 ISO/IEC JTC 1/SC 29/WG 7 N1086

**ISO/IEC JTC 1/SC 29/WG 7  
MPEG 3D Graphics and Haptics Coding   
Convenorship: AFNOR (France)**

**Document type:** Output Document

**Title:** Enhanced G-PCC performance evaluation and anchor results

**Status:** Approved

**Date of document:** 2025-02-21

**Source:** ISO/IEC JTC 1/SC 29/WG 7

**Expected action:** None

**Action due date:** None

**No. of pages:** 7 (with cover page)

**Email of Convenor:** marius.preda @ imt . fr

**Committee URL:** [https://isotc.iso.org/livelink/livelink/open/jtc1sc29wg7](https://isotc.iso.org/livelink/livelink/open/jtc1sc29wg3)

**INTERNATIONAL ORGANIZATION FOR STANDARDIZATION**

**ORGANISATION INTERNATIONALE DE NORMALISATION**

**ISO/IEC JTC 1/SC 29/WG 7 MPEG Coding for 3D Graphics and haptics**

**ISO/IEC JTC 1/SC 29/WG 7 N1086**

**January. 2025, Geneva**

|  |  |
| --- | --- |
| **Title** | **Enhanced G-PCC performance evaluation and anchor results** |
| **Source** | **WG 7, MPEG Coding for 3D Graphics and Haptics** |
| **Status** | **Approved** |
| **Serial Number** | **24806** |

# Abstract

This document provides a summary of anchor results for experiments on point cloud compression for dynamically acquired content (Category 3) and high-density content (Category 1) using N1089 common test conditions and E-G-PCC TMC13v29.0-rc1 software.

# Summary

This report contains $B-$configB-vs-$A-$configA.xlsm results reporting $A under tool configuration $configA against $B under tool configuration $configB.

Bitstreams and results were generated on a 64-bit Linux server using revision release-v29.0-rc1 of TMC13 built with gcc-11.4.0:

CMAKE\_BUILD\_TYPE:STRING=Release

CMAKE\_CXX\_FLAGS:STRING=-g -O3

CMAKE\_CXX\_FLAGS\_RELEASE:STRING=-O3 -DNDEBUG

Anchor results are produced using pc\_error version release-0.14.1. Due to the nature of the cluster environment, reported run time changes are approximate only.

The tag “release-v29.0-rc1” is available from https://git.mpeg.expert/MPEG/3dgh/g-pcc/software/tm/mpeg-pcc-tmc13. Further software documentation and usage description is available [2, 3].

# Anchor results according to common test conditions

Anchor results using the following common test conditions of N1089 are reported in the enclosed reporting sheets:

* C1: (near) lossless geometry, lossy attributes [all intra],
* C2: lossy geometry, lossy attributes [all intra],
* CW: (near) lossless geometry, lossless attributes [all intra],
* CY: (near) lossless geometry, near lossless attributes [all intra],

The results for all-intra and random access (inter) configurations are reported separately; the names of the sheet use the following tags for identification of tool configuration:

* octree-predlift : octree geometry coding, LOD attribute coding (all-intra)
* octree-raht : octree geometry coding, RAHT attribute coding (all-intra)
* predgeom-predlift : predictive tree geometry coding, LOD attribute coding (all-intra)
* predgeom-raht : predictive geometry coding, RAHT attribute coding (all-intra)
* trisoup-predlift : trisoup geometry coding, LOD attribute coding (all-intra)
* trisoup-raht : trisoup geometry coding, RAHT attribute coding (all-intra)
* octree-predlift-inter : octree geometry coding, LOD attribute coding (random access)
* octree-raht-inter : octree geometry coding, RAHT attribute coding (random access)
* predgeom-predlift-inter: predictive tree geometry coding, LOD attribute coding (random access)
* predgeom-raht-inter : predictive geometry coding, RAHT attribute coding (all-intra) (random access)

# Summary analysis for v29.0-rc1 against v28.0-rc2 results

Compression results for v29.0-rc1 compared to v28.0-rc2 is provided for Category 1 and 3 sequences using both the LOD-based lifting /predicting transforms as well as RAHT and using octree and predictive geometry coding. The excel files corresponding to these results are attached; a summary is provided below in Figure 1 - Figure 10. As the simulations were run in a server, the runtime comparisons are not accurate.

