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# Introduction

This document provides a list of conformance test vectors for OMAF 2nd edition along with a description of OMAF features supported by each file and corresponding specification clauses.

# Conformance for ISO/IEC 23090-2

## **General**

This clause defines conformance for ISO/IEC 23090-2. There is no official reference tool provided to check the conformance of files. The reference software allows users to check the conformance (i.e. syntactic correctness and value range validation) of a given ISOBMFF container file to the ISO/IEC 23090-2:—[[1]](#footnote-1) standard. At the basic level, this can be achieved using omaf\_tool by providing a listing of OMAF-related metadata which can then be used to verify conformance.

A set of test vectors for conformance are available at: https://standards.iso.org/iso-iec/23090/-17/ed-1/en/.

[Ed. (AH): URL to be changed to <https://standards.iso.org/iso-iec/23090/-17/ed-2/en/> in the final document.]

[Ed. (AH): omaf\_tool should be updated to provide support for parsing OMAFv2 features.]

## **Description of conformance files**

## **ISO/IEC 23090-2 1st edition**

This set of test vectors contains a number of files that conform to the following OMAF profiles: HEVC-based viewport-independent OMAF video profile, HEVC-based viewport-dependent OMAF video profile, and OMAF HEVC image profile. In addition, DASH MPDs and media segments for some of the test vectors in this set are also available. Table 3 describes the main features of this set of test vectors.

Table 3 — Description of ISO/IEC 23090-2 conformance test vectors

| ID | Projection | Profile | Mono/ stereo | Region-wise packing/tiling structure | Output | DASH profile and MPD |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | equirectangular | HEVC-based viewport-independent OMAF video profile | mono | — | MP4  Case1/PoleVault.omaf.mp4 | — |
| 2 | equirectangular | HEVC-based viewport-independent OMAF video profile | stereo (top-bottom frame packing) | — | MP4  Case2/PoleVault.TB.omaf.mp4 | — |
| 3 | equirectangular | HEVC-based viewport-independent OMAF video profile | mono | — | DASH  Case3/PoleVault.omaf.mpd | on-demand profile  MPD contains:  — projection format |
| 4 | equirectangular | HEVC-based viewport-independent OMAF video profile | stereo (top-bottom frame packing) | — | DASH  Case4/PoleVault.TB.omaf.mpd | on-demand profile  MPD contains:  —projection format  —VideoFramePackingType indicator |
| 5 | equirectangular | HEVC-based viewport-dependent OMAF video profile | mono | as described in ISO/IEC 23090-2:—[[2]](#footnote-2), Figure D.7. | DASH  Case5/BalboaPark.omaf.mpd | live profile in segment template mode  MPD contains:  — projection format  — spherical quality ranking  — region-wise packing indicator  — coverage information  — extractor with preselection descriptor |
| 6 | equirectangular | HEVC-based viewport-dependent OMAF video profile | mono | as described in ISO/IEC 23090-2:—, Figure D.8. | DASH  Case6/BalboaPark.omaf.mpd | on-demand profile  MPD contains:  — projection format  — spherical quality ranking  — region-wise packing indicator  — coverage information  — extractor with preselection descriptor |
