**3GPP TSG-SA WG4 Meeting #131-bie-eS4-250720**

**Online, 11 - 18 April 2025**

**Source: Tencent**

**Title: [FS\_Beyond2D] Permanent document on B2D format evaluation**

**Agenda item: 9.7**

**Document for: Agreement**

**1. Introduction**

As agreed in SA4#131, The present document aims at keeping track of the progress of each representation format under study as part of FS\_Beyond2D.

**2. Proposal**

It is proposed to agree the current document as basis for further work.

# 1 List of B2D formats under consideration

## 1.1 Formats under study

- Stereoscopic video

- Dense dynamic point cloud

- Multi-view plus depth video

- Dynamic Mesh

## 1.2 Other formats

- Neural radiance field

- Light fields video

- 3D Gaussian splats

# 2 Representation format and associated quality factors

Is the representation format fully described? This includes quality factors specific to the format.

* Pink: representation format and quality factors are not defined
* Yellow: representation format and quality factors are described but incomplete.
* Green: representation format and quality factors are complete

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| --- | --- | --- | --- |
| Format | In Permanent document | In TR 26.956 | Other |
| Extended Stereoscopic video |  | Representation format defined in clause 4.3.2 | Quality factors undefined |
| Dense dynamic point cloud |  | Representation format defined in clause 4.3.3.1  Quality factors defined in Clause 4.3.3.4.5 |  |
| Multi-view video |  | Representation format defined in clause 4.3.4.1,  Quality factors introduced in Clause 4.3.4.4.2 and 4.3.4.4.2 |  |
| Dynamic Mesh |  | Representation format defined in clause 4.3.5.1,  Quality factors Introduced in Clause 4.3.5.4.5 |  |

# 3 Reference sequences

Are the reference sequences available, validated?

* Pink: reference sequences are missing
* Yellow: reference sequences are selected, but not yet frozen.
* Green: Reference Sequences are frozen

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| Format | In Permanent document | In TR 26.956 | Other |
| Stereoscopic video |  | Candidate test set described in clause 7.2.7 |  |
| Dense dynamic point cloud |  | Selected test set described in clause 7.3.8.2 |  |
| Multi-view video | One sequence is considered in the PD (S4-250714). | In clause 7.4.7, pointer MPEG CTC, to be replaced. | Ongoing work to add a few more sequences and obtain permissions. |
| Dynamic Mesh |  | Candidate test set described in Annex C 2.5, C 2.6, C 2.7. C 2.8, C 2.10, C 2.11, C 2.12 |  |

# 4 Quality Metrics

Are the quality metrics fully defined, selected and validated?

* Pink: quality metrics are missing
* Yellow: quality metrics are documented, but not validated yet.
* Green: quality metrics are frozen

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| Format | In Permanent document | In TR 26.956 | Other |
| Stereoscopic video |  | Defined in clause 7.2.5 |  |
| Dense dynamic point cloud |  | Defined in clause 7.3.6 |  |
| Multi-view video |  | Quality metrics defined in Clause 4.3.4.4.2 and 7.4.5- not consistent |  |
| Dynamic Mesh |  | Introduced in Clause 4.3.5.4.5 |  |

# 5 Evaluation framework

Is the evaluation framework fully defined and validated?

- Pink: evaluation framework is missing

- Yellow: evaluation framework is documented, but not validated yet.

- Green: evaluation framework is frozen

Generic B2D framework defined for the messaging scenario in clause 6.1 of the technical report 26.956. The messaging scenario is not part of the documented scenarios of the TR (only documented in clause 2.1 of the PD).

# 6 Reference codec + renderer implementation

Is there a reference codec (encoder/decoder) available? This includes the availability of a reference renderer when applicable (as part of the framework). This also includes any pre-processing tool required.

* Pink: reference codec is missing
* Yellow: reference codec is partially available.
* Green: reference codec is available and validated.

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| Format | In Permanent document | In TR 26.956 |  |
| Stereoscopic video |  |  | missing |
| Dense dynamic point cloud |  | Described in clause 4.3.3.3 and 7.3.2-E (renderer) - 7.3.9.4 (codec) –not available yet |  |
| Multi-view video | TMIV 24 + HM 18.0 (S4-240714, may upgrade SW later) | Described in 7.4.4 – not available yet |  |
| Dynamic Mesh |  |  | missing |

# 7 Encoder config files

Are the codec configuration files available and validated. This includes encoder parameters aligned with service constraints.

* Pink: codec config files missing
* Yellow: codec config files available but not validated.
* Green: codec config files available and validated.

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| Format | In Permanent document | In TR 26.956 | Other |
| Stereoscopic video |  | Encoding configuration defined in clause 7.2.4 | Config files missing |
| Dense dynamic point cloud |  | Encoding configuration defined in clause 7.3.5 | Config files missing |
| Multi-view video | First configuration files provided; will likely change (S4-240714) | Encoding configuration defined in clause 7.4.4 | Config files missing |
| Dynamic Mesh |  |  | Config files missing |

# 8 Evaluation/characterization tests

Have the tests been conducted.

* Pink: evaluation tests are missing
* Yellow: evaluation tests results are partially available.
* Green: evaluation tests results are fully available and open for crosscheck.

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| Format | In Permanent document | In TR 26.956 | Other |
| Stereoscopic video |  |  | Missing |
| Dense dynamic point cloud |  |  | Missing |
| Multi-view video | A preliminary test was conducted on a single sequence (S4-240714) |  | Missing |
| Dynamic Mesh |  |  | missing |

# 9 Verification tests

Have the tests results been verified.

* Pink: evaluation tests are not crosschecked
* Yellow: evaluation tests results are partially crosschecked.
* Green: evaluation tests results are fully crosschecked and validated.

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| Format | In Permanent document | In TR 26.956 | Other |
| Stereoscopic video |  |  | Missing |
| Dense dynamic point cloud |  |  | Missing |
| Multi-view video |  |  | Missing |
| Dynamic Mesh |  |  | missing |