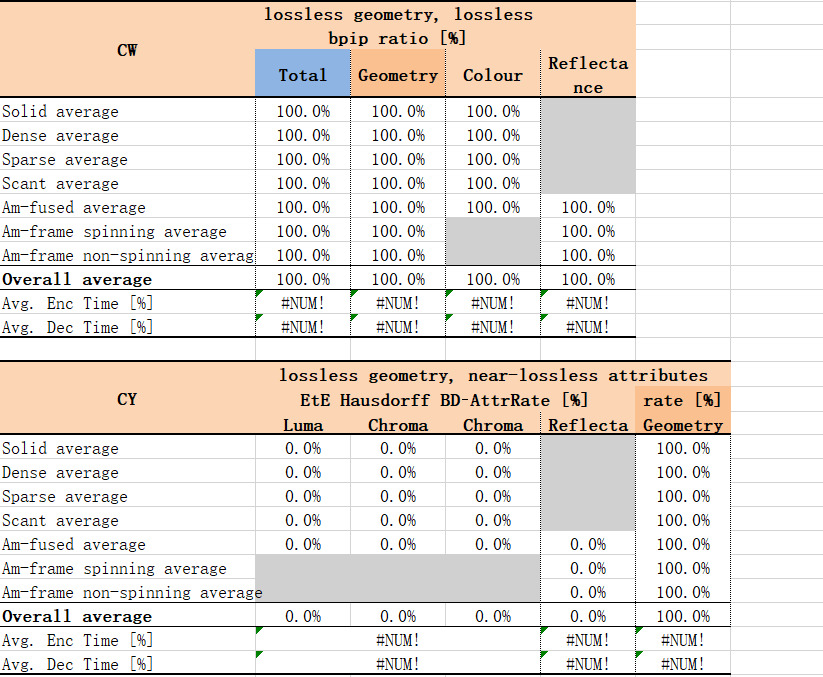
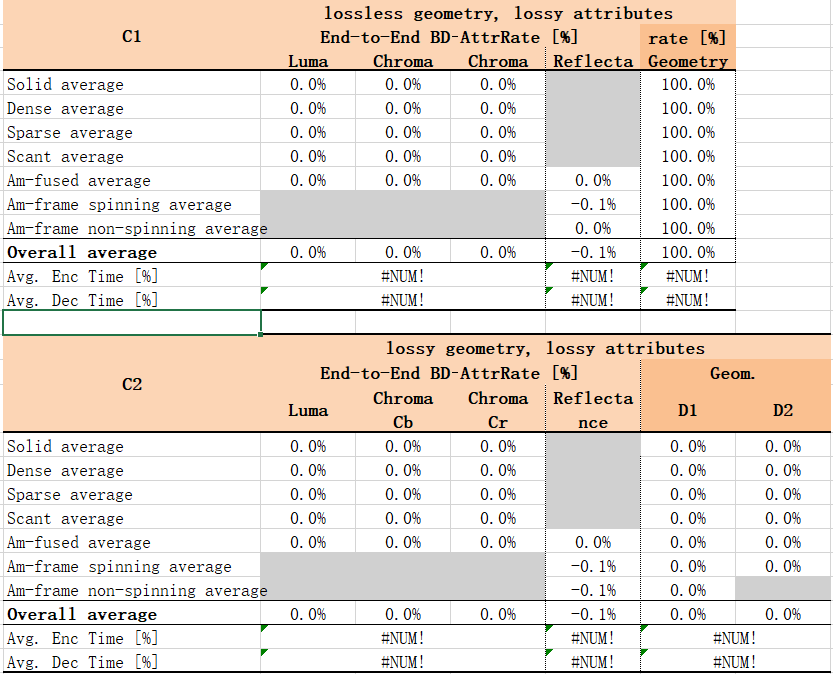


