**INTERNATIONAL ORGANISATION FOR STANDARDISATION**

**ORGANISATION INTERNATIONALE DE NORMALISATION**

**ISO/IEC JTC1/SC29/WG11**

**CODING OF MOVING PICTURES AND AUDIO**

**ISO/IEC JTC1/SC29/WG11**

**Geneva, CH, March 2019**

**Source: MPEG 3D GC**

**Title: 3D GC report from the 126 MPEG meeting @ Geneva**

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**Status: Draft (To be added to xxx)**

3DGC meeting report
Geneva, March 2019

Summary

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[10.2.6 50](#_Toc5964714)

[10.2.7 3DG subgroup would like to thank Korea and Japan for comments on ISO/IEC DIS 23093-3 IoMT Media Data Formats 50](#_Toc5964715)

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# Opening of the meeting

## Roll call

## Approval of the agenda

The agenda is approved.

## Goals for the week

The goals of this week are:

* Review contributions related to MPEG 3D Graphics Compression
* Point cloud compression
* Edit Test Models for PCC
* Design CE for PCC
* Issue DIS for V-PCC
* Review of ballot results
* Issue CD for G-PCC
* Software
* Utilities
* Pcc\_error software
* Renderer
* Test data
* Requirements update
* CTC update
* Liaisons
* Profile
* SEI messages
* Review contributions related to IoMT
* Review and issue liaison statements (IoMT)
* Review the IoMT votes
* Web-site
* MPEG database

## Standards from 3DGC

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| **Standard** | **Part** | **Title** | **Type** | **E#** | **122** | **123** | **124** | **125** | **126** | ***127*** | ***128*** | ***129*** | ***130*** |
| MPEG-I | **2** - Omnidirectional MediA Format | Omnidirectional MediA Format | STD | 2 | **WD** | **WD** | **WD** | **WD** | **CD** | **DIS** | **DIS** | **FDIS** |  |
| MPEG-I | **3** - Versatile Video Coding | Versatile Video Coding | STD | 1 | **WD** | **WD** | **WD** | **WD** | **WD** | **WD** | **CD** | **DIS** | **DIS** |
| MPEG-I | **4** - Immersive Audio | Immersive Audio | STD | 1 |  |  |  |  |  |  |  | **CfP** | **CfP** |
| MPEG-I | **5** - Video-based Point Cloud Compression | Video-based Point Cloud Compression | STD | 1 | **WD** | **WD** | **CD** | **CD** | **CD** | **DIS** | **DIS** | FDIS |  |
| MPEG-I | **6** - Immersive Media Metrics | Immersive Media Metrics | STD | 1 | **WD** | **WD** | **WD** | **WD** | **WD** | **WD** | **CD** | **DIS** | **DIS** |
| MPEG-I | **7** - Immersive Media Metadata | Immersive Media Metadata | STD | 1 | **WD** | **WD** | **WD** | **WD** | **WD** | **WD** | **CD** | **DIS** | **DIS** |
| MPEG-I | **8** - Network-based Media Processing | Network-Based Media Processing | STD | 1 | **CfP** | **WD** | **WD** | **CD** | **CD** | **DIS** | **DIS** | **FDIS** |  |
| MPEG-I | **9** - Geometry-based Point Cloud Compression | Geometry-based Point Cloud Compression | STD | 1 |  |  | **WD** | **WD** | **CD** | **CD** | **DIS** | **DIS** | **FDIS** |
| MPEG-I | **10** - Carriage of Point Cloud Data | Carriage of Point Cloud Data | STD | 1 |  |  | **WD** | **WD** | **CD** | **DIS** | **DIS** | **FDIS** |  |
| MPEG-IOMT | **1** - IoMT Architecture | IoMT Architecture | STD | 1 | **CD** | **CD** | **DIS** | **DIS** | **DIS** | FDIS |  |  |  |
| MPEG-IOMT | **2** - IoMT Discovery and Communication API | IoMT Discovery and Communication API | STD | 1 | **CD** | **CD** | **DIS** | **DIS** | **FDIS** |  |  |  |  |
| MPEG-IOMT | **3** - IoMT Media Data Formats and API | IoMT Media Data Formats and API | STD | 1 | **CD** | **CD** | **DIS** | **DIS** | **FDIS** |  |  |  |  |
| MPEG-IOMT | **4** - IoMT Reference Software and Conformance | IoMT Reference Software and Conformance | STD | 1 |  |  | **WD** | **WD** | **CD** | **CD** | **DIS** | **DIS** | **FDIS** |

