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TECHNICAL REPORT

Unit Test Descriptions for Hybrid Broadcast Broadband TV

ETSI

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Foreword

This Technical Report (TR) has been produced by Joint Technical Committee (JTC) Broadcast of the European Broadcasting Union (EBU), Comité Européen de Normalisation ELECtrotechnique (CENELEC) and the European Telecommunications Standards Institute (ETSI).

NOTE: The EBU/ETSI JTC Broadcast was established in 1990 to co-ordinate the drafting of standards in the specific field of broadcasting and related fields. Since 1995 the JTC Broadcast became a tripartite body by including in the Memorandum of Understanding also CENELEC, which is responsible for the standardization of radio and television receivers. The EBU is a professional association of broadcasting organizations whose work includes the co-ordination of its members' activities in the technical, legal, programme-making and programme-exchange domains. The EBU has active members in about 60 countries in the European broadcasting area; its headquarters is in Geneva

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Modal verbs terminology

In the present document "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

The Unit Test Descriptions for Hybrid Broadcast Broadband TV referenced in the present document have been defined for verification of HbbTV® Devices for conformance with the following HbbTV® Specifications:

- ETSI TS 102 796 V1.4.1 (informally known as HbbTV® 2.0.1) [i.1]

- ETSI TS 102 796 V1.5.1 (informally known as HbbTV® 2.0.2) [i.2]

The audience the present document targets is any regulator or any organization referring to the HbbTV® specifications listed above with an intention to define a conformance regime.

The Unit Test descriptions for the HbbTV® Specifications contains information about the XML format of the unit test description with a link to the Test Assertions Repository.

1 Scope

The present document extends [i.2] (and its previous version [i.1]) by providing users of these specifications with a method to access to the test assertions for the purpose of assessing the compliance of equipment and services with [i.2] (and its previous version [i.1]).

2 References

2.1 Normative references

Normative references are not applicable in the present document.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

> NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1]   ETSI TS 102 796 (V1.4.1): "Hybrid Broadcast Broadband TV".

[i.2]   ETSI TS 102 796 (V1.5.1): "Hybrid Broadcast Broadband TV".

[i.3]   HbbTV® Test Specification For HbbTV® Test Suite.

> NOTE: Available at https://www.hbbtv.org/resource-library/.

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the following terms apply:

assertion: testable statement derived from a Conformance requirement that leads to a single test result

Broadband: always-on bi-directional IP connection with sufficient bandwidth for streaming or downloading A/V content

Broadcast: classical uni-directional MPEG-2 transport stream-based broadcast such as DVB-T, DVB-S or DVB-C

conformance requirement: unambiguous statement in the HbbTV® specification, which mandates a specific feature or behaviour of the terminal implementation

HbbTV® application: application conformant to the present document that is intended to be presented on a terminal conformant with the present document

HbbTV® test case XML: HbbTV® XML document to store for a single test case information such as Test Assertions, Test Procedure, specification references and history

HbbTV® Technical Specification: Refers to [i.3], HbbTV® specification [i.2] and previous version [i.1].

referring organizations: organizations publishing documents that refer to this Technical Specification.

resting group: working group of the HbbTV® Association that is authorized to approve HbbTV® Test Assertions and Test Material, manage the working practices of test creation, and test challenges and test removal/repair

test assertion: high level description of the test purpose, consisting of a testable statement derived from a Conformance requirement that leads to a single test result

    NOTE: Not to be confused with the term "assertion" as commonly used in test frameworks (e.g. JUnit).

test case: complete set of documents and assets (assertion, procedure, preconditions, pass criteria and test material) required to verify the derived Conformance requirement

    NOTE 1: This definition does not include any test infrastructure (e.g. web server, DVB-Playout, etc.) required to execute the test case.

    NOTE 2: For the avoidance of doubt, Test Material is implemented in a way that produces deterministic and comparable test results to be stored in the final test report of this Test Material. Test Material adhere to the HbbTV® Test Specification as defined by the HbbTV® Testing Group.

test material: all the documents (e.g. HTML, JavaScript, CSS) and additional files (DVB-TS, VoD files, static images, XMLs) needed to execute the test case

test procedure: high level textual description of the necessary steps (including their expected behaviour) to follow in order to verify the Test Assertion

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CH	Channel
CSS	Cascading Style Sheets
DUT	Device Under Test
DVB	Digital Video Broadcasting
HbbTV	Hybrid Broadcast Broadband TV
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
ICANN	Internet Corporation for Assigned Names and Numbers
ID	Identifier
IP	Internet Protocol
MPEG	Motion Picture Experts Group
TS	Transport Stream
TV	TeleVision
VoD	Video on Demand
XML	eXtensible Markup Language

4   Test Assertions specification

4.1   Test Assertion Template

4.1.1   Introduction

Each Test Assertion consists of a list of attributes, as described below.

The attributes can be:

- General Attributes: The General Attributes uniquely identify the Test Assertion.

- References: References to the spec that the Test Assertion applies to.

- Preconditions: Lists preconditions on the DUT before this test can be run.

4.1.2   General Attributes

4.1.2.1   Test Assertion ID

The Test Assertion ID is a string that uniquely identifies the Test Assertion . It contains two parts, a "namespace" and a "Local ID", separated by an underscore.

For official HbbTV® tests, the Test Assertion IDs will usually be allocated by the HbbTV® Testing group. In this case, the namespace is "org.HbbTV®". E.g. "org.HbbTV®_0000123F". The HbbTV® Testing group ensures those tests IDs are unique.