Figure 1: Summary performance of octree geometry (intra coding) and LOD attribute coding using release v29.0-rc1 relative to v28.0-rc2

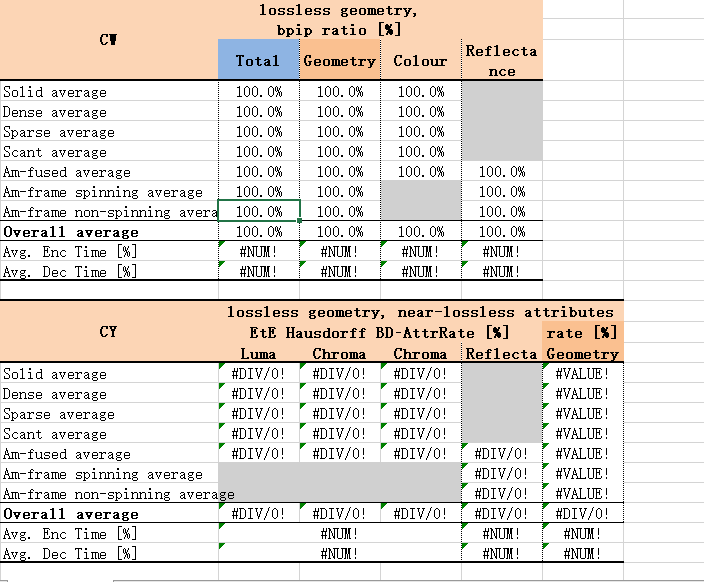
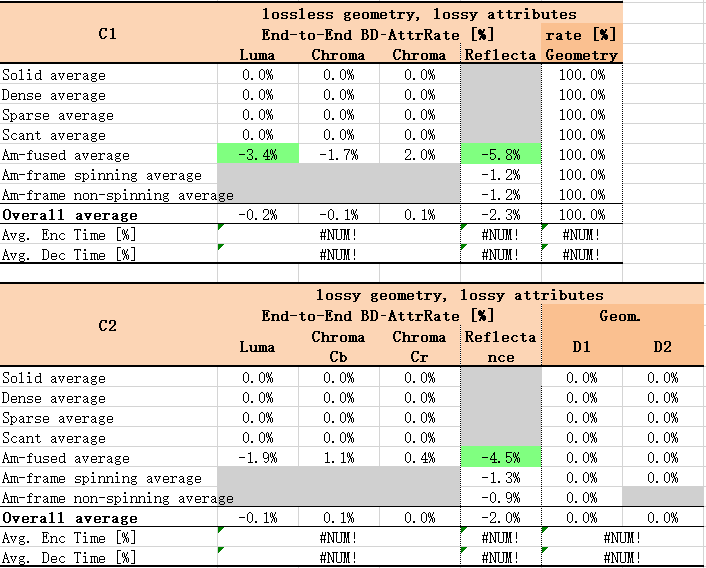


Figure 2: Summary performance of octree geometry (intra coding) and RAHT attribute coding using release v29.0-rc1 relative to v28.0-rc2