## Room allocation

* 3DGC group: room 5
* BoG IoMT room 16

## Schedule at a glance

Available here:

http://wg11.sc29.org/calendar/demos/allCalendar.php?id\_meeting=178&idSubGroup=6

# AhG reports

## Point Cloud Compression AhG Report

http://wg11.sc29.org/doc\_end\_user/ahg\_presentations.php?id\_meeting=178

## IoMT AhG Report

http://wg11.sc29.org/doc\_end\_user/ahg\_presentations.php?id\_meeting=178

# Plenary presentations

3DG Activities are reported in the Wednesday and Friday plenary

Wednesday:

<http://wg11.sc29.org/doc_end_user/plenary_presentations.php?id_meeting=178>

Friday:

<http://wg11.sc29.org/doc_end_user/plenary_presentations.php?id_meeting=178>

# Analysis of 3DG PCC related contributions

## List of contributions, summary of discussions and resolutions per contribution

Haut du formulaire

Bas du formulaire

Haut du formulaire

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| [Number](http://wg11.sc29.org/doc_end_user/current_meeting.php?id_meeting=178&type_order=0&sql_type=document_number) | [Created](http://wg11.sc29.org/doc_end_user/current_meeting.php?id_meeting=178&type_order=0&sql_type=document_date_time) | [Uploaded](http://wg11.sc29.org/doc_end_user/current_meeting.php?id_meeting=178&type_order=0&sql_type=upload_document_date_time) | [Title](http://wg11.sc29.org/doc_end_user/current_meeting.php?id_meeting=178&type_order=0&sql_type=title) | [Source](http://wg11.sc29.org/doc_end_user/current_meeting.php?id_meeting=178&type_order=0&sql_type=authors) |

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| Downloadhttp://wg11.sc29.org/Templates/Download.png |   |

 |
| **PCC Generic** |
| [m46684](http://wg11.sc29.org/doc_end_user/current_document.php?id=66535&id_meeting=178) | 2019-03-08 11:53:09 | 2019-03-08 16:11:01 | Minutes PCC AhG Call 01/03/2019 | Ralf Schaefer, Khaled Mammou, Madhukar Budagavi |

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| [m46684 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m46684-v2-MPEG-PCCAhGDashboard-2019-03-01.zip) |   |

 |
| [m47410](http://wg11.sc29.org/doc_end_user/current_document.php?id=67261&id_meeting=178) | 2019-03-18 13:56:54 | 2019-03-20 15:16:53 | Minutes PCC AhG Call 14/03/2019 | Ralf Schaefer, Khaled Mammou, Madhukar Budagavi |

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| [m47410 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47410-v1-MPEG-PCCAhGDashboard-2019-03-14.zip) |   |

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| **BALLOT RESULTS** |
| [m46693](http://wg11.sc29.org/doc_end_user/current_document.php?id=66544&id_meeting=178) | 2019-03-11 06:54:26 | 2019-03-23 04:16:29 | Summary of voting on ISO/IEC CD 23090-5 | SC 29 Secretariat |

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| [m46693 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m46693-v1-m46693.zip) |

 |
| Comments:16 x Approval, 3 x Approval with comments (Japan (JISC), Korea, Republic of (KATS), United States (ANSI)), 1 x Disapproval (Finland (SFS)), 8 x AbstentionAP: issue the DoC

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| [m47997](http://wg11.sc29.org/doc_end_user/current_document.php?id=67848&id_meeting=178) | 2019-03-26 16:54:15 | 2019-03-26 16:55:49 | AllGeneral/All | Late comments on ISO/IEC CD 23090-5, Information technology -- Coded representation of immersive media -- Part 5: Point Cloud Compression | SC 29 Secretariat |

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| [m47997 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47997-v1-m47997.zip) |   |

