



Assure. Secure. Innovate.

Reference Applications in HbbTV

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Assure. Secure. Innovate.

We assure

quality for our customers and partners by delivering total quality services across the entire digital lifecycle. With a proven pedigree across our core industry sectors, we ensure every project meets the highest standards, driving measurable business value.

We secure

our customers' digital ecosystems with industry- leading cyber security expertise. As global technology partners, we protect our clients' data and infrastructure, keeping businesses resilient in an increasingly connected world.

We innovate

for our customers and partners by embracing the latest technologies and fostering an innovation-first mindset. With a holistic approach spanning software and hardware, we empower our clients to stay ahead of the competition and unlock new growth opportunities.

About Resillion

We offer consulting, technology and testing services, focusing on technology interoperability and conformance with regulatory standards.

With our strategic advice and outcome-driven solutions, we help businesses adapt to digitalisation, ensuring their systems securely and seamlessly integrate with emerging ecosystems and comply with regulations and industry best practices.

Our services reduce risks and costs, enabling our customers to innovate and compete in increasingly complex markets.

Accreditations



Global coverage

Europe

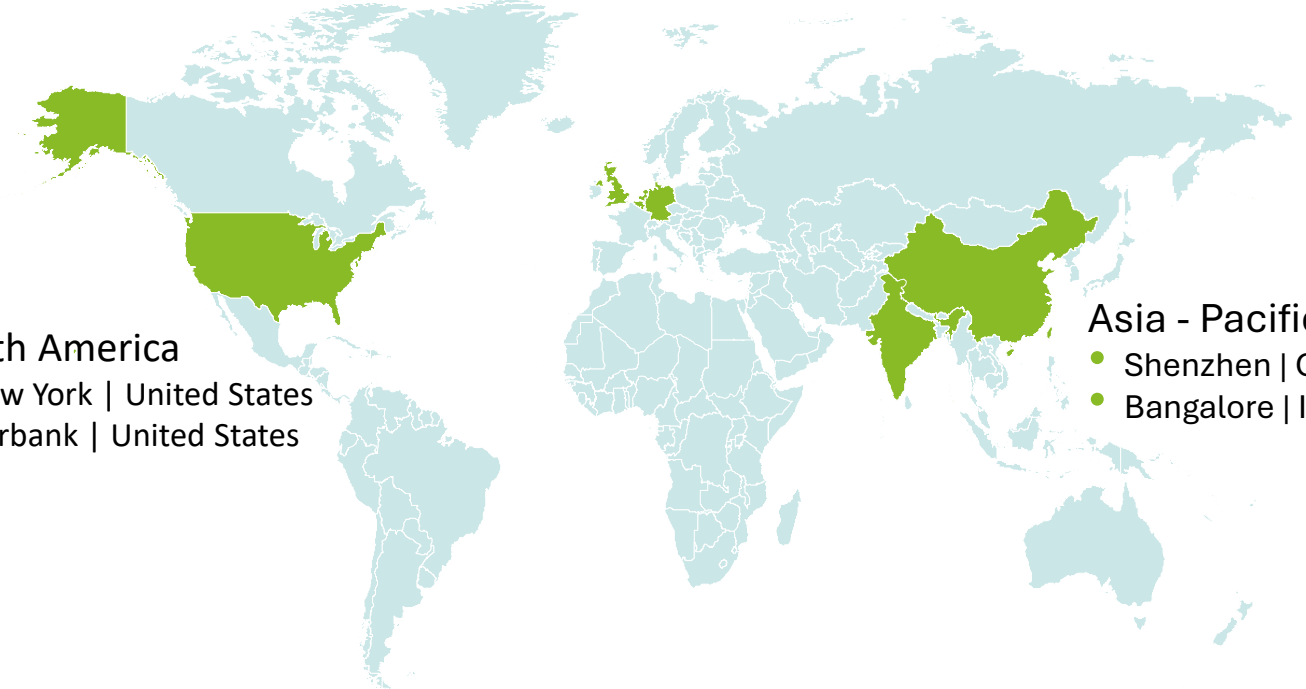
- Birmingham | United Kingdom
- Bristol | United Kingdom
- Manchester | United Kingdom
- Glasgow | United Kingdom
- London | United Kingdom
- Edinburgh | United Kingdom
- Groningen | Netherlands
- Haarlem | Netherlands
- Hasselt | Belgium
- Berlin | Germany

