**3GPP TSG-SA SA4#131S4-250141**

**Geneva (CH), 17 – 21 February 2025**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  |  | **CR** |  | **rev** |  | **Current version:** | **0.2.1** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | |
| ***Title:*** | pCR on Scenario 2 related to datasets | | | | | | | |
|  |  | | | | | | | |
| ***Source to WG:*** | Nokia, Philips, Interdigital, Deutsche Telekom, Fraunhofer HHI, KDDI, Samsung, Sony Group Corporation, Huawei | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | |
|  |  | | | | | | | |
| ***Work item code:*** |  | | |  | ***Date:*** | | | 2025-02-11 |
|  |  | | |  |  | | |  |
| ***Category:*** | B |  | | | ***Release:*** | | | Rel-19 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | |
| ***Reason for change:*** | | Volumetric Video content provider Volucap kindly made 2 additional licenced datasets available to 3GPP and based on discussions during SA#130 Post Video SWG a new way for hosting non-public licensed datasets is proposed | | | | | | |
|  | |  | | | | | | |
| ***Summary of change:*** | | Updates related to scenario 2 datasets | | | | | | |
|  | |  | | | | | | |
| ***Consequences if not approved:*** | | 3GPP could not use newly provided datasets and hosting of non-public licensed datasets would not be solved | | | | | | |
|  | |  | | | | | | |
| ***Clauses affected:*** | |  | | | | | | |
|  | |  | | | | | | |
|  | | **Y** | **N** |  | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | TS/TR ... CR ... | | |
|  | |  | | | | | | |
| ***Other comments:*** | | Changes are tracked starting from TR V0.2.1  A demonstration on tablet showing the new sequences will be available during SA4#131 | | | | | | |
|  | |  | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | |

**== CHANGE 1 (all new) ===**

## 7.3 Scenario 2: Streaming of professionally produced Volumetric Video with single asset containing people

### 7.3.8 Test Sequences

Editor’s Note: The content of this scenario relates to moving persons.

#### 7.3.8.1 Candidate source dense point cloud sequences

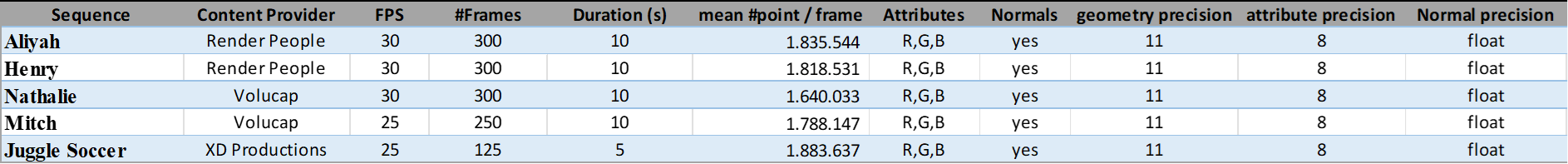
Collected candidate raw dense point cloud sequences that are available for testing are presented in Annex C.x

#### 7.3.8.2 Selected source dense point cloud sequences

This section lists 5 raw point cloud sequences that have been selected for objective and subjective testing. The following sequences have been selected for performing objective and subjective tests.

Test sequences have been selected based on visual quality and that these have not been used during codec development in MPEG. The following table lists the selected test sequences:

**Table 7.3.8.2 Selected source point cloud sequences**



The following thumbnails illustrate the selected test sequences:

A person in a red flannel shirt

Description automatically generatedA person in a blue shirt and shorts

Description automatically generatedA person in a red shirt and pants

Description automatically generated A person in a grey shirt and black shorts

Description automatically generatedA person kicking a football ball

Description automatically generated

Figure 7.3.8.2-1 Aliya, Henry, Nathalie, Mitch and Joggle Soccer (content courtesy by Renderpeople, Volucap and XD Productions)

The selected licensed source point cloud sequences can be grouped as follows:

- Group 1 - Freely available to 3GPP members: Nathalie, Mitch and Joggle Soccer

- Group 2 - Publicly purchasable: Henry

- Group 3 - Publicly free available: Aliyah

Sequences of group 1 have already been converted to pointclouds of around 2 million points per frame and maximum 10s length and are provided on the server. Sequences of group 2 and group 3 need to be downloaded and converted by those doing the test.

