**** **ISO/IEC JTC 1/SC 29/WG 03 N0089**

**ISO/IEC JTC 1/SC 29/WG 03  
MPEG Systems   
Convenorship: KATS (Korea, Republic of)**

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**Expected action:** None

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**Email of Convenor:** young.L @ samsung . com

**Committee URL:** <https://isotc.iso.org/livelink/livelink/open/jtc1sc29wg3>

**INTERNATIONAL ORGANIZATION FOR STANDARDIZATION**

**ORGANISATION INTERNATIONALE DE NORMALISATION**

**ISO/IEC JTC 1/SC 29/WG 03 MPEG SYSTEMS**

**ISO/IEC JTC 1/SC 29/WG 03 N** **0089**

**October 2020, Virtual**

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| **Title** | **Summary of Systems standards for video codecs after the 1st WG03 meeting** |
| **Source** | **WG 03, MPEG Systems** |
| **Status** | **Approved** |
| **Serial Number** | **19864** |

# HEVC

## ISO/IEC 23000-19 2nd edition AMD 1 Additional CMAF HEVC media profiles

### Scope

* Adding high frame rate HEVC video CMAF media profiles (120Hz)
* Adding interlaced HEVC video CMAF media profile

### Project status

<https://sd.iso.org/projects/project/80756/overview>

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **40.60** | **1** | **Close of voting** | **2020-09-22** |  | **2020-09-23** | **Current** |
| 40.92 |  | Full report circulated: DIS referred back to TC or SC |  |  |  | Awaiting |
| 40.93 |  | Full report circulated: decision for new DIS ballot |  |  |  | Awaiting |
| 40.99 |  | Full report circulated: DIS approved for registration as FDIS |  |  |  | Awaiting |
| 50.00 |  | Final text received or FDIS registered for formal approval | 2021-01-12 |  |  | Awaiting |

### Reference output document

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Title** | **In Charge** | **TBP** | **Available Date** | **S/N** |
|  | **ISO/IEC 23000-19 - Common Media Application Format** |  |  |  |  |
| **58** | **DoC on ISO/IEC 23000-19:2019 DAM 1 Additional CMAF HEVC media profiles** | **Krasimir Kolarov** | **N** | **2020-10-16** | **19761** |
| **59** | **Text of ISO/IEC 23000-19:2019 FDAM 1 Additional CMAF HEVC media profiles** | **Krasimir Kolarov** | **N** | **2020-10-16** | **19763** |

### Open issues

## ISO/IEC 23000-22 AMD 2 MIAF HEVC Advanced HDR profile and other clarifications

### Scope

* Adding HEVC Advanced HDR profile

### Project status

### <https://sd.iso.org/projects/project/81634/overview>

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **30.60** | **1** | **Close of voting/comment period** |  |  | **2020-10-12** | **Current** |
| 30.92 |  | CD referred back to Working Group |  |  |  | Awaiting |
| 30.99 |  | CD approved for registration as DIS |  |  |  | Awaiting |
| 40.00 |  | DIS registered | 2020-10-30 | 2021-03-01 |  | Awaiting |

### Reference output document

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| **No.** | **Title** | **In Charge** | **TBP** | **Available Date** | **S/N** |
|  | **ISO/IEC 23000-22 - Multi-Image Application Format** |  |  |  |  |
| **18** | **DoC on ISO/IEC 23000-22 CDAM 2 MIAF HEVC Advanced HDR profile and other clarifications** | **Krasimir Kolarov** | **N** | **2020-10-16** | **19698** |
| **62** | **Text of ISO/IEC 23000-22 DAM 2 MIAF HEVC Advanced HDR profile and other clarifications** | **Cyril Concolato** | **N** | **2020-11-06** | **19769** |

### Open issues

# VVC

## ISO/IEC 13818-1:2019 AMD 2 Carriage of VVC in MPEG-2 TS

### Scope

* VVC data alignment with PES packets
* VVC video descriptor and VVC HRD descriptor
* Constraints on transport of VVC bitstream
* T-STD extension for single layer VVC and layered temporal video subsets