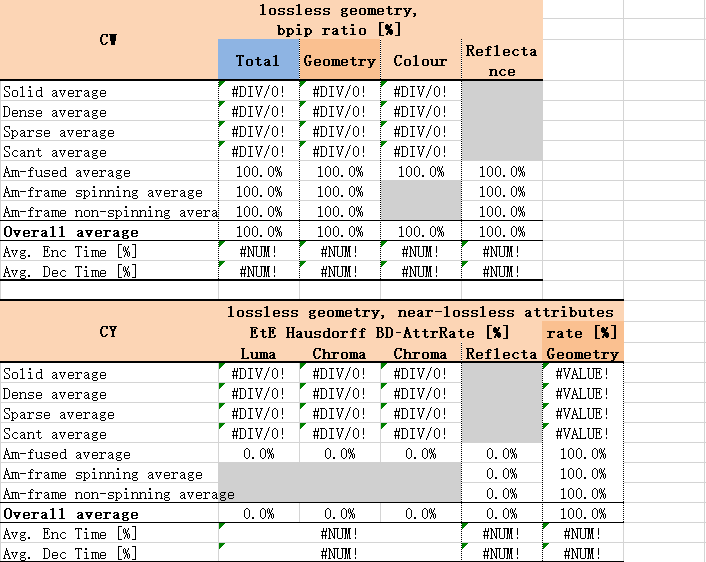
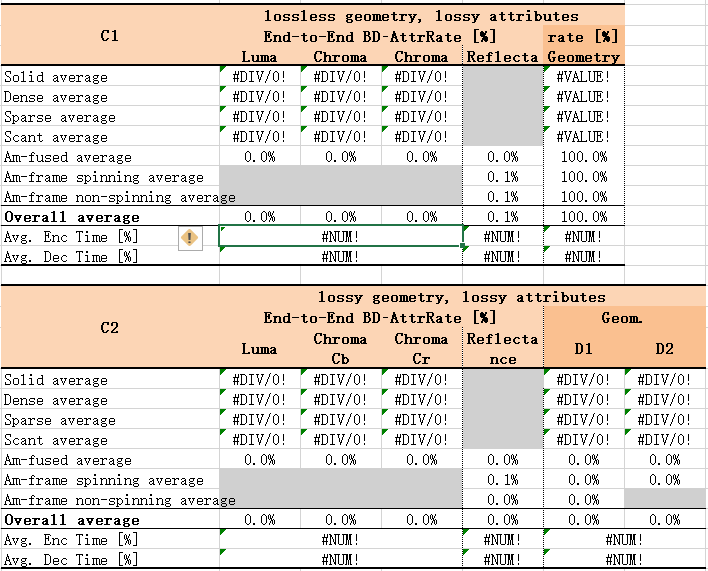


Figure 3: Summary performance of predictive geometry (intra coding) and LOD attribute coding using release v29.0-rc1 relative to v28.0-rc2

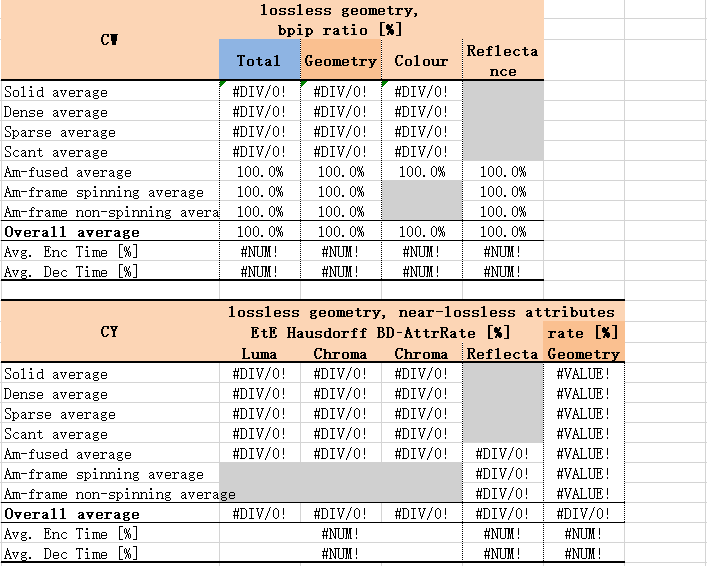
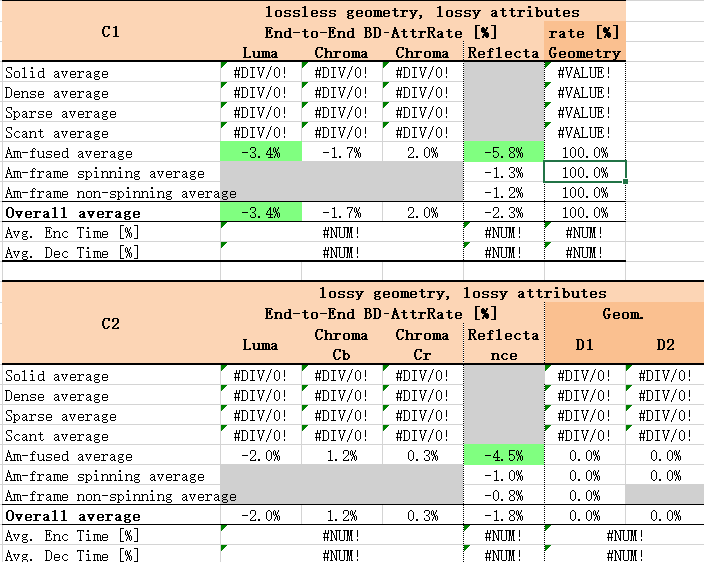