Editor’s Note: Provide instructions and scripts on how to convert sequences of group 2 and group 3

**== CHANGE 2 ===**

# Annex C: Reference Sequences

## C.x Test Sequences for Volumetric Video with single asset containing people

### C.x.1 Overview

This annex presents candidate test sequences that are available for testing. Some sequences have been made freely available to 3GPP under license agreement but cannot be made publicly available. Some sequences are not free but can be publicly purchased by those who need to work with the source sequences. Yet other sequences are free and publicly available for download by respecting the license.

NOTE: Sequences from Volucap and XD Productions that are freely available to 3GPP members have been converted to the dense dynamic point cloud representation format with around 2 million points per frame.

### C.x.2 Juggle Soccer test sequence

#### C.x.2.1 Description

Soccer player with red shirt is showing soccer tricks with a ball. Particularity with the sequence is that a moving person and a ball are captured in one asset.

A person kicking a football ball

Description automatically generated

Figure X1 Joggle Soccer - content courtesy XD Productions

#### C.x.2.2 Sequence properties

The tables Y1 and Y2 summarize the properties of the Joggle Soccer sequence

|  |  |
| --- | --- |
| Parameter | Value |
| Frame rate | 25 |
| #frames | 125 |
| Mean #point / frame | 1.883.637 |
| Attributes | RGB |
| Normals | Yes |
| Geometry Precision | 11 |
| Attribute Precision | 8 |
| Normal Precision | Float |

Table Y1 Joggle Soccer sequence properties dense dynamic point cloud

|  |  |
| --- | --- |
| Parameter | Value |
| Frame rate | 25 |
| #triangles per frame | 80K |
| Texture resolution | 4K |
| #frames | 125 |

Table Y2 Joggle Soccer sequence properties dynamic mesh

The sequence can be accessed: <https://aspera.pub/I4tSQ8k>

3GPP members can request the password by contacting XYZ.

#### C.x.2.3 Copyright and license information

XD Productions[Vol-22] kindly made this sequence freely available for 3GPP internal usage under license. License XD\_Productions\_-\_InterDigital\_Content\_license\_3GPP is provided in the directory with the sequence.

### C.x.3 Mitch test sequence

#### C.x.3.1 Description

Mitch is slacklining with slow movements allowing to check preserved details in tissue of the shirt and in the face.

A person in a grey shirt and black shorts

Description automatically generated

Figure X2 Mitch - content courtesy Volucap

#### x.3.2 Sequence properties

The tables Y3 and Y4 summarize the properties of the Mitch sequence

|  |  |
| --- | --- |
| Parameter | Value |
| Frame rate | 25 |
| #frames | 250 |
| Mean #point / frame | 1.788.147 |
| Attributes | RGB |
| Normals | Yes |
| Geometry Precision | 11 |
| Attribute Precision | 8 |
| Normal Precision | Float |

Table Y3 Mitch sequence properties dense dynamic point cloud

|  |  |
| --- | --- |
| Parameter | Value |
| Frame rate | 25 |
| #triangles per frame | 30K |
| Texture resolution | 4K |
| #frames | 475 |

Table Y4 Mitch sequence properties dynamic mesh

The sequence can be accessed: <https://aspera.pub/I4tSQ8k>

3GPP members can request the password by contacting XYZ

#### C.x.3.3 Copyright and license information

Volucap [Vol-16] kindly made this sequence freely available for 3GPP internal usage under license. License “License\_Volucap\_T097\_Mitch2.1-05” is provided in the directory with the sequence.