| 7 | equirectangular | HEVC-based viewport-dependent OMAF video profile | mono | equal resolution streams as described in ISO/IEC 23090-2:—, D.4.2 with 4x2 tiling | DASH  Case7/PoleVault.4x2.omaf.mpd | on-demand profile  MPD contains:  — projection format  — spherical quality ranking  — region-wise packing indicator  — coverage information  — extractor with preselection descriptor |
| 8 | equirectangular | HEVC-based viewport-dependent OMAF video profile | stereo (top-bottom frame packing) | equal resolution streams as described in ISO/IEC 23090-2:—, D.4.2 with 4x4 tiling (4x2 per eye) | DASH  Case8stvi/PoleVault.TB.4x4.omaf.mpd | on-demand profile  MPD contains:  — projection format  — spherical quality ranking  — region-wise packing indicator  — coverage information  — VideoFramePackingType indicator  — extractor with preselection descriptor |
| 9 | cubemap | HEVC-based viewport-dependent OMAF video profile | mono | equal resolution streams as described in ISO/IEC 23090-2:—[[3]](#footnote-3), D.4.2 with one tile per cube face, and default OMAF cubemap face arrangement | DASH  Case9/PoleVault.cube.6.omaf.mpd | live profile in segment template mode  MPD contains:  — projection format  — spherical quality ranking  — coverage information  — extractor with preselection descriptor |
| 10 | cubemap | HEVC-based viewport-dependent OMAF video profile | mono | equal resolution streams as described in ISO/IEC 23090-2:—, D.4.2 with 2x2 tiling per cube face (24 tiles total), and default OMAF cubemap face arrangement | DASH  Case10/PoleVault.cube.24.omaf.mpd | on-demand profile  MPD contains:  — projection format  — spherical quality ranking  — coverage information  — extractor with preselection descriptor |
| 11 | equirectangular | OMAF HEVC image profile | mono | No tiling (i.e. only a coded image item) | HEIC  Case11/Balboa.heic Case11/pole.heic | — |
| 12 | equirectangular | OMAF HEVC image profile | mono | 6x6 tiling (with 'grid' derived image item) | HEIC  Case12/Balboa\_grid.heic | — |
| 13 | equirectangular | OMAF HEVC image profile | stereo (left-right frame packing) | 6x6 tiling (with 'grid' derived image item) with 3x6 per view | HEIC  Nokia/Case13/Pole\_sbs.heic | — |
| 14 | cubemap | HEVC-based viewport-dependent OMAF video profile | mono | 24 viewports; frame packing with mixed resolution tiles: 12 high resolution (768x768) and 12 low resolution (384x384); IDR period is 9 frames | MP4  Case14/Trolley\_q32.mp4 | — |
| 15 | cubemap | HEVC-based viewport-dependent OMAF video profile | mono | 24 viewports; frame packing with mixed resolution tiles: 12 high resolution (768x768) and 12 low resolution (384x384); IDR period is 9 frames | DASH  Case15/Trolley.mpd | on-demand profile  MPD contains:  — projection format  — spherical quality ranking  — coverage information  — extractor with preselection descriptor |
| 16 | cubemap | HEVC-based viewport-dependent OMAF video profile | mono | 24 viewports; frame packing with mixed resolution tiles: 12 high resolution (768x768) and 12 low resolution (384x384); IDR period is 9 frames | DASH  Case16/Trolley\_live.mpd | live profile  MPD contains:  — projection format  — spherical quality ranking  — coverage information  — extractor with preselection descriptor |