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| [m47369](http://wg11.sc29.org/doc_end_user/current_document.php?id=67220&id_meeting=178) | 2019-03-18 07:28:07 | 2019-03-20 12:27:55 | [V-PCC] comments on V-PCC SCD | Sebastian Schwarz, Emre Aksu, Miska Hannuksela, Mika Pesonen, Lauri Ilola, ,  |

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| [m47369 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47369-v1-m47369_SCD_comments.zip) |   |

 |
| Resolution: Consider this proposal when the DoC on V-PCC CD is edited.To be resubmitted after the new version of the CD is released, if some of the issues can not be solved by the editorial team. |
| **Content, Software** |
| [m47347](http://wg11.sc29.org/doc_end_user/current_document.php?id=67198&id_meeting=178) | 2019-03-18 06:10:04 | 2019-03-18 06:19:14 | PCC CE0.2 report on Content | Ohji Nakagami |

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| [m47347 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47347-v1-m47347_CE02_Content.zip) |   |

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| [m47596](http://wg11.sc29.org/doc_end_user/current_document.php?id=67447&id_meeting=178) | 2019-03-18 23:33:38 | 2019-03-20 23:23:45 | [V-PCC] Crosscheck of TMC2 v5.0 | Indranil Sinharoy |

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| [m47596 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47596-v1-m47596_cc_tmc2v5.0.zip) |   |

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| [m47746](http://wg11.sc29.org/doc_end_user/current_document.php?id=67597&id_meeting=178) | 2019-03-19 23:54:15 | 2019-03-20 01:52:31 | [V-PCC] Identified bugs and other issues in the current V-PCC Study of CD Text | A. M. Tourapis, J. Kim, K. Mammou, Y. He |

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| [m47746 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47746-v1-m47746.zip) |   |

 |
| This document tries to resolve several additional issues that have been identified since the publication of that document. - reduction of the SPS size by introducing grouping and flags per group. Resolution: adopted.- signaling the number of attributes by adding a sentence related to the range limit. Resolution: adopted- attribute index in the attribute frame and patch parameter set (mainly a bug). Resolution: adopted.- attribute dimension: Resolution: adopted.- Predictor Index for inter patches. Resolution: to be investigated in CE 2.24.- Order of units in V-PCC. Resolution: adopted, text to be provided by the editors.- Placement of patch bit count parameters. There is a debate on the need to sent it at each frame. However, it can be represent more compactly. Resolution: to be investigated.- Naming inconsistencies. resolution: adopted- ops\_occupancy\_packing\_block\_size. Resolution: adopted: a), b) and d) but c) should be investigated in CE 2.24. - Parsing of elementary streams. Add a header for PCC units that includes a length element. Resolution: adopted.  |
| **V-PCC CEs** |
| [m47597](http://wg11.sc29.org/doc_end_user/current_document.php?id=67448&id_meeting=178) | 2019-03-18 23:34:43 | 2019-03-21 18:23:35 | [V-PCC] Crosscheck of CE 2.8 of Sony's additional projection plane for patch generation (part B) | Indranil Sinharoy |

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| [m47597 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47597-v1-m47597_cc_ce2.8_additional_proj_plane.zip) |   |

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| [m47643](http://wg11.sc29.org/doc_end_user/current_document.php?id=67494&id_meeting=178) | 2019-03-19 08:41:31 | 2019-03-20 06:22:37 | [V-PCC] Crosscheck of CE2.8 on enhanced projection plane | Satoru Kuma, Ohji Nakagami,  |

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| [m47643 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47643-v1-m47643-CE2.8-enhancedProjectionPlane.zip) |   |

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| [m47348](http://wg11.sc29.org/doc_end_user/current_document.php?id=67199&id_meeting=178) | 2019-03-18 06:14:38 | 2019-03-20 05:06:19 | [V-PCC] Report of Core Experiment 2.8 on additional projection plane | Satoru Kuma, Ohji Nakagami |

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| [m47348 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47348-v2-m47348-CE2.8_AdditionalProjectionPlane_1.zip) |   |

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| [m47610](http://wg11.sc29.org/doc_end_user/current_document.php?id=67461&id_meeting=178) | 2019-03-19 00:03:40 | 2019-03-20 20:59:49 | [V-PCC] Report on CE 2.8 on enhanced algorithm for the selection of projection plane | Youngho Oh, Rajan Joshi, Madhukar Budagavi, Sungryeul Rhyu |