### C.x.4 Thomas test sequence

#### C.x.4.1 Description

Thomas is waiting and performing slow body and hands/arms movements allowing to check for preserved details in tissue of the shirt and in the face.

A person holding his hand up

Description automatically generated

Figure X3 Thomas - content courtesy Volucap

#### C.x.4.2 Sequence properties

|  |  |
| --- | --- |
| The table Y5 summarizes the properties of the Thomas sequenceParameter | Value |
| Frame rate | 25 |
| #triangles per frame | 30K |
| Texture resolution | 4K |
| #frames | 748 |

Table Y5 Thomas sequence properties dynamic mesh

The sequence can be accessed: <https://aspera.pub/I4tSQ8k>

3GPP members can request the password by contacting XYZ

#### C.x.4.3 Copyright and license information

Volucap [Vol-16] kindly made this sequence freely available for 3GPP internal usage under license. License “License\_Volucap\_T003\_ThomasScenic-03” is provided in the directory with the sequence.

### C.x.5 Nathalie test sequence

#### C.x.5.1 Description

Nathalie is performing a classic dance, as such the sequence is dynamic.

A person in a red shirt and pants

Description automatically generated

Figure X4 Nathalie - content courtesy Volucap

#### C.x.5.2 Sequence properties

The tables Y6 and Y7 summarize the properties of the Mitch sequence

|  |  |
| --- | --- |
| Parameter | Value |
| Frame rate | 30 |
| #frames | 300 |
| Mean #point / frame | 1.640.033 |
| Attributes | RGB |
| Normals | Yes |
| Geometry Precision | 11 |
| Attribute Precision | 8 |
| Normal Precision | Float |

Table Y6 Nathalie sequence properties dense dynamic point cloud

|  |  |
| --- | --- |
| Parameter | Value |
| Frame rate | 30 |
| #triangles per frame | 30K |
| Texture resolution | 4K |
| #frames | 925 |

Table Y7 Nathalie sequence properties dynamic mesh

The sequence can be accessed: <https://aspera.pub/I4tSQ8k>

3GPP members can request the password by contacting XYZ

#### C.x.5.3 Copyright and license information

Volucap [Vol-16] kindly made this sequence freely available for 3GPP internal usage under license. License “AOM\_License Volucap\_rp\_nathalie\_4d\_001\_dancing-20211214\_Gsplats” is provided in the directory with the sequence.

### C.x.6 Steam Roller test sequence

#### C.x.6.1 Description

Steam Roller is a performance on a BMX bike. Particularity with the sequence is that a moving person and an object (bicycle) are captured in one asset and that there are fast movements.

A person on a bicycle

Description automatically generated

Figure X5 Steam Roller - content courtesy Volucap

#### C.x.6.2 Sequence properties

The table Y8 summarizes the properties of the Steam Roller sequence

|  |  |
| --- | --- |
| Parameter | Value |
| Frame rate | 30 |
| #triangles per frame | 70K |
| Texture resolution | 8K |
| #frames | 493 |

Table Y8 Steam Roller sequence properties dynamic mesh

The sequence can be accessed: <https://aspera.pub/I4tSQ8k>

3GPP members can request the password by contacting XYZ

#### C.x.6.3 Copyright and license information

Volucap [Vol-16] kindly made this sequence freely available for 3GPP internal usage under license. License “AOM\_License Volucap\_Rec030\_Steam\_Roller\_no\_hands\_Gsplats” is provided in the directory with the sequence.

### C.x.7 Aliyah test sequence

#### C.x.7.1 Description

Aliyah is performing a modern dance, as such the sequence is pretty dynamic.

