.3, the status column shall be changed to "M(*)" and the Notes column to:

Only the onPlayPositionChanged property and event are required except where the RTSP feature is supported, in which case the onPlaySpeedChanged property and event shall also required.

4.8.10 AV Control queue clarification

In clause A.2.5, the paragraph “Calling stop() or modifying the data property shall cause any queued media item to be discarded” shall be changed as follows;

Calling stop(), ~~or~~ modifying the data property or entering the error state shall cause any queued media item to be discarded.

4.8.11 Open IPTV Forum Errata

In table A.1 “Section-by-section profile of the OIPF DAE specification”, in the row for “the Application class”, clause 7.2.2 of that document, the following text shall be replaced;

- a property "privateData" (which shall have the same semantics as the private property)

with

- the property “privateData”

4.8.12 charCode defined as both included and not included

In Table A.1 “Section-by-section profile of the OIPF DAE specification”, in the row for “Annex I

charCode attribute support”, the “M” shall be changed to “NI”.

4.8.13 Capabilities for CI+ and DRM

The clause A.1, in Table A.3: “Key to status column”, the additions shown underlined below shall be made;

Status	Meaning
M	Mandatory.
M-C	Mandatory if CI+ is supported. <u>Support of the related section/sub-section in table A.1 is not expected if CI+ support is not indicated according to clause 10.2.4. If CI+ is supported then the APIs required for the DRM feature shall also be supported. NOTE This does not mean that all devices supporting CI+ must also support a DRM system.</u>
M-D	Mandatory if the download feature supported otherwise not included.
M-M	Mandatory if the DRM feature is supported otherwise not included. <u>Support of the related section/sub-section in table A.1 is not expected if the support of the DRM feature is not indicated according to clause 10.2.4. If CI+ is supported then the APIs required for the DRM feature shall also be supported. NOTE This does not mean that all devices supporting CI+ must also support a DRM system.</u>
M-P	Mandatory if the PVR feature is supported otherwise not included.
M-R	Mandatory if the RTSP feature is supported otherwise not included.
NI	Not included.
NOTE:	Any of the above may be post-fixed with (*) where only some parts of the section or sub-section are required in the present document.

4.8.14 The video/broadcast object stop method and broadcast-independent applications

In clause A.2.4.2, the following change shall be made;

The following methods shall have no effect: setFullScreen, ~~and release~~, and stop.

4.8.15 Usage of the video/broadcast extension for recording and time shift

In clause A.1, in table A.1 “Section-by-section profile of the OIPF DAE specification”, in the row for “Extensions for recording and timeshift”;

- The “status” column shall be changed from “M-P” to “M(*), M-P”.
- The “notes” column shall read as follows;
 - The following events and properties shall always be supported:
 - RecordingEvent
 - recordingState
 - playPosition
 - playSpeed

A new clause A.2.4.3 shall be added as follows;

A.2.4.3 Extensions to the Configuration class for time-shift

The following property is added to the Configuration class.

readonly Boolean timeShiftSynchronized
--

Returns a boolean indicating if the terminal is capable of maintaining synchronization between applications and A/V components during time-shift. A definition of synchronization between applications and A/V components can be found in clause 6.2.2.4.

5 Editorial Changes to TS 102 796

5.1 General

5.1.1 DAE Reference Error

In many places, the OIPF DAE specification is referred to as reference [2] when it is in fact reference [1] in the list of normative references.

5.1.2 PlayStateChangedEvent in HbbTV Spec

In many places, the OIPF “PlayStateChange event” is referred to by the wrong name - “PlayStateChanged event” or even “PlayStateChangedEvent”.

5.2 Clause 2.1 – Normative References

In clause 2.1, the note after reference 6 shall be changed from;

NOTE: Available at <http://www.isma.tv>.

to

NOTE: Available at http://www.mpegif.org/m4if/bod/ISMA/ISMA_2.0.pdf

5.3 Clause 5 – User experience

5.3.1 Default Background Colour

In clause 5.3.3.1, the following paragraph shall be modified as shown;

Applications will start with a window covering the entire display in order that they can position the "Red Button" notification where they wish. ~~By default, the background colour of this window should be set to an opaque colour. Therefore,~~ Since the browser rendering canvas default color is device-dependent, applications should explicitly set the background of their <body> element to transparent using (for example) the following CSS rule (or an equivalent mechanism):

```
body {
    background-color: transparent;
}
```

5.3.2 Reference to figure 13

In clause 5.3.4, in case D, the reference to figure 13 shall be replaced with one to figure 7.