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| [m47610 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47610-v1-m47610.zip) |   |

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| [m47575](http://wg11.sc29.org/doc_end_user/current_document.php?id=67426&id_meeting=178) | 2019-03-18 22:23:20 |  | [V-PCC] Cross check report on CE2.9 | Lukasz Litwic |  |
| [m47537](http://wg11.sc29.org/doc_end_user/current_document.php?id=67388&id_meeting=178) | 2019-03-18 21:19:35 | 2019-03-20 21:59:17 | [V-PCC] Report on Core Experiment CE 2.9 on lossy occupancy map coding | Rajan Joshi, Madhukar Budagavi, Neha Dawar |

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| [m47537 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47537-v1-m47537.zip) |   |

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| [m47604](http://wg11.sc29.org/doc_end_user/current_document.php?id=67455&id_meeting=178) | 2019-03-18 23:46:24 | 2019-03-21 23:18:25 | [V-PCC] Crosscheck Report on CE2.10 | Esmaeil Faramarzi, Rajan Joshi |

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| [m47604 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47604-v2-m47604-vpcc_crosscheck_report_on_ce2.10.zip) |   |

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| [m47273](http://wg11.sc29.org/doc_end_user/current_document.php?id=67124&id_meeting=178) | 2019-03-16 04:32:03 | 2019-03-22 17:47:29 | [VPCC]CE2.10 metadata signalling report | J. Kim, A. M. Tourapis, K. Mammou (Apple) |

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| [m47273 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47273-v2-m47273.zip) |   |

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| [m47466](http://wg11.sc29.org/doc_end_user/current_document.php?id=67317&id_meeting=178) | 2019-03-18 18:24:27 | 2019-03-20 17:42:00 | [V-PCC][CE] Proponent report on CE2.11 | Jean-Claude Chevet, David Gendron, Celine Guede, Joan Llach, Yannick Olivier, Julien Ricard,  |

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| [m47466 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47466-v1-m47466-ProponentreportonCE2.11-v1.0.zip) |   |

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| [m47885](http://wg11.sc29.org/doc_end_user/current_document.php?id=67736&id_meeting=178) | 2019-03-21 18:04:10 | 2019-03-23 02:22:36 | [V-PCC][CE] CE2.11 toolA(PLRM) Crosscheck result | Jiheon Im, Kyuheon kim |

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| [m47885 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47885-v2-%5BV-PCC%5D%5BCE%5DCE2.11toolA%28PLRM%29Crosscheckresult.zip) |   |

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| [m47622](http://wg11.sc29.org/doc_end_user/current_document.php?id=67473&id_meeting=178) | 2019-03-19 04:19:31 |  | [V-PCC][CE] CE2.11 Point Density Scalability Report | Jiheon Im, Junsik Kim, Kyuheon Kim |  |
| [m47447](http://wg11.sc29.org/doc_end_user/current_document.php?id=67298&id_meeting=178) | 2019-03-18 17:41:00 | 2019-03-18 17:44:13 | [V-PCC] CE2.12 Report  | Danillo Graziosi |

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| [m47447 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47447-v1-m47447.zip) |   |

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| [m47825](http://wg11.sc29.org/doc_end_user/current_document.php?id=67676&id_meeting=178) | 2019-03-20 22:48:04 |  | [V-PCC] Crosscheck report for CE 2.11 | Rajan Joshi |  |
| [m47452](http://wg11.sc29.org/doc_end_user/current_document.php?id=67303&id_meeting=178) | 2019-03-18 18:03:29 | 2019-03-18 18:04:18 | [V-PCC] CE2.12 Cross-check by Sony of Samsung’s proposal  | Danillo Graziosi |

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| [m47452 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47452-v1-m47452.zip) |   |

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| [m47601](http://wg11.sc29.org/doc_end_user/current_document.php?id=67452&id_meeting=178) | 2019-03-18 23:42:23 | 2019-03-23 06:50:06 | [V-PCC] CE2.12 Report on Texture Padding | Esmaeil Faramarzi, Madhukar Budagavi, Rajan Joshi |