A person in a red flannel shirt

Description automatically generated

Figure X6 DancingAliyah - content courtesy Renderpeople

#### C.x.7.2 Sequence properties

The tables Y9 and Y10 summarize the properties of the Aliyah sequence

|  |  |
| --- | --- |
| Parameter | Value |
| Frame rate | 30 |
| #frames | 300 |
| Mean #point / frame | 1.835.544 |
| Attributes | RGB |
| Normals | Yes |
| Geometry Precision | 11 |
| Attribute Precision | 8 |
| Normal Precision | Float |

Table Y9 Aliyah sequence dense dynamic point cloud

|  |  |
| --- | --- |
| Parameter | Value |
| Frame rate | 30 |
| #triangles per frame | 30K |
| Texture resolution | 4K |
| #frames | 1112 |

Table Y10 Aliyah sequence properties dynamic mesh

Renderpeople [Vol-23] provides a free and publicly downloadable “4D People” source sequence under license. This source sequence is provided in file formats for 3ds Max, Maya, Blender, Cinema 4D and Alembic and can be stored or converted to mesh or dense point cloud format.

The sequence can be accessed: <https://renderpeople.com/free-3d-people/>

Select then the free sequence under 4D People

#### C.x.7.3 Copyright and license information

General terms and conditions can be found here: <https://renderpeople.com/general-terms-and-conditions/>

### C.x.8 Henry test sequence

#### C.x.8.1 Description

Henry is performing a stretching exercise, as such the sequence is dynamic.

A person in a blue shirt and shorts

Description automatically generated

Figure X7 Henry - content courtesy Renderpeople

#### C.x.8.2 Sequence properties

The tables Y11 and Y12 summarizes the properties of the Henry sequence

|  |  |
| --- | --- |
| Parameter | Value |
| Frame rate | 30 |
| #frames | 300 |
| Mean #point / frame | 1.818.531 |
| Attributes | RGB |
| Normals | Yes |
| Geometry Precision | 11 |
| Attribute Precision | 8 |
| Normal Precision | Float |

Table Y11 Henry sequence properties dense dynamic point cloud

|  |  |
| --- | --- |
| Parameter | Value |
| Frame rate | 30 |
| #triangles per frame | 30K |
| Texture resolution | 4K |
| #frames | 733 |

Table Y12 Henry sequence properties dynamic mesh

Renderpeople[Vol-24] provides a catalogue of currently 130 “4D People” under license and the catalog is growing. These source sequences are provided in file formats for 3ds Max, Maya, Blender, Cinema 4D and Alembic and can be stored or converted to mesh or dense point cloud format. Sequences from the 4D catalog are not free and need to be purchased. Henry is one of the sequences in the catalog that has been picked up as it is dynamic and different from the other presented sequences.

The “4D People” shop is accessible here: <https://renderpeople.com/3d-people/?_product=4d-people>

#### C.x.8.3 Copyright and license information

General terms and conditions can be found here: <https://renderpeople.com/general-terms-and-conditions/>

### C.x.9 Ultra Video Group of Tampere University test sequences

#### C.x.9.1 Description

Ultra Video Group of Tampere University [Vol-25] kindly provides 12 downloadable sequences @25 fps under license.

Detailed descriptions and thumbnails are directly available on the website and are not reproduced here.

#### C.x.9.2 Sequence properties

All sequences can be downloaded as dense dynamic point cloud or as dynamic mesh. Different quality levels are proposed when downloading.

The table Y13 summarizes the properties of the UVG sequences

|  |  |
| --- | --- |
| Parameter | Value |
| Frame rate | 25 |
| #frames | 250 |
| Mean #point / frame | Depends per sequence and on geometry precision |
| Attributes | RGB |
| Normals | Yes |
| Geometry Precision | 9, 10, 11 and 12 bit |
| Attribute Precision | 8 |
| Normal Precision | 9, 10, 11 or 12 bit integer |

Table Y13 UWG sequences properties dynamic point cloud

#### C.x.9.3 Copyright and license information

The license agreement can be found here: https://ultravideo.fi/UVG-VM/UVG-VM\_LICENSE\_AGREEMENT.pdf