

**ISO/IEC JTC 1/SC 29/WG 11**

**Coding of moving pictures and audio**

**Convenorship: UNI (Italy)**

**ISO/IEC JTC 1/SC 29/WG 11 N18713**

**Document type: Approved WG 11 document**

**Title: Description of Core Experiment 13.23 for G-PCC: on duplicated point**

**Status: Draft**

**Date of document: 2019-07-26**

**Source: 3DG**

**Expected action:**

**No. of pages:**

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**INTERNATIONAL ORGANISATION FOR STANDARDISATION**

**ORGANISATION INTERNATIONALE DE NORMALISATION**

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**Gothenburg, SE – July 2019**

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# Abstract

In this document we provide descriptions for the core experiment 13.23 on the study of improvements to the coding of point position in the Inferred Direct Coding Mode (IDCM) in case points may be duplicated. By definition, duplicated points are points that belong to the point cloud and have exactly same three coordinates x, y and z. Duplicated points may be useful as they may not carry the same attribute information.

IDCM was introduced early in the GPCC development process. QNX sequences, that have many duplicated points, were added later to the Common Test Conditions. Consequently, IDCM has historically no mechanism to tackle duplicated points and simply codes multiple times the associated xyz coordinates.

The goal of this Core Experiment is focused on:

* adapt IDCM to duplicated points in order to improve the compression capability of the IDCM coding mode.

# CE 13.23 toward duplicated point

## Mandates

* Evaluate the impact on compression performance of the improvement introduced into IDCM by m48905 to avoid the multiple coordinate coding associated with duplicated points

Related changes to the G-PCC Improvements [2] shall be reported.

## Participants, description of tools, and implementation notes

The following people are participating in this CE. Their specific roles are detailed in the next section. Proposals are based on the input contributions

1. m48905, *Improved geometry coding for duplicated points,* BlackBerry

Proponents and cross checkers are

| **Name** | **Company** | **E-mail address** | **Type** |
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## Information on proposed tools

### Improved geometry coding for duplicated points from m48905

In contribution m48905 [4], a mechanism has been introduced to code only once the coordinates of duplicated points in case all point belonging to the node undergoing IDCM are locate at the same xyz position. This implies adding a flag signalling duplicated points if the number of coded 3D coordinates is one and, if this flag is true, adding a counter for the number of duplications of the unique 3D coordinate.

## Information for conducting tests

Adoption of the tool should be based on the discussion of the compression gains and the complexity of said tools.

### Software

TMC13v7 shall be used for these experiments. The proposed tools shall be implemented on top of TMC13v7.

### Test configurations

Parameters and configurations for the modified TMC13v7 software will be provided by the proponent.

### Evaluation Method

The point cloud test material will be tested for the test sequences of category

* (1) Static Objects and Scenes
* (3) Dynamic Acquisition

as defined by the CTC [3]. The following test conditions will be under evaluation

1. *CW AI lossless geometry – (lossless attribute)*
2. *C2 AI, lossy geometry – (lossy attribute)*

without activating Trisoup. Note that the tested technologies have an impact on geometry compression only and that attribute compression performance are reported informatively.

## CE 13.23 Coordinators

Sébastien Lasserre ([slasserre@blackberry.com](mailto:slasserre@blackberry.com))

# Timeline:

* **2019-08-12**: Expected date for TMC13v7 release;
* **2019-09-02 [TMC13v7 + 3 weeks]**: Deliver source code and results for cross check;
* **2019-09-16**: **[TMC13v7 + 5 weeks]** Report of preliminary cross check results;
* **2019-10-02**: MPEG document upload deadline.

# References

1. “*G-PCC Test Model 7*”, ISO/IEC JTC1/SC29/WG11 MPEG2019 Doc. w18664, Goteborg, Sweden, July 2019
2. “*G-PCC Improvements*”, ISO/IEC JTC1/SC29/WG11 MPEG2019 Doc. w18669, Goteborg, Sweden, July 2019
3. “Common Test Conditions for PCC” ISO/IEC JTC1/SC29 WG11 MPEG2018”, ISO/IEC JTC1/SC29/WG11 MPEG2019 Doc. w18665, Goteborg, Sweden, July 2019
4. m48905, *Improved geometry coding for duplicated points,* Goteborg, Sweden, July 2019