It is important that every Test Assertion has a different Test Assertion ID. If another organization wants to generate Test Assertion IDs for its own tests, then it does not use the "org.HbbTV®" namespace. Instead, it takes a domain name it controls, reverse it, and use that for the namespace part of the Test Assertion ID. In this case, the Local ID can be anything permitted by the schema. Organizations should have some internal procedure to allocate Local IDs so that they do not generate duplicate Test Assertion IDs.

EXAMPLE: A company that controls the "example.com" domain could use Test Assertion IDs like "com.example_FOO", or "com.example_BAR_BAZ_9876-42".

NOTE: The domain name used in Test Assertion IDs is a real domain name, and is registered on the Internet in the usual way, using the normal ICANN roots. There is no need to have a separate and dedicated website for that.

4.1.2.2   Test Assertion Version

The Test Assertion Version specifies a specific version of the Test Assertion and has the following format: <integer> version.

4.1.2.3   Title

The Title is a short title to identify this specific Test Assertion (mandatory).

4.1.2.4   Test Suite Version

The Test Suite Version contains the version of the release, where the test, based on the Test Assertion, was first included for the first time.

4.1.2.5 Assertion Text

The Assertion Text field:

- Describes what is tested in this Test Assertion.

- Value format is a text field (no limit).

- Whitespace is not significant.

For HbbTV® tests, there are at most one assertion.

4.1.2.6 Additional Information

Contains information about challenges, i.e. when the challenge is raised against the test based on a test assertion, there will be information indicating that a challenge against exists but has not been validated.

4.1.3 References

4.1.3.1 Test Applicability

The Test Assertion specifies which specifications it applies to. Official HbbTV® tests specify this element and use a name of "HBBTV®" (case sensitive) and a version of "1.4.1", "1.5.1". Tests that are valid for more than one version of HbbTV® includes tags for all applicable versions. The master list of specification names is maintained by HbbTV® Testing Group and is described in the HbbTV® Test Specification [i.3]. For each spec element in the <appliesTo> tag, the test case:

- is conformant to that specification; and

- test some feature of that specification.

It is not necessary to include a specification element for every potential regime that could reference HbbTV® to use this test. For instance, a country-specific testing regime may require support for HbbTV® and seek to use a particular Test Assertion - it is not required to include a specification element for that regime.

Every test case has an 'appliesTo' element with at least one specification element. It includes a specification element for at least one HbbTV® version. It may also include specification elements for other specifications as defined in the HbbTV® Test Specification [i.3].

4.1.3.2 Specification References

4.1.3.2.1 Specification References general description

References to the different specification clauses or versions.

For each version of the HbbTV® specification, there is a list of clauses covered by this Test Assertion (top-level). Each top level entry includes references to one or more specification clauses. Each specification clause has the following attributes, detailed in the following clauses.

4.1.3.2.2 Document Name

A short identifier for the document that contains the specification clause (e.g. "HBBTV®" for the HbbTV® specification). A list of acceptable identifiers is maintained by HbbTV® Testing Group and is described in the HbbTV® Test Specification [i.3].

4.1.3.2.3 Clause

The clause contains the clause number within the specified document (a dot separated list of integers or characters without spaces, e.g. 9.3.1).

4.1.3.2.4   Specification Text

It contains the specific text from the referenced specification clause tested by this Test Assertion (optional).

The format of the specification text is a text field (no limit) and whitespace is not significant.

4.1.4   Preconditions

4.1.4.1   Required Terminal Options

The terminal options that are required on the DUT to run this test (if empty, this test is mandatory for all devices).

The format of the Required Terminal Options value is a text field without spaces.

Available options and their correct usage are described in the HbbTV® Test Specification [i.3].

4.1.4.2   Optional Features

Terminal features which are required on the DUT, in addition to required terminal options, to run this test.

Available features and their correct usage are described in the HbbTV® Test Specification [i.3].

4.2   Test Results

4.2.1   Overview (informative)

The present document describes the Test Assertions for verification of HbbTV® Devices.

4.2.2   Pass criteria

The result of the test is a 'pass' only if all of the following criteria are met:

1)   All normative test preconditions were satisfied.

2)   All step results stored by the test harness have the value 'true' for the 'result' parameter.

3)   All steps that involve analysis of device behaviour have been evaluated to give a result and that result is 'true'.

4)   All steps that involve interaction with the test environment (e.g. user input through a remote, or changing the input media to the device) succeeded.

5)   The test ran successfully to the end, and did not terminate abruptly.

If, at a given time, any of the above criteria are not met the result at that time is 'fail'. However, users of reports of conformance against these assertions should note the possibility of 'fail' results caused by test issues (Challenges), non-deterministic behaviours within the whole test environment such as internet connectivity and other factors. Therefore a robust review, challenge and waiver process will need to be implemented to interpret and address such issues.

4.3   Test Assertion repository

4.3.1   Location of the Test Assertion Repository

The HbbTV® Association maintains a repository of current Test Assertions supported by the HbbTV® Test Suite. The repository is maintained by the HbbTV® Association in a timely manner to reflect changes to the status of the Test Assertions.

The repository of current Test Assertions can be found at the following link:

•   https://tar.HbbTV.org.

4.3.2 Guidance and Recommendations for referring organizations

The HbbTV® Association provides guidance and recommendations for organizations who wish to refer to the present document and in particular, to make use of the Test Assertion Repository indicated in clause 4.3.1.

These guidelines, recommendations and background information can be found at the following link:

- https://www.HbbTV.org/resource-library/#testing-information-and-support

under the clause titled "HbbTV® Test Assertion Specification".

History

Document history		
V1.1.1	April 2022	Publication