North America

- New York | United States
- Burbank | United States

Asia - Pacific

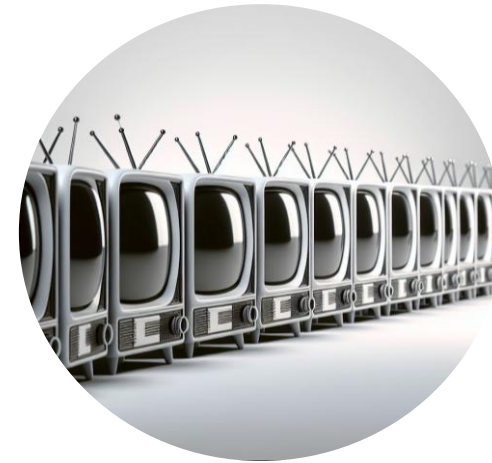
- Shenzhen | China
- Bangalore | India



Background....

What is Conformance vs Interoperability?

- Understanding *Conformance*
Conformance ensures that products and services adhere to established standards, meeting specific criteria for quality and performance.
- BUT think of it like “unit testing”: a **necessary foundation** but **not sufficient for high quality** consumer experience
- Importance of *Interoperability* (integration testing)
Interoperability is essential for different systems to work together seamlessly, enhancing collaboration and efficiency in a connected world.

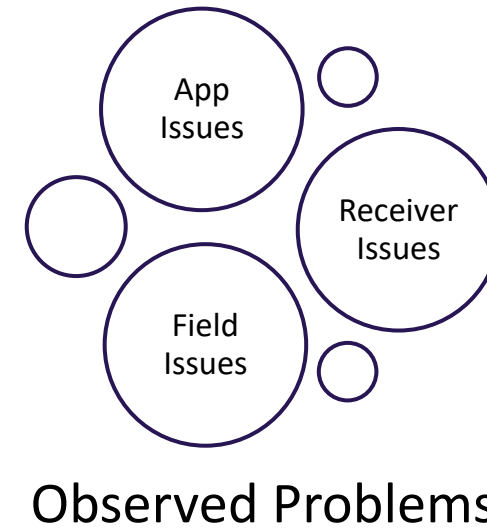
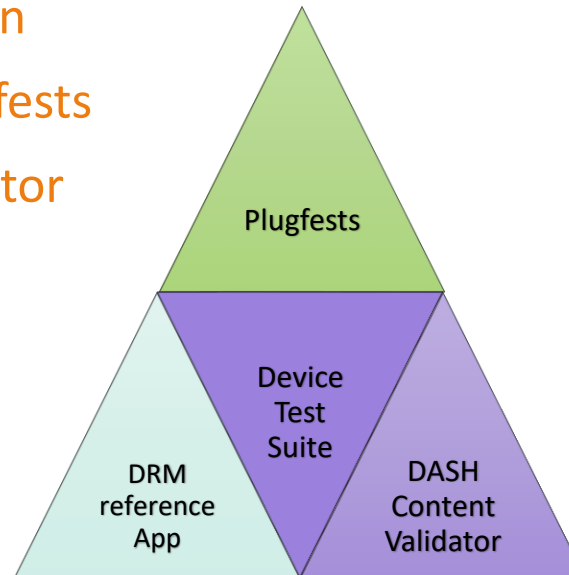


HbbTV's approach

A set of tools to support conformance and interoperability:

- Receiver Conformance Test Suite
- Reference Application
- Interoperability Plugfests
- DASH Content Validator


Testing
Pyramid:



HbbTV Reference Apps

What is a Reference App?

- A demonstration of HbbTV Features as intended to be used in a market, often linking together capabilities
- Ideally:
 - Easy to understand what is expected behaviour
 - Think about how to communicate to the test community what good looks like, document scenarios/user journeys
 - Available – easy to access wherever the test device may be
 - Think about disabling geo-blocking of the app and content, don't block devices
 - Think about working with a 3rd party lab to facilitate fast and stable access
 - Stable – not changing under the feet of testers
 - Think about how to manage a release cycle, rather than testing on the production instance

Example Best Practice

HbbTV Test Suite Test Applications

- Almost all HbbTV Test Suite tests comprise both test content and test application,
- Therefore, technically, its simply a question of scale, what is being tested could be a single API or a more complex state machine/user story
- A Reference Application may typically layer on top additional libraries, which may complicate diagnosis of failures
- Performance and Usability criteria are especially hard to define objectively

Example Best Practice

HbbTV DRM Reference App

- Demo...
- <https://refapp.hbbtv.org/>

DASH-DRM Reference Application

Links:

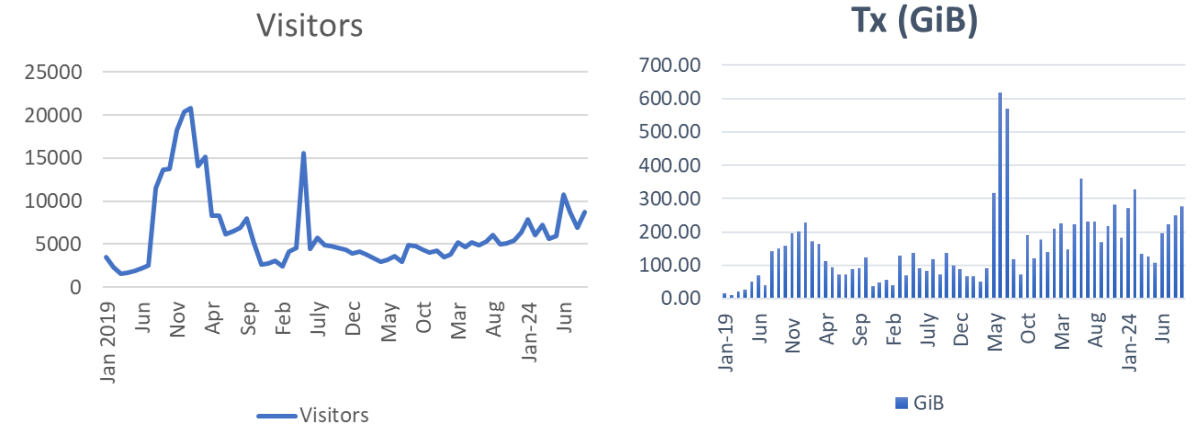
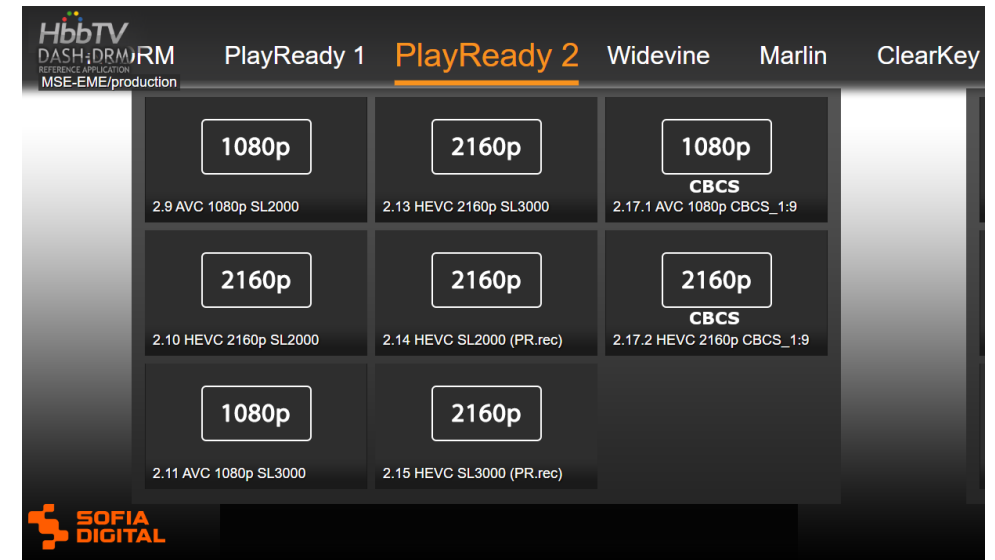
- Production version updated in line with test suite, 3 times a year [Production](#)
- Staging version intended for early access to new features of the app [Staging](#)
- Testing version intended for development and testing new features of the app [Testing](#)

Issues:

- <https://github.com/HbbTV-Association/ReferenceApplication/issues>

Adding extra 3rd party content:

- See <https://member.hbbtv.org/wg/IITF/document/7173>



DASH-DRM Reference Application

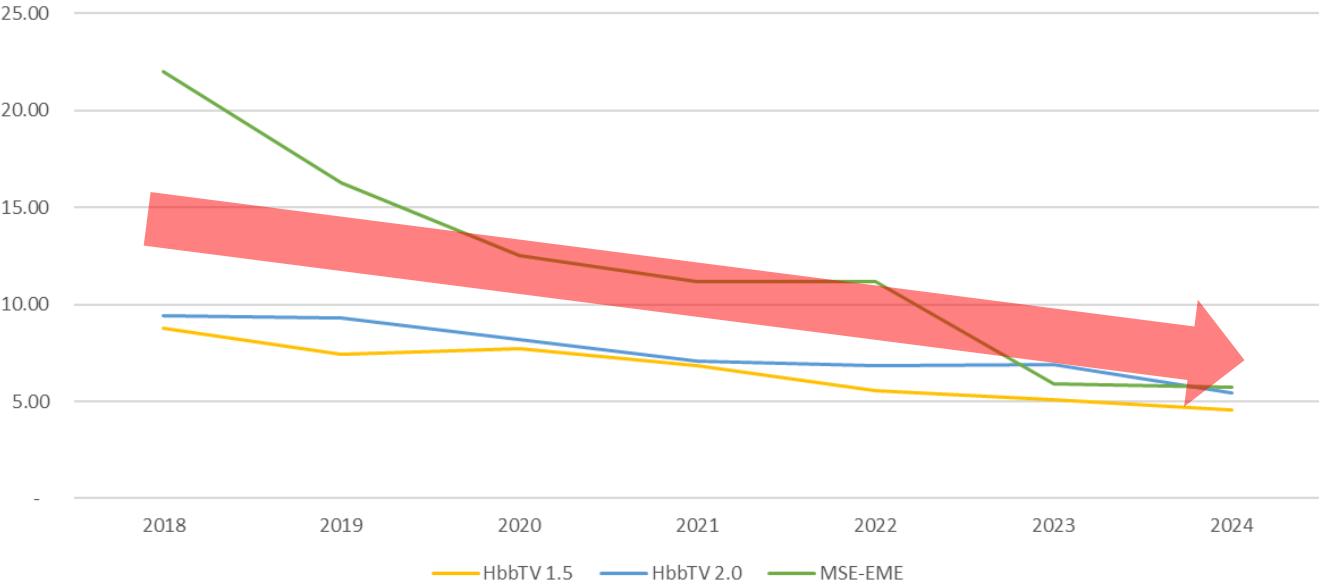
Test Results against devices in the market:

[HbbTV-IITF-01520-003-RefApp-Results-Anonymized.xlsx](#) (As of 30th May 2024)

Year	Model Count
2017	7
2018	8
2019	10
2020	12
2021	15
2022	13
2023	13
2024	8*

		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	Y	Z	AA
1																											
2																											
3																											
4																											
5	No.	Year	HbbTV																								
6	014	2017	1.4.1																								
7	012	2018	1.4.1																								
8	018	2018	1.4.1																								
9	020	2018	1.4.1																								
10	047	2018	1.4.1																								
11	082	2018	1.4.1																								
12	002	2018	1.4.1																								
13	048	2019	1.4.1																								
14	060	2019	1.4.1																								
15	108	2018	1.5.1																								
16	038	2019	1.5.1																								
17	070	2019	1.5.1																								
18	099	2019	1.5.1																								
19	121	2019	1.5.1																								
20	067	2020	1.5.1																								
21	068	2020	1.5.1																								
22	071	2020	1.5.1																								
23	077	2020	1.5.1																								
24	078	2020	1.5.1																								
25	081	2020	1.5.1																								
26	089	2020	1.5.1																								
27	098	2020	1.5.1																								
28	133	2020	1.5.1																								
29	181	2020	1.5.1																								
30	211	2020	1.5.1																								
31	084	2021	1.5.1																								
32	090	2021	1.5.1																								
33	095	2021	1.5.1																								
34	107	2021	1.5.1																								
35	109	2021	1.5.1																								
36	112	2021	1.5.1																								

HbbTV DASH DRM Ref App Device Zoo Testing
Average number of "Fatal" issues per device over time



Virtual Application Testing

First ever remote HbbTV Plugfest

- Resillion hosted manufacturers in our Shenzhen Lab, each had own room
- Reduced the complexity of logistical challenges (IP allow-listing, VPNs etc)
- Easy to have on site dev teams for the region with local support to facilitate operations and communications
- With the help of Suitest tools we connected them to App developers like BBC and Everyone TV, in Europe
- App developers able to try to execute their test apps on a remote device
- Still needed a lot of preparation and on-site support and some challenges e.g. where devices needed specific certificates.



Incorporating Ref Apps into Certification

Trademark Logo Testing

- Needs to be easy for manufacturers to know what they need to do to pass
 - Needs to be well supported for triage of issues and questions
 - Needs to be stable, can't be a moving target
 - Needs to be accessible wherever the testers are
-
- ✓ Use a partner lab to support technical and logistical challenges, facilitate communications and reduce overhead handling support

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