

# Streaming Interoperability and Standardization Across DVB, HbbTV, and CTA WAVE

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# Updates

For more on DVB-I, see "The global DVB-I revolution: bringing the live TV button back!" by Emily Dubs from this morning.

- DVB-I Specification
  - Apps that request / withdraw / update GDPR consent, single sign on, ...
    - Either at the level of an entire service list, or,
    - Each service provider / broadcaster doing it themselves for their services
  - Authentication of DVB-I service lists, content guide data, ...
  - DRM without using an app – license request URL in the service list
  - CMCD v2
  - Many small issues & improvements based on feedback from early users
  - Accessibility Implementation Guidelines
  - Guidelines for implementers on various (other) topics
- DVB-DASH Specification
  - DRM without using an app – DASH-IF 'laur' license request URL in manifest
  - Report on streaming media workflow
- [DASH Validator](#)
  - Extensions for DVB-DASH & to better support live streams
  - Maintenance
- [DVB-I Reference Application](#)
  - Support for CMCD v2

# Reference Streams

- A collection of DASH live / linear services with less common properties (codecs, multiple tracks, ..)
  - Based on VOD streams looped using livesim2
  - See <https://live-linear.dvb.org/videos/index.html>
- Streams can be referenced using the manifest linked from that page or using a DVB-I service list

Stream	Video, Audio and Subtitle / Caption codecs
01_avc_hd_sdr_heaac	AVC SDR (1080p), HEAAC (eng), TTML (fin)
02_hevc_hd_sdr_heaac	HEVC SDR (1080p), HEAAC (eng), TTML (fin)
03_hevc_uhd_sdr_ac4	HEVC SDR (2160p), AC4 (eng), TTML (fin)
04_hevc_uhd_sdr_mpeggh	HEVC SDR (2160p), MPEGH (eng), TTML (fin)
05_hevc_uhd_hlg_heaac	HEVC HLG (2160p), HEAAC (eng), TTML (fin)
06_hevc_uhd_pq10_heaac	HEVC PQ10 (2160p), HEAAC (eng), TTML (fin)
07_avc_hd_sdr_heaac	AVC SDR (1080p), HEAAC (eng,fin,ger), TTML (fin,swe)
08_vvc_uhd_pq10_ac4	VVC PQ10 (2160p), AC4 (eng), TTML (fin)
09_avs3_uhd_pq10_heaac	AVS3 PQ10 (2160p), HEAAC (eng), TTML (fin)
1001_vvc_hd_sdr_heaac	VVC SDR (1080p), HEAAC (eng), TTML (fin)
1002_vvc_uhd_pq10_heaac	VVC PQ10 (2160), HEAAC (eng), TTML (fin)
1003_avc_hd_sdr_mpeggh	AVC SDR (1080p), MPEGH (eng,ger), TTML (fin,swe,eng,ger)
1004_avs3_hd_sdr_heaac	AVS3 SDR (1080p), HEAAC (eng), TTML (fin)
1005_av1_hd_sdr_heaac	AV1 SDR (1080p), HEAAC (eng), TTML (fin)

AVC 1920x1080 SDR 2500k 00:00:06:18

25fps frame: 169



Sorry, no Big Buck Bunny!

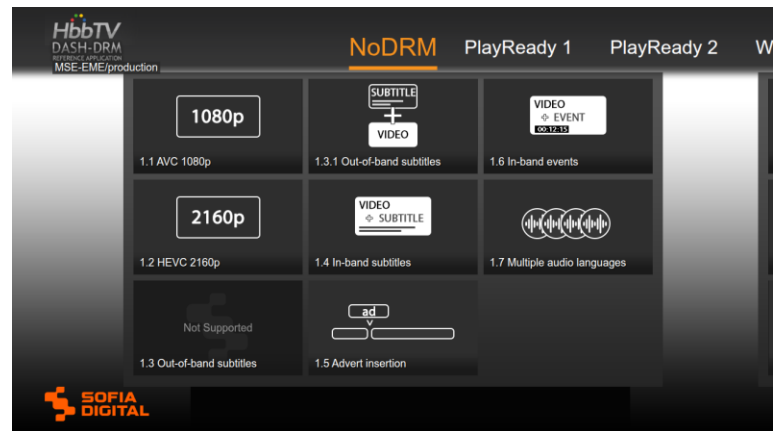
Subtitle 1: 0:02 - 0:08, next at 0:12(fin åäöÄÖ), sansSerif font

# Looking Forwards

- DVB-I
  - Supporting deployments, building on feedback from trials and PoCs
  - Updated "Accessibility Implementation Guidelines" following a wider review
  - Considering possible future topics, please bring your ideas
- DVB-DASH
  - CMCD
  - Considering the implications of MPEG DASH 6th Edition
    - Also pre-6th-edition features never used in the real world
- Possible co-operation with HbbTV on a dedicated specification for TLS & other security in media consumption devices
  - Including preparing for post-quantum crypto
- Reference Streams
  - Extending these to include DRM protected live streams, both with & without apps
- DASH validator
  - Maintenance, DASH 6th edition, SCTE-35 in DASH? Suggestions welcome.