Figure 4: Summary performance of predictive geometry (intra coding) and RAHT attribute coding using release v29.0-rc1 relative to v28.0-rc2

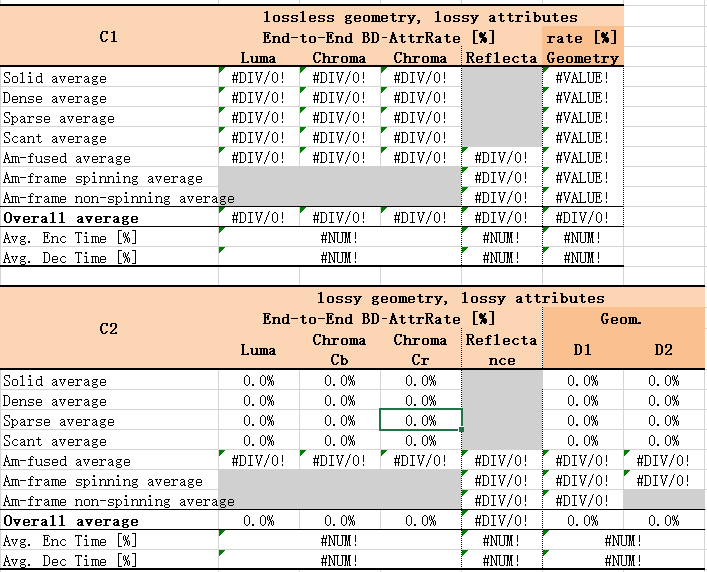


Figure 5: Summary performance of trisoup geometry and LOD attribute coding using release v29.0-rc1 relative to v28.0-rc2

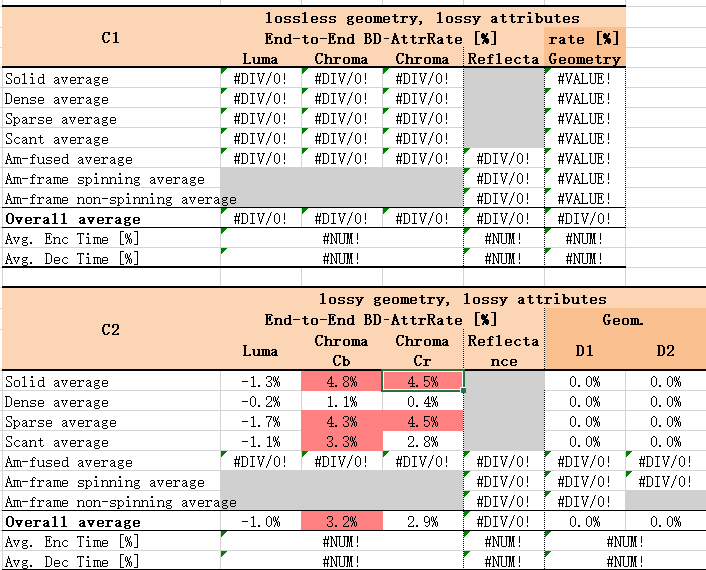


Figure 6: Summary performance of trisoup geometry and RAHT attribute coding using release v29.0-rc1 relative to v28.0-rc2