### Project status

<https://sd.iso.org/projects/project/80754/overview>

| **Type** | **Version** | **Started** | **End date** | **Status** | **Result** |
| --- | --- | --- | --- | --- | --- |
| [DIS](https://isotc.iso.org/livelink/eb3/part/view.do?id=448397) | 1 | 2020-10-06 | 2020-12-29 | OPEN |  |

### Reference output document

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Title** | **In Charge** | **TBP** | **Available** |
| **19270** | **Draft DoC on ISO/IEC 13818-1:2019 CDAM 2 Carriage of VVC in MPEG-2 TS** | **Karsten Grüneberg** | **N** | **2020-04-24** |
| **19277** | **Draft text of ISO/IEC 13818-1:2019 DAM 2 Carriage of VVC in MPEG-2 TS** | **Karsten Grüneberg** | **N** | **2020-04-24** |

### Open issues

## ISO/IEC 14496-15:2019 AMD 2 Carriage of VVC and EVC in ISOBMFF

### Scope

* Definition of sample, sub-sample, sync sample, decoder configuration record and etc.
* storage format for single-layer VVC (ISO/IEC 23090-3) video streams
* storage of multiple layers in one track or each layer/sub-layer in its own track
* storage format for VVC bitstreams with more than one layer.

### Project status

<https://sd.iso.org/projects/project/80903/overview>

| **Type** | **Version** | **Started** | **End date** | **Status** | **Result** |
| --- | --- | --- | --- | --- | --- |
| [DIS](https://isotc.iso.org/livelink/eb3/part/view.do?id=448361) | 1 | 2020-10-04 | 2020-12-27 | OPEN |  |

### Reference output document

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| --- | --- | --- | --- | --- |
| **No.** | **Title** | **In Charge** | **TBP** | **Available** |
| **19278** | **Text of ISO/IEC 14496-15:2019 CDAM 2 Carriage of VVC and EVC in ISOBMFF** | **Miska Hannuksela** | **N** | **2020-05-01** |

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| **No.** | **Title** | **In Charge** | **TBP** | **Available Date** | **S/N** |
|  | **ISO/IEC 14496-15 - Carriage of NAL unit structured video in the ISO Base Media File Format** |  |  |  |  |
| **35** | **Potential improvements on Carriage of VVC and EVC in ISOBMFF** | **Miska Hannuksela** | **N** | **2020-11-13** | **19715** |
| **36** | **Technologies under Consideration for NAL File Format** | **Emmanuel Thomas** | **N** | **2020-10-16** | **19716** |

### Open issues

## ISO/IEC 23000-19:2019 AMD 2 CMAF Media Profiles for MPEG-H 3D Audio, EVC, VVC and other technologies

### Scope

* Definition of CMAF VVC media track
* Definition of CMAF VVC media profile

### Project status

### Reference output document

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| --- | --- | --- | --- | --- | --- |
| **No.** | **Title** | **In Charge** | **TBP** | **Available Date** | **S/N** |
|  | **ISO/IEC 23000-19 - Common Media Application Format** |  |  |  |  |
| **60** | **Request for ISO/IEC 23000-19:2019 AMD 2 CMAF Media Profiles for MPEG-H 3D Audio, EVC, VVC and other technologies** | **Krasimir Kolarov** | **N** | **2020-10-16** | **19767** |
| **61** | **WD of ISO/IEC 23000-19:2019 AMD 2 CMAF Media Profiles for MPEG-H 3D Audio, EVC, VVC and other technologies** | **Krasimir Kolarov** | **N** | **2020-10-30** | **19768** |

### Open issues

## ISO/IEC 23008-12:2017 AMD 3 Support for VVC, EVC, slideshows and other improvements

### Scope

* VVC image item definition
* VVC subpicture and operating points
* VVC image sequences

### Project status

<https://sd.iso.org/projects/project/81688/overview>

| **Stage** | **Version** | **Description** | **Target date** | **Limit date** | **Started** | **Status** |
| --- | --- | --- | --- | --- | --- | --- |
| **20.99** | **1** | **WD approved for registration as CD** |  |  | **2020-07-01** | **Current** |
| 40.00 |  | DIS registered | 2020-10-30 | 2021-03-01 |  | Awaiting |