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| [m47601 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47601-v2-m47601-V-PCC-CE2.12-Report_on_Texture_Padding-Samsung-v2.zip) |   |

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| [m47602](http://wg11.sc29.org/doc_end_user/current_document.php?id=67453&id_meeting=178) | 2019-03-18 23:43:28 | 2019-03-21 23:14:12 | [V-PCC] Crosscheck Report on CE2.12 | Esmaeil Faramarzi, Madhukar Budagavi, Rajan Joshi |

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| [m47602 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47602-v2-m47602-vpcc_crosscheck_report_on_ce2.12_samsung.zip) |   |

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| [m47392](http://wg11.sc29.org/doc_end_user/current_document.php?id=67243&id_meeting=178) | 2019-03-18 12:03:40 | 2019-03-21 02:31:26 | [V-PCC] Crosscheck by LGE of Nokia’s proposal on CE 2.15 | Sejin Oh, Jangwon Lee |

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| [m47392 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47392-v1-m47392_CE2.15_crosscheck.zip) |   |

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| [m47449](http://wg11.sc29.org/doc_end_user/current_document.php?id=67300&id_meeting=178) | 2019-03-18 17:51:33 | 2019-03-18 17:52:28 | [V-PCC] CE2.15 Cross-check by Sony of Nokia’s proposal  | Danillo Graziosi |

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| [m47449 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47449-v1-m47449.zip) |   |

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| [m47367](http://wg11.sc29.org/doc_end_user/current_document.php?id=67218&id_meeting=178) | 2019-03-18 07:26:23 | 2019-03-20 08:58:11 | [V-PCC] CE2.15 report | Mika Pesonen, Deepa Naik, Sebastian Schwarz,  |

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| [m47367 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47367-v1-m47367_CE2.15_GenericAttribute.zip) |   |

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| [m47327](http://wg11.sc29.org/doc_end_user/current_document.php?id=67178&id_meeting=178) | 2019-03-17 21:46:42 | 2019-03-20 19:29:05 | [V-PCC] CE2.17 Crosscheck for low complexity color smoothing (m46277) | Vladyslav Zakharchenko, Kangying Cai |

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| [m47327 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47327-v1-m47327_v0.zip) |   |

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| [m47457](http://wg11.sc29.org/doc_end_user/current_document.php?id=67308&id_meeting=178) | 2019-03-18 18:17:46 | 2019-03-20 18:16:59 | [VPCC] Huawei CE 2.17 report of m46235 | Kangying CAI, Vladyslav Zakharchenko,  |

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| [m47457 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47457-v1-m47457_CE2.17.Report_v1.zip) |   |

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| [m47468](http://wg11.sc29.org/doc_end_user/current_document.php?id=67319&id_meeting=178) | 2019-03-18 18:25:24 | 2019-03-20 18:41:15 | [V-PCC][CE] Proponent report on CE2.17 | Jean-Claude Chevet, David Gendron, Celine Guede, Joan Llach, Yannick Olivier, Julien Ricard,  |

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| [m47468 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47468-v1-m47468-CE2.17Reportonsmoothing.zip) |   |

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| [m47473](http://wg11.sc29.org/doc_end_user/current_document.php?id=67324&id_meeting=178) | 2019-03-18 18:27:24 | 2019-03-20 18:34:48 | [V-PCC][CE] Cross-check report on CE2.17 | Jean-Claude Chevet, David Gendron, Celine Guede, Joan Llach, Yannick Olivier, Julien Ricard,  |

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| [m47473 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47473-v1-m47473-CE2.17Cross-checkreport.zip) |   |

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| [m47594](http://wg11.sc29.org/doc_end_user/current_document.php?id=67445&id_meeting=178) | 2019-03-18 23:15:44 | 2019-03-22 16:32:13 | [V-PCC] Crosscheck of CE 2.17 on Technicolor’s contribution on geometry smoothing (m46096) | Hossein Najaf-Zadeh |

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| [m47594 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47594-v1-CE2.17-m46096-xcheck.zip) |   |