- **Specification 2.0.5**
  - 3 mandatory new features - DRM, Web Assembly, Web security
  - Optional new features - New video codecs, HTTP/3, o New DVB-I application models
  - Removals and deprecations of unused or superseded features
- **Test suite for devices**
  - Newest release includes total 3439 test cases, 2907 of them approved.
  - Churn continues, most recently 94 more tests were approved, of which:
    - 64 tests were approved for the first time
    - 30 tests were re-approved after challenge
    - Also 183 already approved tests were improved/fixed and re-approved
  - Recent additions
    - CTA WAVE tests for MSE-based media playback promoted from "additional" to "approved"
    - Widevine DRM tests

- Test & conformance applications
  - Example source code for app & terminal developers
    - App developers can see how things can be done
    - Easier for terminal developers to debug than a real app
    - Platforms can use it to approve implementations for a regime
  - We already have the [DASH-DRM reference application](#), what about others?
    - An operator application?
    - More?
- All-IP
  - Devices without a DVB-C/S/T tuner
    - Also users who never connect an aerial (or don't have one)
  - Still support all basic HbbTV use-cases and applications but for linear services via IP
  - Are there existing features that cannot work? That are not worth making work?
  - How to test a device without a tuner? How to run tests? Which tests to run, to modify, to exclude?
- Both have study mission groups meeting regularly



- Developer guides, API reference, blog, ....
  - Including articles like these ...
    - Reimagining satellite TV with DVB-I and HbbTV
    - Why HbbTV is needed for broadband-only television
    - Navigating the fragmented world of smart TV operating systems
- Application showcase
  - Highlights real-world deployments of HbbTV applications from across the globe,
  - Helps developers, broadcasters and platforms understand what is possible with HbbTV and how it is being used in practice.
- Slack
  - [https://join.slack.com/t/hbbtvdevelopers/shared\\_invite/zt-40kt0r27n-55Yted6onsXmyQ59Y5Nxgg](https://join.slack.com/t/hbbtvdevelopers/shared_invite/zt-40kt0r27n-55Yted6onsXmyQ59Y5Nxgg)

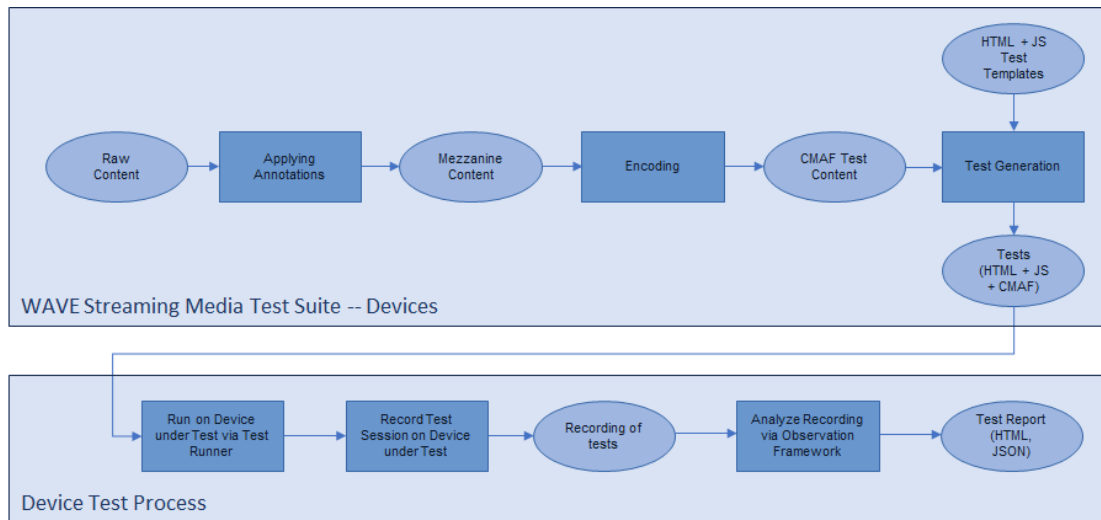


# Recent CTA WAVE Specifications

- [Device Playback Capabilities Specification](#) (CTA-5003-C)
  - Updated based on feedback from running the test suite & filling gaps
- [Common Media Client Data](#) v2 (CTA-5004-B)
  - Enhanced based on experiences with the original
    - <https://www.qualabs.com/blog/unlocking-streaming-insights-with-cmcd-v2>
  - Many people here know far more about this than I do!
- [Web Media API Snapshot 2025](#) (CTA-5000-H)
  - Tracks web standards supported across all main browser code bases at the end of 2025

# CTA WAVE Streaming Media Test Suite - Devices

- [Unit tests](#) for web media playback using MSE (& EME)
- Initial focus was AVC video
- Release 3.0.0 (in HbbTV test suite) added MPEG & Dolby audio
- New release [4.0.0](#) adds more tests including HEVC & HDR
- Tests uses specially constructed test content with QR codes (video) & pseudo-random noise (audio)
- Observation framework analyzes recordings & determines pass/fail.



179 validated tests

Video: 33 for AVC, 27 for HEVC

Audio: 30 for MPEG (caac, caaa, camc), Dolby (ceac, ca4s)

# More CTA WAVE Streaming Media Test Suites

- User Agents
  - Provides optimised running of [Web Platform Tests](#) on user agents embedded in devices
  - Variants available depending on the year of the browser
    - Linked to [Web Media API Snapshot](#) spec
- Test content
  - The content from the device test suite [usable independently](#)
- CTA WAVE funds the DASH validator with DVB

# Looking Forwards

- Update Web Media API Snapshot for [web APIs widely deployed for the first time in 2026](#)
  - e.g. WebTransport now supported in all main browsers since Safari 26.4 (March 2026)
  - User agents test suite to be updated to match
- Candidates for devices specification and test suite
  - [Observation framework performance optimisation](#)
  - [Commercial DRM](#)
  - VVC and other new codecs, WCG/HDR/dynamic metadata (tbc)
  - Smaller features – playback > 1.0, [edit lists](#), [TextTrackCue timing](#)
  - Continue debugging existing tests not yet validated
  - Support of new features such as low-latency DASH/HLS and SGAI
    - Analysis needed to understand the impact of these at or below the MSE layer

Thank You Very Much For Listening