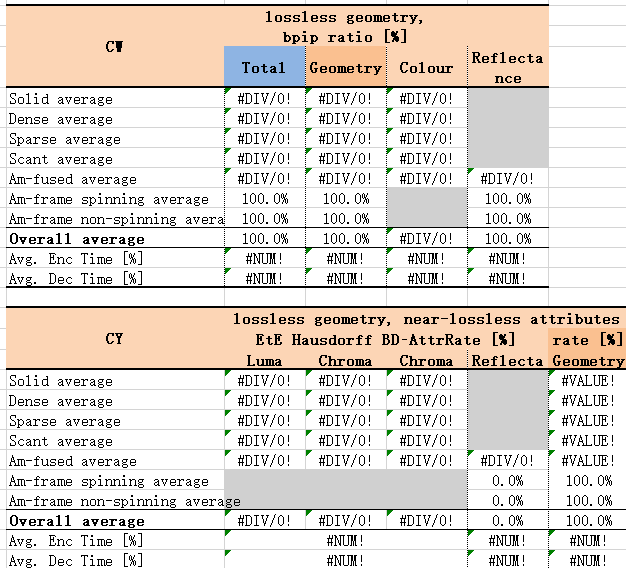
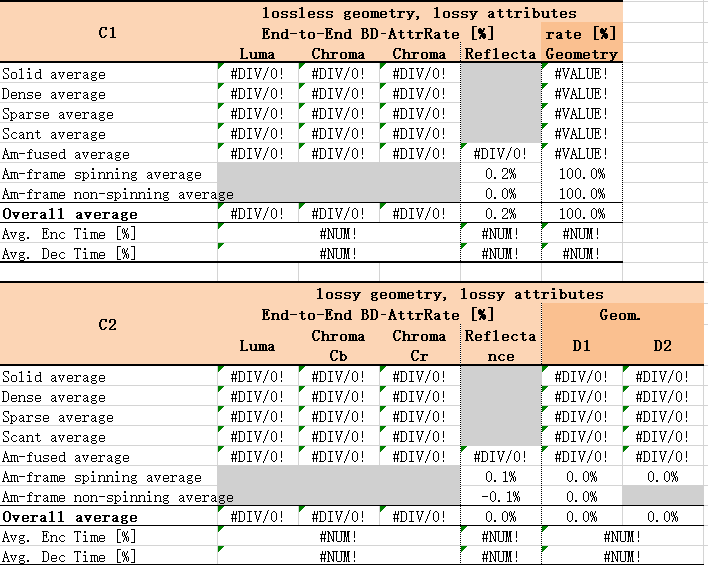


Figure 7:Summary performance of octree geometry (inter coding) and LOD attribute coding using release v29.0-rc1 relative to octree geometry (inter coding) and LOD attribute coding using release v28.0-rc2

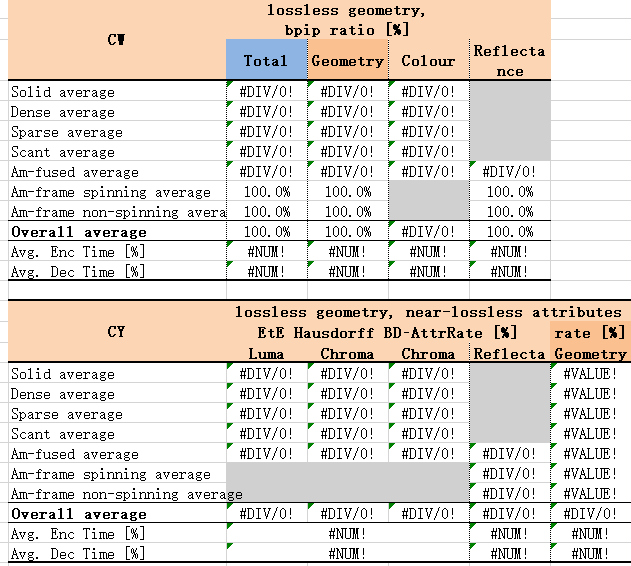
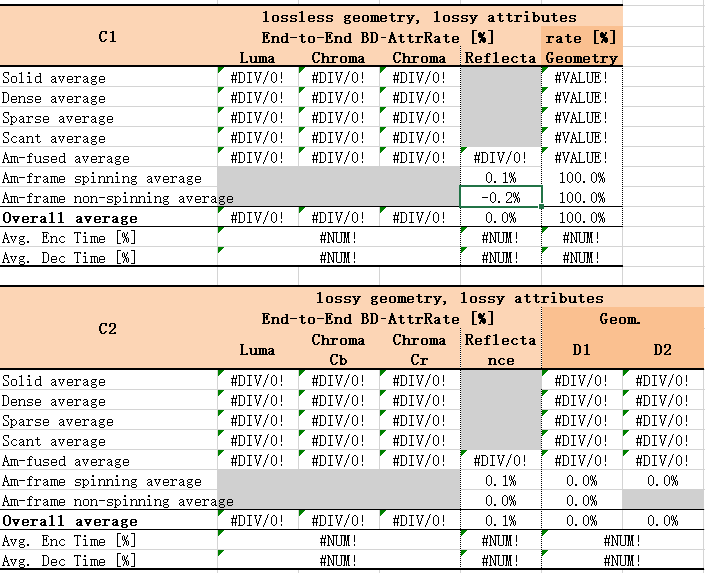