### Reference output document

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Title** | **In Charge** | **TBP** | **Available Date** | **S/N** |
|  | **ISO/IEC 23008-12 - Image File Format** |  |  |  |  |
| **38** | **Revised text of ISO/IEC 23008-12:2017 CDAM 3 Support for VVC, EVC, slideshows and other improvements** | **Frederic MAZE** | **N** | **2020-11-13** | **19718** |

### Open issues

# EVC

## ISO/IEC 13818-1:2019 AMD 3 Carriage of EVC in MPEG-2 TS and update of the MPEG-H 3D Audio descriptor

### Scope

* a new stream type for ISO/IEC 23094-1 (EVC) elementary streams;
* descriptors carrying metadata for EVC elementary streams;
* constraints for the transport of EVC elementary streams;
* the T-STD buffer model for EVC elementary streams.

### Project status

<https://sd.iso.org/projects/project/81686/overview>

| **Stage** | **Version** | **Description** | **Target date** | **Limit date** | **Started** | **Status** |
| --- | --- | --- | --- | --- | --- | --- |
| **20.99** | **1** | **WD approved for registration as CD** |  |  | **2020-07-02** | **Current** |
| 40.00 |  | DIS registered | 2020-10-30 | 2021-03-01 |  | Awaitin |

### Reference output document

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| --- | --- | --- | --- | --- | --- |
| **No.** | **Title** | **In Charge** | **TBP** | **Available Date** | **S/N** |
|  | **ISO/IEC 13818-1 - Systems** |  |  |  |  |
| **16** | **Text of ISO/IEC 13818-1:2019 DAM 3 Carriage of EVC in MPEG-2 TS and update of the MPEG-H 3D Audio descriptor** | **Thomas Stockhammer** | **N** | **2020-10-16** | **19696** |

### Open issue?

## ISO/IEC 23000-19:2019 AMD 2 CMAF Media Profiles for MPEG-H 3D Audio, EVC, VVC and other technologies

### Scope

* Definition of CMAF EVC media track
* Definition of CMAF EVC media profile

### Project status

### Reference output document

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| --- | --- | --- | --- | --- | --- |
| **No.** | **Title** | **In Charge** | **TBP** | **Available Date** | **S/N** |
|  | **ISO/IEC 23000-19 - Common Media Application Format** |  |  |  |  |
| **60** | **Request for ISO/IEC 23000-19:2019 AMD 2 CMAF Media Profiles for MPEG-H 3D Audio, EVC, VVC and other technologies** | **Krasimir Kolarov** | **N** | **2020-10-16** | **19767** |
| **61** | **WD of ISO/IEC 23000-19:2019 AMD 2 CMAF Media Profiles for MPEG-H 3D Audio, EVC, VVC and other technologies** | **Krasimir Kolarov** | **N** | **2020-10-30** | **19768** |

### Open issues

## ISO/IEC 23008-12:2017 AMD 3 Support for VVC, EVC, slideshows and other improvements

### Scope

* EVC image item definition
* EVC image sequences

### Project status

<https://sd.iso.org/projects/project/81688/overview>

| **Stage** | **Version** | **Description** | **Target date** | **Limit date** | **Started** | **Status** |
| --- | --- | --- | --- | --- | --- | --- |
| **20.99** | **1** | **WD approved for registration as CD** |  |  | **2020-07-01** | **Current** |
| 40.00 |  | DIS registered | 2020-10-30 | 2021-03-01 |  | Awaiting |

### Reference output document

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Title** | **In Charge** | **TBP** | **Available Date** | **S/N** |
|  | **ISO/IEC 23008-12 - Image File Format** |  |  |  |  |
| **38** | **Revised text of ISO/IEC 23008-12:2017 CDAM 3 Support for VVC, EVC, slideshows and other improvements** | **Frederic MAZE** | **N** | **2020-11-13** | **19718** |

### Open issues

# LCEVC

## ISO/IEC 13818-1:2019 AMD 4 Carriage of LCEVC and other improvements

### Scope

* a new stream type for ISO/IEC 23094-2 (LCEVC) elementary streams;
* descriptors carrying metadata for LCEVC elementary streams;
* constraints for the transport of LCEVC elementary streams;
* a new descriptor for ISO/IEC 23008-3 (kind\_media\_service\_descriptor)