5.3.3 URL Entry

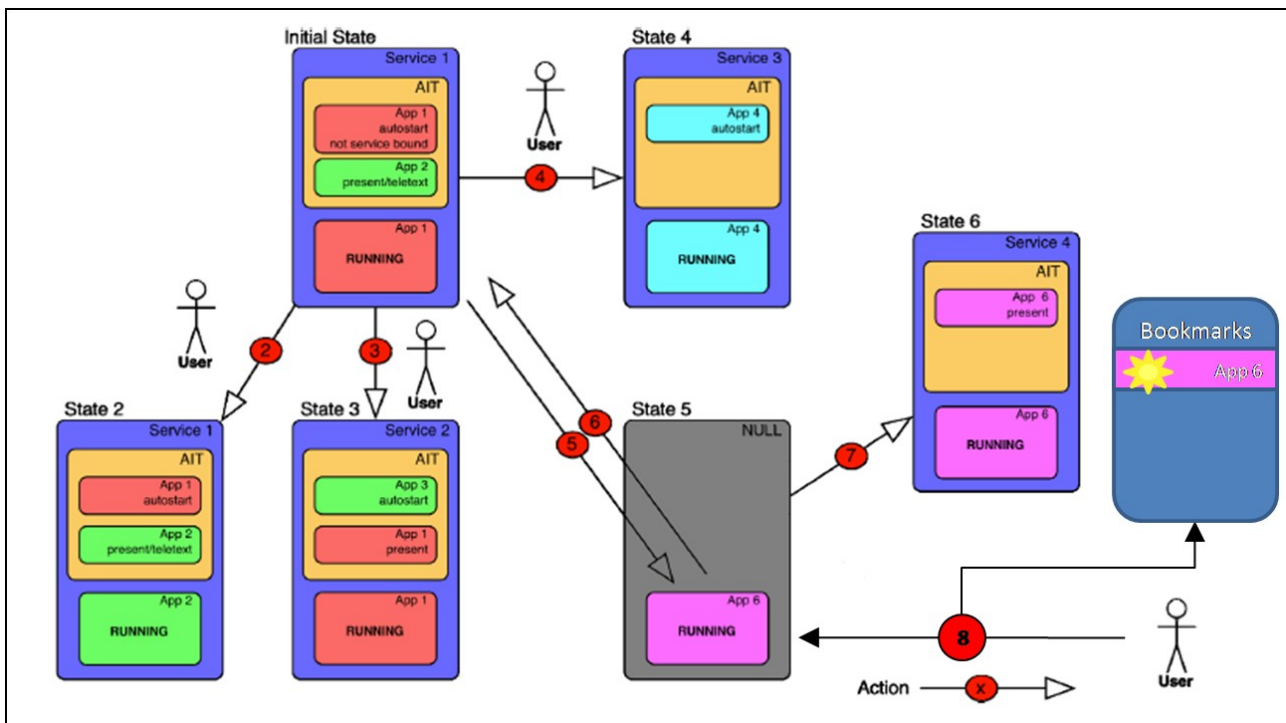
The underlined sentence shall be added into the middle of section 5.3.5 as shown.

Broadcast-independent applications are started via a running application or an Internet TV Portal. An Internet TV Portal is an application which provides a type of start page where broadcast-independent applications are sorted and offered in an appropriate and useful way to the end user. The Internet TV Portal may be opened by pressing a dedicated Internet TV Button on the RCU. The type of interactive applications that are listed in the Internet TV Portal is the responsibility of the manufacturer. There may be an option for the user to add broadcast independent applications via manual URL entry or similar means like apps on mobile phones. The structure and the design of the start page is the responsibility of the manufacturer and out of the scope of the present document. Broadcast-independent applications are described in more detail in clause 6.2.2.6.

5.4 Clause 6 – Service and application model

5.4.1 Application lifecycle example

In clause 6.2.3, figure 15 and the following table shall be updated as shown.



Starting state	Action	Resulting state
Initial State: Application 1 is running	2: User presses "TEXT" key	State 2: Application 2 will be started due to TELETEXT signalling.

Initial State: Application 1 is running	3: User selects service 2	State 3: Application 1 keeps running assuming it is not service-bound.
Initial State: Application 1 is running	4: User selects service 3	State 4: Application 1 will be killed and Application 4 will be started due to AUTOSTART signalling.
Initial State: Application 1 is running	5: Application call to <u>createApplication()with an XML AIT to start a broadcast-independent application</u>	State 5: Broadcast-independent application 6 is running. Any former presentation of service components will be stopped. <u>The application has an application identifier as it was started from an XML AIT. See also action #7.</u>
State 5: Application 6 is running	6: User selects Service 1	State 1: Application 6 will be stopped and Application 1 will be started due to AUTOSTART signalling.
State 5: Application 6 is running	7: User <u>Application 6</u> selects service 4	State 6: <u>Presentation of service 4 starts. Application 6 is signalled on service 4. It transitions to broadcast-related and keeps running. Due to signalling, presentation of service components starts.</u>
	8: <u>User enters URL of XML AIT or initial page to start application and to store it in his bookmarks. Terminal takes application title and logo for bookmark entry as signalled in HTML header.</u>	State 5: same as for action 5.