[Ed. (AH): Cases 14-16 in Table 3 in ISO/IEC IS 23090-17 need to be reviewed and potentially updated since they were present in the 1st edition but it seems that now they apply to 2nd edition conformance files.]

## **ISO/IEC 23090-2 2nd edition**

This set of test vectors contains a number of files that conform to the following OMAF profiles: HEVC-based viewport-dependent OMAF video profile, simple tiling OMAF video profile, HEVC-based viewport-independent OMAF video profile, and advanced tiling OMAF video profile. Mainly the file set conforms to OMAF overlay and viewpoint and indexed tiling profile related features.

[Ed. (AH): The set of test vectors are available on the MPEG Content server ([**https://mpegfs.int-evry.fr/mpegcontent/**](https://mpegfs.int-evry.fr/mpegcontent/)**)** under the following paths:

* **/MPEG-I/Part02-OmnidirectionalMediaFormat/ReferenceSoftwareTestVectors/Nokia/**
* **/MPEG-I/Part02-OmnidirectionalMediaFormat/ReferenceSoftwareTestVectors/Advanced%20Tiling%20Profiles/**

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Table 4 — Description of ISO/IEC 23090-2 2nd edition conformance test vectors

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ID | Location | Projection | DASH Profile | OMAF Profile | OMAF features | Relevant Clauses |
| 1 | Case14 | Equirectangular | Two versions: isoff-on-demand:2011 and  isoff-live:2011 | HEVC-based viewportdependent OMAF video profile | * Two Viewpoints belonging to ‘vipo’ entity group * Viewpoint position structure viewpoint group structure * Viewpoint switching list structure * Looping for both viewpoints * Viewpoint “vp1” set as initial viewpoint * Overlay and background grouping | (7.12.2)  (7.12.1.2)  (7.12.1.6)  (7.12.1.7)  (7.12.1.8)  (7.12.3.2)  (7.14.7.2) |
| 2 | Case15 | Equirectangular | Two versions: isoff-on-demand:2011 and  isoff-live:2011 | HEVC-based viewportdependent OMAF video profile | * Two Viewpoints and Dynamic viewpoint information | (7.12.3.1) |
| 3 | Case16 | Equirectangular | isoff-on-demand:2011 | HEVC-based viewportdependent OMAF video profile | * Four viewport-relative overlays with different aspect ratio sources and overlays * overlay configuration box * alternate overlays | (7.14.3.2)  (7.14.4)  (7.14.7.1) |
| 4 | Case17 | Equirectangular | isoff-on-demand:2011 | HEVC-based viewportdependent OMAF video profile | 2D overlay with 2D source video and omnidirectional overlay with 360 mono video source, both in different distance and partly overlapping with different opacities. | (7.14.2)  (7.14.3.3)  (7.14.3.4)  (7.14.3.13)  (7.14.4) |
| 5 | Case18 | Equirectangular | isoff-on-demand:2011 | HEVC-based viewportdependent OMAF video profile | Partly overlapping 2D overlays with different priority / layering order and distance; also with different source region. | (7.14.3.6)  (7.14.3.7)  (7.14.3.8)  (7.14.3.11)  (7.14.4)  (8.5.5) |
| 6 | Case19 | Equirectangular | isoff-on-demand:2011 | HEVC-based viewportdependent OMAF video profile | Overlay with activation region | (7.14.3.12)  (7.14.4) |
| 7 | Case20 | Equirectangular | Standalone MP4 | HEVC-based viewportdependent | Overlay as an item. Overlay created from 2D heic image. | (7.14.5) |
| 8 | Case21 | Equirectangular | isoff-on-demand:2011 | HEVC-based viewportdependent | 2D overlay, user interactions enabled with dynamically changing parameters | (7.14.3.9)  (7.14.6) |
| 9 | Case22 | Equirectangular | indexed-isobmff:2020 / siti | Simple tiling OMAF video profile | Simple Tiling Profile compliant MPD and DASH segments |  |
| 10 | Case23 | Cubemap | indexed-isobmff:2020 / siti | Simple tiling OMAF video profile | Simple Tiling Profile compliant MPD and DASH segments |  |
| 11 | F3\_360\_mono | Cubemap | N/A | Advanced tiling OMAF video profile | * One sub-picture track per motion-constrained tile set or slice * One HEVC tile base track per representation with equivalent resolution * Tile track conforms to the constraints of the 'hvt3' sample entry * Base track has an 'hvc2' sample entry * Four types of files: initialization segment (video-init prefix), high resolution index segments (main-index prefix), fallback video index segments (fb-index prefix), and tile media segments (main-tile prefix). | (10.1.6)  (D.6.8) |

[Ed. (AH): Additional columns are needed to provide more information, such as the profiles and the type of region-wise packing, to align with the table in ISO/IEC IS 23090-17.]

[Ed. (AH): Consider merging the two tables, possibly with a new column to specify which edition the conformance file is for.]

The following applies to cases 14 to 23 in Table 4:

* For ftyp / styp brands:
  + initialization segments contain the ‘hevd’ and ‘iso5’ brands
  + data segments contain the ‘mshd’ and ‘msix’ brands
  + ‘imda’ initialization segments also include the ‘siti’ brand
  + ‘imda’ index segments include ‘sibm’ brand
  + ‘imda’ data segments include the ‘imds’ brand
  + the ‘vwpt’ brand is included if the stream contains more than 1 viewpoint
* Partial adaptation sets do not contain a value attribute in the preselection property. Linking between base adaptation set and its partial sets is done only from base set’s @preselection attribute to the partial sets’ ids.
* ‘invp’ timed metadata is included in every ‘vipo’ entity group in MP4 files and MPDs
* For simple tiling profile (siti) test vectors (cases 22 and 23):
  + The index segment is generated separately for every base adaptation and signalled in the SegmentTemplate@index attribute or the RepresentationIndex element of the SegmentBase element in the MPD depending on whether a live or on-demand DASH profile is used.
  + The index segments are not listed as a separate partial adaptation set in MPD and not referred to from preselections.
  + The ContentComponent element is used in the MPD.

1. Under preparation. Stage at the time of publication: ISO/IEC FDIS 23090-2:2020. [↑](#footnote-ref-1)
2. Under preparation. Stage at the time of publication: ISO/IEC DIS 23090-2:2020. [↑](#footnote-ref-2)
3. Under preparation. Stage at the time of publication: ISO/IEC DIS 23090-2:2020. [↑](#footnote-ref-3)