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

**CODING OF MOVING PICTURES AND AUDIO**

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| **Source** | **3DG** |
| **Title** | **G-PCC Exploration Experiment 13.6 on Geometry Quantization** |
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**G-PCC Exploration Experiment 13.6 on Geometry Quantization**

**Abstract**

This document provides a description of the Exploration Experiments 13.6 on geometry quantization.

1. **Introduction**

The goal of 13.6 is to further study and evaluate the geometry quantization scheme proposed in [1]. The experimental results of the EE will be evaluated by the 3DG/PCC AhG.

1. **EE 13.6: On Geometry Partition**
   1. ***Mandates***

Mandates for EE13.6 are as follows:

1. Evaluate the delta-QP signaling scheme for geometry quantization in octree coding as proposed in [1], compared with external approach
2. Study implementation of geometry quantization in octree coding
3. Study and report the changes to the G-PCC Working Draft
4. Study slice-based geometry quantization
   1. ***Participants***

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* 1. ***Test Model, anchors and Test Conditions***
     1. **Anchors**

The proposed tools shall be implemented on top of TMC13v7.

* + 1. **Test Conditions**

Since proposed scheme is about additional functionality of G-PCC, i.e., to enable rate control, adaptive quantization, etc., CTC for TMC13 model will not be used. Instead, a special test is to be used and described in the following section.

* 1. ***Proposed Tools & tests***
     1. **Information about Proposed Tools**

In [1], a new quantization is introduced into the octree partition stage, thus the octree coding can then be lossy because of the extra quantization. The new quantization is applied while octree partition is performed. At each node of octree partition, all the points inside the corresponding sub-cube can be quantized based on a specified QP, which can vary for different nodes. Furthermore, QP variation, in form of delta QP, is signaled at a certain depth of octree partition

* + 1. **Proposed Tests**

It is suggested to compare the results from [1] with a non-normative approach.

In [1], during octree coding, at certain depth, nodes are quantized and compressed in encoder to generate a bitstream, called test bitstream. At the decoder, the test bitstream is decoded to generate test output point cloud. Note that the dequantization process is built into the octree decoding process.

The corresponding non-normative approach is to quantize those corresponding regions corresponding to the node in octree partition and deqantize those regions to form a new point cloud. The new point cloud will be used as input to TMC13v7 to generate anchor bitsteam using lossless coding. Note that new point cloud is actual the test output point cloud.

The test bitsteam size is compared with the size of anchor bitstream.

1. **Timeline**

2019/07/12 MPEG #127 meeting ends

2019/08/12 Expected date for release of cross-verified G-PCCv7.0 software and anchors

2019/09/18 Distribution of EE SW and results for verification

2019/09/25 EE verification feedback from cross-checkers to the proponents

2019/10/02 MPEG 128 document upload deadline

1. **Document and software references**
2. Signaling delta QPs for adaptive geometry quantization in point cloud coding, ISO/IEC JTC1/SC29 WG11 m49232, Gothenburg, SE, July 2019.