5.5 Clause 7 – Formats and Protocols

5.5.1 Typo in reference to TS 102 809

In clause 7.2.3.1, in table 5, “Supported application signalling features”, in the row for clause 5.2.4 of TS 102 809, the reference to TS 102 809 has a duplicated character '8'.

5.6 Clause 8 – Browser Application Environment

5.6.1 Add reference to XML event description file

In clause 8.2.1.1, the description of the targetURL argument of the addStreamEventListener method shall have text added as follows.

The URL of the DSM-CC StreamEvent object or the XML event description file (as defined in clause 8.2 of [3]) describing the event.

5.7 Clause 9 – System Integration

5.7.1 Incorrect references into the OIPF DAE specification

In clause 9.1.1.2, the reference to clause 8.1.3.1 of the OIPF DAE specification shall be to 8.2.3.1.

In clause 9.1.2, the reference to clause 8.1.1.1 of the OIPF DAE specification shall be to clause 8.2.1.1.

5.8 Clause 10 – Capabilities

5.8.1 Editorial change of table 14 for font reference

In Table 14 in 10.2.1, "... the support for the Unicode character range "Basic Euro Latin Character set" as defined in annex D of TS 102 809 [3]." shall be

"... the support for the Unicode character range "Generic Application Western European Character Set" as defined in annex C of TS 102 809 [3]."

5.9 Annex A - OIPF DAE Specification Profile

5.9.1 Typo in Annex A

In the row for OIPF clause 5.3.1.2, "Out of Session even the notification" shall be "Out of Session event notification"

6 Changes and Issues with Referenced Specifications

6.1 Open IPTV Forum Specifications

6.1.1 Changing MIME types of OIPF embedded objects

A new section A.2.9 shall be added as follows;

A.2.9 Clarification on changing MIME types of OIPF embedded object

Once an OIPF embedded object has been instantiated, dynamic change of its MIME type which could cause the properties and methods associated with the object to change shall be ignored.

For instance, it is possible to change the MIME type of an AV Control embedded object from "video/mpeg" to "video/mp4" but it is not possible to change the MIME type of an OIPF embedded object from "application/oipfApplicationManager" to "application/oipfConfiguration".

6.1.2 Behaviour of video and audio for a stopped video/broadcast object

In A.2.4.1, the following changes shall be made;

Calling the stop() method will stop presentation of video, and audio and subtitles ~~presentation~~ and cause the video/broadcast object to transition to the stopped state. Scarce resources for video and audio presentation shall be released during this transition. This has no effect on access to non-media broadcast resources such as AIT monitoring or access to objects in a DSM-CC carousel as defined in clause 6.2.2.7. Calling the bindToCurrentChannel() method while in the stopped state shall result in scarce resources for video and audio presentation being claimed and video and audio presentation being restarted. Calling the setChannel(), nextChannel() or prevChannel() methods while in the

stopped state shall result in the terminal attempting to claim scarce resources and select the new service. Applications can use the playState property of the video/broadcast object to read its current state.

In Table A.4, “Possible values of the playState property and state property of the PlayStateChanged event”, the following changes shall be made;

Value	Description
0	unrealized; the application has not made a request to start presenting a channel or has stopped presenting a channel and released any resources. The content of the video/broadcast object is transparent <u>an opaque black rectangle</u> . Control of media presentation is under the control of the terminal, as defined in clause Error: Reference source not found.
1	connecting; the terminal is connecting to the media source in order to begin playback. Objects in this state may be buffering data in order to start playback. Control of media presentation is under the control of the application, as defined in clause Error: Reference source not found. The content of the video/broadcast object is transparent. <u>The content of the video/broadcast object may be the last frame of decoded video in the case of transient errors, or an opaque black rectangle otherwise.</u>
2	presenting; media is currently being presented to the user. The object is in this state regardless of whether the media is playing at normal speed, paused, or playing in a trick mode (e.g. at a speed other than normal speed). Control of media presentation is under the control of the application, as defined in clause Error: Reference source not found. The video/broadcast object contains the video being presented.
3	stopped; the terminal is not presenting media, either inside the video/broadcast object or in the logical video plane. The logical video plane is disabled. The content of the video/broadcast object is an opaque black rectangle. Control of media presentation is under the control of the application, as defined in clause Error: Reference source not found. The application is still granted access to broadcast resources as defined in clause Error: Reference source not found.