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| [m47725](http://wg11.sc29.org/doc_end_user/current_document.php?id=67576&id_meeting=178) | 2019-03-19 15:36:33 | 2019-03-20 18:17:02 | [V-PCC] Report on Core Experiment CE 2.17 on low complexity color smoothing  | Hossein Najaf-Zadeh, Madhukar Budagavi |

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| [m47725 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47725-v1-CSLC-package.zip) |   |

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| [m47803](http://wg11.sc29.org/doc_end_user/current_document.php?id=67654&id_meeting=178) | 2019-03-20 17:36:05 | 2019-03-21 05:34:09 | [V-PCC] [CE2.17 Report] Iterative geometry smoothing | Arash Vosoughi, Sehoon Yea, Shan Liu |

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| [m47803 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47803-v1-m47803.zip) |   |

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| [m47808](http://wg11.sc29.org/doc_end_user/current_document.php?id=67659&id_meeting=178) | 2019-03-20 17:46:43 | 2019-03-22 23:41:03 | [V-PCC] CE2.17 objective crosscheck report (m46235) | Arash Vosoughi, Sehoon Yea, Shan Liu |

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| [m47808 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47808-v2-m47808-crosscheck-for-m46235.zip) |   |

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| [m47325](http://wg11.sc29.org/doc_end_user/current_document.php?id=67176&id_meeting=178) | 2019-03-17 21:38:18 | 2019-03-20 19:41:26 | [V-PCC] CE2.18 Crosscheck report on Harmonized patch orientation signalling | Vladyslav Zakharchenko, Kangying Cai |

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| [m47325 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47325-v1-m47325_v0.zip) |   |

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| [m47483](http://wg11.sc29.org/doc_end_user/current_document.php?id=67334&id_meeting=178) | 2019-03-18 18:46:54 | 2019-03-18 18:48:35 | [V-PCC] CE2.18 Report | Danillo Graziosi |

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| [m47483 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47483-v1-m47483.zip) |   |

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| [m47623](http://wg11.sc29.org/doc_end_user/current_document.php?id=67474&id_meeting=178) | 2019-03-19 04:20:13 | 2019-03-23 15:31:59 | [V-PCC][CE] CE2.19 3D Grid Division Report | Jiheon Im, Junsik Kim, Kyuheon Kim | [m47623](https://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47623-v3-%5BV-PCC%5D%5BCE%5DCE2.193DGridDivisionReport.zip) |
| [m47624](http://wg11.sc29.org/doc_end_user/current_document.php?id=67475&id_meeting=178) | 2019-03-19 04:33:14 | 2019-03-23 07:49:15 | [V-PCC] Report of Core Experiment CE2.19 on Method1-Point cloud level partitioning | Li Cui, Tianyu Dong, So Myung Lee, Eun-Yong Chang, Jihun Cha, Jae Young Ahn, Euee S. Jang |

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| [m47624 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47624-v2-m47624.zip) |   |

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| [m47804](http://wg11.sc29.org/doc_end_user/current_document.php?id=67655&id_meeting=178) | 2019-03-20 17:37:05 | 2019-03-21 22:03:42 | [V-PCC] [CE2.19 Report] Content-aware PCC supporting spatial random-access and parallel encoding/decoding | Arash Vosoughi, Sehoon Yea, Shan Liu |

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| [m47804 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47804-v1-m47804.zip) |   |

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| [m47886](http://wg11.sc29.org/doc_end_user/current_document.php?id=67737&id_meeting=178) | 2019-03-21 18:05:00 | 2019-03-23 01:51:26 | [V-PCC][CE] CE2.19 method4(content-aware PCC) Crosscheck result | Jiheon Im, Kyuheon kim |

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| [m47886 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47886-v2-%5BV-PCC%5D%5BCE%5DCE2.19method4%28content-awarePCC%29Crosscheckresult.zip) |   |

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| [m47349](http://wg11.sc29.org/doc_end_user/current_document.php?id=67200&id_meeting=178) | 2019-03-18 06:18:53 | 2019-03-20 06:17:03 | [V-PCC] Objective crosscheck of CE2.20 on Samsung's occupancy map 2D filtering | Satoru Kuma, Ohji Nakagami |

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| [m47349 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47349-v1-m47349-CE2.20-Objective_crosscheck_on_Samsung_occupancyMap2DFilterling.zip) |   |

