HbbTV tools and activities supporting logos, certification and compliance in various HbbTV regimes

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Successful deployments of HbbTV have typically included:

- **Consumer marketing** of the features and services
  - e.g.:
    - [https://vimeo.com/141272035](https://vimeo.com/141272035) (Freeview Play, UK)
    - [https://vimeo.com/340234128](https://vimeo.com/340234128) (LOVEStv, Spain)
    - [https://vimeo.com/132418985](https://vimeo.com/132418985) (Freeview Plus, New Zealand)

- **A consumer logo agreement:**
  - so consumers know what to look out for in the shops
  - manufacturers sign a logo licence agreement

- **A conformance testing regime:**
  - devices are known to meet a minimum set of requirements
  - applications tested on devices
  - *consumers can have confidence in the services they receive*
Typical Testing in a Conformance Regime

- **Receiver** Testing (and **Companion Device** Testing)
- **Interoperability** Testing
- **App** Testing
- **Field** Testing

HbbTV Testing Ecosystem

- Device Test Suite
- Plugfests
- DRM reference App
- DASH Content Validator

Observed Problems

- App Issues
- Receiver Issues
- Field Issues
TV Manufacturers need to compete but enable the operators
Run by the HbbTV Association
• sometimes by individual country regimes

Voluntary & Open
• including non-HbbTV members

Variety of participants
• Manufacturers
• App developers
• Operators/broadcasters
• Service providers
DVB – HbbTV

DASH Validator

- DVB-HbbTV Conformance Software Tool: “DASH Validator”
- extension to DASH-IF Conformance Software, built with DVB’s support
- The tool checks DASH media (mpd and segments) conforms to DASH-related media specifications (including now, HbbTV and DVB profiles)
- Open source & online via DASH-IF: https://conformance.dashif.org
- Provides crucial information for content generators and service providers
• HbbTV Application with sample DASH content including DRM
  • [http://refapp.hbbtv.org](http://refapp.hbbtv.org)
• Tested on a wide selection of current receivers in the market
• A recipe for application developers to use as a reference!
• Open source licence
• Workflow and documentation to replicate using common tools
HbbTV Test Suite

- Designed to provide at least minimum conformance of devices entering the market
- Approximately 2000 tests
- Covers HbbTV 2.0.2, including HDR, NGA, and additional tests for OpApps, Targeted Advertising Independent Specifications
- Additional materials for regional platforms build on this (e.g. Freeview Play, Tivú, DRM Test Suites)
- Not sufficient alone, but the foundation on which to build interoperability…
HbbTV Test Suite

The basis of a Test Suite

HbbTV Test Suite

The basis of a Test Suite

HbbTV App 1 ➔ HbbTV App 2

API 1
API 2
API 3
API 4 (Untested)
API 5 (Untested)
API 6 (Untested)
API 7 (optional)
API 8 (optional)
API 9 (optional)

Regime Specific Test Suite

HbbTV Platform Extra Support

- If you have a partially tested HbbTV Platform,
- It may work with some Apps,
- But not all…
  - HbbTV Test Suite covers all of the required features
- But there are also specific regime requirements
- That’s why extra test suite is also useful
What is the difference?

- More representative of “The Real World”?
- Better at covering integration and “state” transitions
- Some app testing is also about performance and look and feel - tricky area for HbbTV Test Suite...
- What does it mean to “pass” the app???

HbbTV Ref App

- More unit coverage of the Spec (maybe too much!)
- Assertion, Spec Reference, Test Procedure, Pass Criteria
  - All very important when dealing with Logo programs
- Formal Review – tests follow spec!
- Suitable for use in commercial sensitive 3rd party Certification..

Test Case App

Conclusion: Both are important!
• Application developers obviously test their app thoroughly...
• Need to check on devices, no fully representative HbbTV emulators exist
• HbbTV devices are sometimes constrained by resources and/or browser platform support
• Application testing on devices can be automated and can be facilitated through use of device Zoo’s
• HbbTV Association formed an “Improving Interoperability Task Force”
• Scopes and manages updates to DRM Reference App, DASH Validator
• Co-ordinates Plug-fest/Interoperability Testing Events
• Solicits feedback from industry on interoperability issues affecting platforms:
  • On more than one device: can’t address individual manufacturers due to anti-trust rules…
  • Can put provide contacts and feedback or pass on to the appropriate HbbTV Working Group…

• See also:
  • https://www.hbbtv.org/resource-library/
Overview of Certification in HbbTV regimes
What is a Certification or Conformance Regime?