6.1.3 Execution timing of GetComponent() function

In clause A.1, in table A.1 “Section-by-section profile of the OIPF DAE specification”;

1) The following shall be added to the Notes column for the row 7.13.4 (“Extensions to video/broadcast for playback of selected components”)

The following text is applied to GetComponent():

If the set of components is known, returns a collection of AVComponent values representing the components of the specified type in the current stream. Otherwise returns undefined. The set of components SHALL be known if the video/broadcast object is in the presenting state and MAY be known if the object is in other states.

The following text is applied to getCurrentActiveComponents():

If the video/broadcast object is in the presenting state, returns a collection of AVComponent values representing the components currently being presented. Otherwise returns undefined.

2) The following shall be added to the Notes column for the row 7.14.4 (“Extensions to A/V Object for playback of selected components”)

The following text is applied to GetComponent():

If the set of components is known, returns a collection of AVComponent values representing the components of the specified type in the current stream. Otherwise returns undefined. The set of components SHALL be known if the AV Control object is in the playing state and MAY be known if the object is in other states.

The following text is applied to `getCurrentActiveComponents()`:

If the AV Control object is in the playing state, returns a collection of AVComponent values representing the components currently being presented. Otherwise returns undefined.

6.1.4 Calling `setChannel()` with a null parameter

In clause A.2.4.1, the following additional text shall be inserted between the paragraph starting “Calling the `stop()` method will stop video and audio presentation” and the paragraph starting “Table A.4 clarifies and extends the possible values of the `playState` property”.

Calling the `setChannel()` method with a null argument will cause the video/broadcast object to transition to the unrealized state and release any resources used for decoding video and/or audio. As described in section 6.2.2.6 this causes the application to transition to a broadcast-independent application, unlike the `release()` method. A `ChannelChangeSucceeded` event will be generated when the operation has completed.

6.1.5 video/broadcast state transitions triggered by external events

In clause A.2.4.1, the following additional text shall be inserted between the paragraph starting “Calling the `stop()` method will stop video and audio presentation” and the paragraph starting “Table A.4 clarifies and extends the possible values of the `playState` property”.

If a mechanism outside the scope of the present document causes a new service to be selected (e.g. the user pressing P+ or P- on a remote control) then an instance of the video/broadcast object that is not in the unrealized state shall transition between states (and generate appropriate events) as if the operation had been initiated by a call to `setChannel()`.

6.1.6 AV Control automatic transition clarification

The following text shall be added to clause A.2.5 between the paragraph starting “Play control keys” and the paragraph starting “The following value shall”,

The timing of automatic transitions from the error state to the stopped state is implementation dependent; applications should not rely on the AV Control object remaining in the error state after an error has occurred and should listen for play state change events in order to detect errors.

If the AVControl object's `play()` method returns true then at least one play state change event shall be generated.

The error property shall be available in the stopped state. After an automatic transition from the error state to the stopped state, the value of the error property shall be preserved.

The end of clause A.2.5 shall be updated as follows;

The following values shall be added to the list of valid values for the error property:

7 - content blocked due to parental control.

undefined - no error has occurred

6.1.7 Error reporting for application failure

A new clause A.2.10 shall be inserted as follows;

A.2.10 Extensions to the application/oipfApplicationManager object

The application/oipfApplicationManager object shall support the following additional property.

function onApplicationLoadError (Application appl)
The function that is called when the terminal fails to load the file containing the initial HTML document of an application (e.g. due to an HTTP 404 error, an HTTP timeout, being unable to load the file from a DSM-CC object carousel or due to the file not being an HTML file). All properties of the Application object referred to by appl shall have the value undefined and calling any methods on that object SHALL fail.

For the intrinsic events listed in the table below a corresponding DOM level 2 event shall be generated in the following manner:

Intrinsic event	Corresponding DOM 2 event	DOM 2 Event properties
onApplicationLoad-Error	ApplicationLoadError	Bubbles: No Cancelable: No Context Info: appl

6.1.8 Mismatch between some VK key codes and W3C spec

In A.1 “Section-by-section profile of the OIPF DAE specification”, the following row shall be modified as shown;

Section, subsection	Reference in DAE [2]	Status in Hybrid broadcast Broadband TV	Notes	Security
Annex F additional KeyCode	B	M(*)	<u>See clause A.2.11</u>	None

A new section A.2.11 shall be added as follows;

A.2.11 Change in VK_* key codes mapping

The constant values for VK_* key codes defined by CEA2014-A Annex F are OPTIONAL for this specification. Terminals SHALL map VK_* constants to an internal, terminal specific, integer. An application SHALL NOT rely on the internal terminal-specific integer key code mapping and SHALL use the VK_* key constant literals defined as attributes of KeyEvent instead. This also apply to the VK_PLAY_PAUSE constant defined in DAE

Annex B.

Note that VK_* key codes are defined as properties of KeyEvent interface and do not have a “global” Javascript scope.