Figure 8: Summary performance of octree geometry (inter coding) and RAHT attribute coding using release v29.0-rc1 relative to octree geometry (inter coding) and RAHT attribute coding using release v28.0-rc2

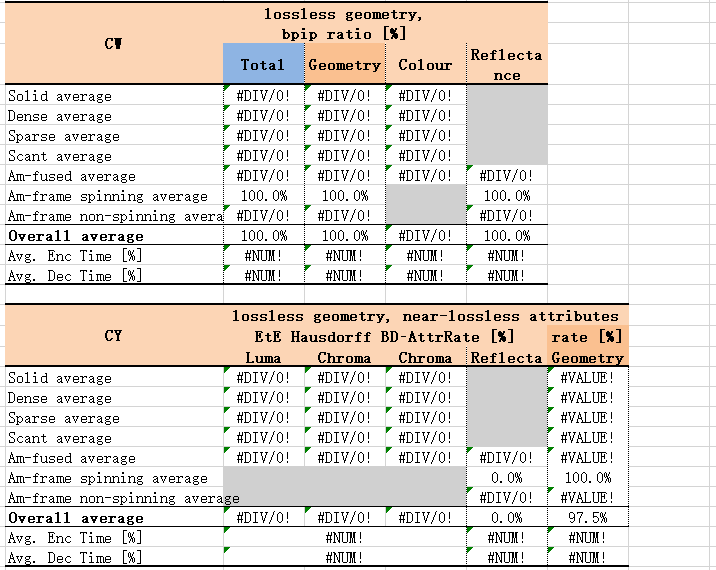
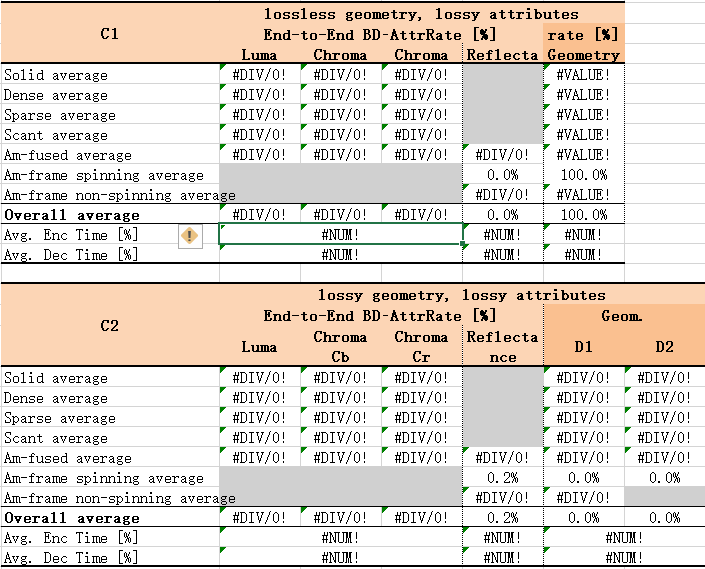