### Project status

### Reference output document

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Title** | **In Charge** | **TBP** | **Available Date** | **S/N** |
|  | **ISO/IEC 13818-1 - Systems** |  |  |  |  |
| **30** | **Request for ISO/IEC 13818-1:2019 AMD 4 Carriage of LCEVC and other improvements** | **Stefano Battista** | **N** | **2020-10-16** | **19710** |
| **34** | **Text of ISO/IEC 13818-1:2019 CDAM 4 Carriage of LCEVC and other improvements** | **Yasser Syed** | **N** | **2020-10-16** | **19714** |

### Open issue?

# Other topics

## *ISO/IEC 23090-13 Video Decoding Interface for Immersive Media*

### Scope

The scope of the VDI specification covers the interface between a media application and the Video Decoding Engine (VDE) of the devices implementing video decoders such as HEVC, VVC, EVC and so on. VDI defines new functions and operations extending the existing VDE capabilities exposed by a Khronos OpenMAX interface.

### Open issues

### VDI bindings with VVC and HEVC is currently being considered. However, The VVC binding still misses metadata for combining the output of decoders into a single output video buffer so that the further processing after decoding can be applied to the sample-synchronized combined decoded sequence. It would be desirable that this metadata is introduced in a video SEI specification in a timely manner to allow the progression of VDI to CD. Some solutions were already proposed in the recent JVET meetings.

## Advance signaling of required video decoding capability

### Scope

The key issues is to provide sufficient information on system level (manifest, MPD, CMAF Header, SDP offer/answer, HTTP capability headers) in order for a system to identify if the provided media streams can be decoded and rendered by the receiving platform before actually receive and parse the video bistreams. APIs such as isTypeSupported or the W3C media capability APIs may be used for this purpose. Currently, focus is on parameters related to codecs, profiles and levels as well as parameters documented in CICP such as color space or transfer characteristics, but recently issues around static and dynamic metadata for HDR are part of the discussion.

### Open issues

* What are relevant video parameters that need to be signaled in advance?
* How can these parameters be mapped to a proper capability on the receiver?
* If there any conformance for any of these receiver parameters?

## Systems Functionalities for Video Conformance

### Scope

For previous codecs such as AVC and HEVC, adaptive streaming system design has been limited by what is supported on hardware devices and the streaming applications needed to deal with the functionalities and limitations of hardware devices, in particular to create “seamlessness” when switching and splicing. While some of this discussion may be deferred to application and system standards, more and more devices included codecs are used for many different services. Hence, consistent decoder implementations also for systems functionalities should be a major concern for the organization that has developed the codec.

It is important that conformance streams and test cases related to adaptive streaming and systems aspects are provided to hardware and SOC decoder implementers for robust VVC/EVC hardware decoders to deal with efficient and feature‐rich streaming functionalities.

### Reference Documents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No.** | **Title** | **In Charge** | **TBP** | **Available Date** | **S/N** |
|  | **Explorations** |  |  |  |  |
| **48** | **Systems Functionalities for Video Conformance** | **Thomas Stockhammer** | **Y** | **2020-10-16** | **19724** |

### Open issues

* Codec initialization: What is sufficient to initialize the codec?
* Codec configuration change: Once initialized, what parameters can be changed without decoder reinitialization?
* Random access, content splicing, and content switching
  + Random access: What kinds of random access can be done (without decoder reinitialization)?
  + Content splicing: What kinds of content can be spliced together (without decoder reinitialization)?
  + Content switching: What kinds of content can be seamlessly switched back and forth (without decoder reinitialization)?
* Coding efficiency: How can we maintain high coding efficiency while enabling the streaming
* functionalities?
* Suitable target latencies: How can we operate at target latencies while maintaining high coding efficiency?
* SEI message placement and handling: How does the SEI messages affect streaming functionalities? Initialization? Same SEIs across all CMAF Tracks?
* Cross‐stream switching: For example support fast join or switching, how can this be achieved?