- Objective is to achieve **High Quality**
- Manage and foster **Adoption** of the technology
- Use of “**Logo**” to identify and build confidence in the market.
- Particularly important in **horizontal / retail** market, e.g. free-to-air DTT,
- Manufacturers using Tools, Test Suit and Support to pass regime
Tivù

Services:
- Tivu (DTT)
- Tivusat (DTH)
- Tivuon (for premium OTT content)

Test Suites:
- DTT/DTH tests (DGTVi and Tivüsat streams)
- HbbTV tests (Tivù test suite and HbbTV 2.0.2 / 1.5.1)
- DRM tests (Tivùon! test suite)

Some Regime Specific Tests:
- Coexistence of MHP/HbbTV (with HbbTV prioritised)
- Launching resident apps (e.g. receiver menu) does not kill HbbTV apps
- RCU tests (e.g. can close HbbTV app by ‘exit’, can change channels while app is running – to prevent HbbTV apps from blocking normal usage)
- H264 and HEVC DASH streaming
- [Tivùon!] Marlin and PlayReady DRM (HTML5)
France HbbTV

Testing
- One of the earliest HbbTV adopters, with no mandatory conformance.
- HD Forum procured the TNT2.0 test suite, including DASH and PlayReady / Marlin DRM tests
  - Various French specific tests – e.g. robustness

Certification
- Original plans for a TNT2.0 logo and trademark license agreement were dropped
- Consumers couldn’t distinguish between TVs that support HbbTV 1.1 and HbbTV 1.5

Deployment
- Most current French HbbTV services only used HbbTV 1.1

Result
- France almost abandoned HbbTV altogether!
- But.. SALTO is coming… Watch this space!...
Freeview Play

Services:
- FreeviewPlay (DTT)

Test Suites:
- Freeview HD (D-Book, HbbTV 2.0.2/1.5.1, HbbTV Transition)
- Platform Technology Testing (HbbTV Platform Specific tests inc. DRM)
- Player Testing (BBC iPlayer + all other players)
- Metadata (interaction with MDS and presentation on screen)
- App Testing

Some Regime Specific Tests:
- Coexistence HbbTV/MHEG5
- AD insertion tests (HTML5)
- Audio description tests via DASH
- PlayReady tests (HTML5)
- HTTP connection tests (e.g. minimal 2 connections, can follow redirects, etc)
- Robustness tests (e.g. app opened and closed, download disrupted, large file, etc)
- User-agent / Capabilities / TLS etc (Just need FVP specific strings & TLS license registered to DUK)
TDT Hibrida

Services:
- TDT Hibrida (DTT)

Test Suites:
- HbbTV 1.5/1.2.1
- DRM and DASH

Some Regime Specific Tests:
- Transcoding to DTS (to S/PDIF as compressed audio) from EAC-3/AC3/HEAAC
- Broadband teletext/subtitles in broadband TS
- UI requirement (No loading graphing displayed while downloading or waiting for server response / no scrollbars in HTML / No ‘x’ when the image URL is dead)
- Default configuration of device (HbbTV enabled / Subtitles disabled / cookies enabled)
- TLS certificate (authentication to TDT server – to confirm that it has been registered at TDT)

LOVEStv Application Testing
Interoperability lab

LOVEStv Interoperability lab
Germany DTT

Testing
- DVB-T2 logo did not mandate HbbTV.
- Commercial suppliers mandated HbbTV v2 (FreenetTV)
- Recently published HbbTV 2 “Minimum Requirements” defined by DTVP
- Some tests “to be provided by broadcasters”

Certification
- DVB-T2 logo is self certified.
  - Consumers can’t tell the difference between HbbTV versions supported…
  - Applications have to be written to work on everything from HbbTV 1, 1.5, 2
Freenet TV

Services:
- Media Broadcast (DTT)

Test Suites:
- DTT (RF, SIPSI, HEVC)
- HbbTV (plus platform specific HbbTV tests)

Some Regime Specific Tests:
- AV Sync - MPEGDASH (This is a Nordig requirement used by MB)
- Zapping time (HbbTV streaming apps on two services)
- RCU tests (e.g. can close HbbTV app by 'exit', can change channels while app is running – to prevent HbbTV apps from blocking normal usage)
- User-agent / Capabilities (MB specific strings, and check that +PVR +DL are not supported)
- Performance tests / robustness tests (No A/V glitch when loading large assets, remains stable when download interrupted etc)
- Authenticate with MB DRM system (Irdeto)
Freeview Plus

Services:
- Freeview Plus (DTT)

Test Suites:
- AS4933.1-2015 (SIPSI and Functionality)
- HbbTV 1.5 (2.0.1 for 2018 models)

Some Regime Specific Tests:
- DRM (PlayReady)
- HbbTV turned on by default
- Application auto-start turned on by default
- Robustness tests
- 4K UHD HDR
- PVR
Freeview New Zealand

Services:
- Freeview Plus (DTT)

Test Suites:
- RF
- SIPSI
- HbbTV 1.5 (2.0.1 for 2018 models)

Some Regime Specific Tests:
- DRM (PlayReady and Marlin)
- HbbTV turned on by default
- Application auto-start turned on by default
- Robustness tests
- 4K UHD HDR
- PVR
1. HbbTV interoperability remains challenging, involving broadcast, broadband, content, apps, multi-devices.

2. Multiple approaches to test and certification drive quality and are increasingly adopted in the market:
   - Use the Official Test Suite
   - Use a country specific certification regime
   - App testing &
   - Interoperability testing

3. Regime specific conformance regimes will continue to be important to broadcasters to address their needs, and evolve new features.