Figure 9: Summary performance of predictive geometry (inter coding) and LOD attribute coding using release v29.0-rc1 relative to predictive geometry (inter coding) and LOD attribute coding using release v28.0-rc2

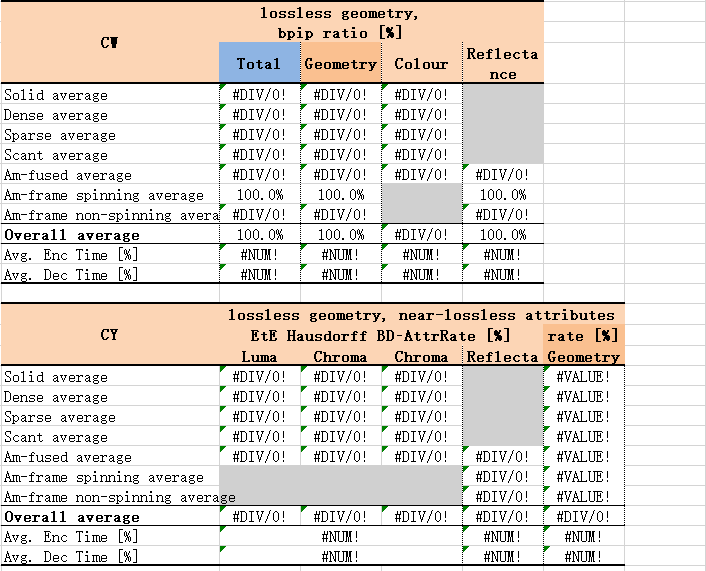
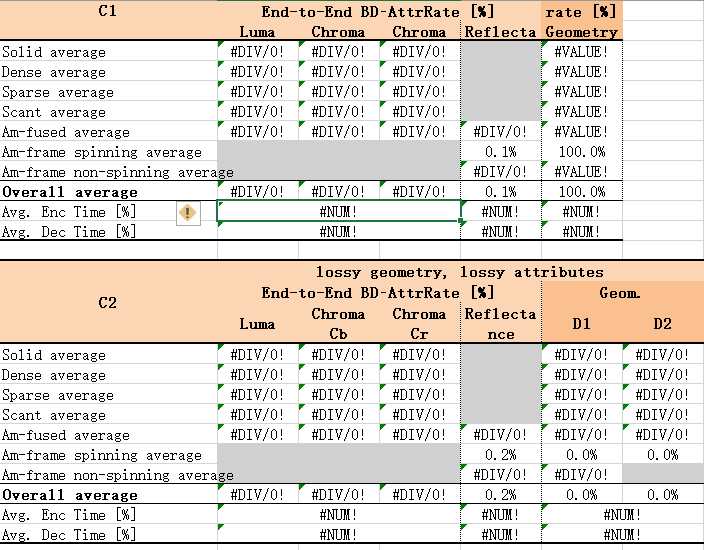


Figure 10: Summary performance of predictive geometry (inter coding) and RAHT attribute coding using release v29.0-rc1 relative to predictive geometry (inter coding) and RAHT attribute coding using release v28.0-rc2

# Cross-checking

The results were cross-checked by OPPO.

# Release v29.0-rc1

This release contains the integration of, or aspects relating to, of all the tools described in N1093.

# References

1. N1089, Common test conditions for Solid G-PCC and E-G-PCC, ISO/IEC JTC1/SC29/WG7 MDS24809\_WG07\_N01089, January. 2025.
2. N1093, List of adopted tools in Enhanced G-PCC, ISO/IEC JTC1/SC29/WG7 MDS24813\_WG07\_N01093, January. 2025.
3. N1085, Enhanced G-PCC test model TM13 v29, ISO/IEC JTC1/SC29/WG7 MDS24805\_WG07\_N01085, January. 2025.