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| [m47351](http://wg11.sc29.org/doc_end_user/current_document.php?id=67202&id_meeting=178) | 2019-03-18 06:20:49 | 2019-03-21 13:19:05 | [V-PCC] Objective crosscheck of CE2.20 on Tencent's occupancy map 2D filtering | Satoru Kuma, Ohji Nakagami |

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| [m47351 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47351-v2-m47351-CE2.20-Objective_crosscheck_on_Tencent_occupancyMap2DFilterling_r1.zip) |   |

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| [m47353](http://wg11.sc29.org/doc_end_user/current_document.php?id=67204&id_meeting=178) | 2019-03-18 06:25:15 | 2019-03-23 06:29:53 | [V-PCC] Subjective crosscheck of CE2.20 on P09's occupancy map 2D filtering | Satoru Kuma, Ohji Nakagami |

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| [m47353 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47353-v2-m47353.zip) |   |

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| [m47458](http://wg11.sc29.org/doc_end_user/current_document.php?id=67309&id_meeting=178) | 2019-03-18 18:19:14 | 2019-03-20 18:41:30 | [VPCC] Huawei CE 2.20 report of m44766, m44767, m46262 and m46455 | Kangying CAI, Vladyslav Zakharchenko, Dejun ZHANG |

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| [m47458 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47458-v1-m47458_CE2.20.Report_v1.zip) |   |

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| [m47461](http://wg11.sc29.org/doc_end_user/current_document.php?id=67312&id_meeting=178) | 2019-03-18 18:21:40 | 2019-03-21 01:49:24 | [V-PCC] CE2.20 crosschecking report by HUAWEI of m46389 | Kangying CAI, Vladyslav Zakharchenko |

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| [m47461 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47461-v1-m47461_CE2.20xCheck_of_m46389_v1.zip) |   |

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| [m47463](http://wg11.sc29.org/doc_end_user/current_document.php?id=67314&id_meeting=178) | 2019-03-18 18:23:09 | 2019-03-21 02:17:46 | [V-PCC] CE2.20 crosschecking report by HUAWEI of m46396 | Kangying CAI, Vladyslav Zakharchenko |

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| [m47463 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47463-v1-m47463_CE2.20xCheck_of_m46396_v1.zip) |   |

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| [m47475](http://wg11.sc29.org/doc_end_user/current_document.php?id=67326&id_meeting=178) | 2019-03-18 18:27:56 | 2019-03-22 17:24:49 | [V-PCC][CE] Cross-check report on CE2.20 | Jean-Claude Chevet, David Gendron, Celine Guede, Joan Llach, Yannick Olivier, Julien Ricard,  |

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| [m47475 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47475-v2-m47475-Cross-checkreportonCE2.20_v1.1.zip) |   |

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| [m47464](http://wg11.sc29.org/doc_end_user/current_document.php?id=67315&id_meeting=178) | 2019-03-18 18:24:07 |

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 | [V-PCC] CE2.20 summary report | Kangying CAI |

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| [m47464 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47464-v1-m47464_CE2.20_Coordinator_Report_v1.zip) |

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| [m47469](http://wg11.sc29.org/doc_end_user/current_document.php?id=67320&id_meeting=178) | 2019-03-18 18:26:02 | 2019-03-20 17:40:54 | [V-PCC][CE] Proponent report on CE2.20 | Jean-Claude Chevet, David Gendron, Celine Guede, Joan Llach, Yannick Olivier, Julien Ricard,  |

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| [m47469 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47469-v1-m47469-CE2.20ReportonOMfiltering-v1.0.zip) |   |

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| [m47366](http://wg11.sc29.org/doc_end_user/current_document.php?id=67217&id_meeting=178) | 2019-03-18 07:25:43 | 2019-03-22 14:28:30 | [V-PCC] CE2.20 subjective crosscheck | Deepa Naik, Nahid Sheikhi Pour, Mika Pesonen, Sebastian Schwarz,  |

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| [m47366 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47366-v1-m473667_CE2.20_subjective_crosscheck.zip) |   |

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| [m47595](http://wg11.sc29.org/doc_end_user/current_document.php?id=67446&id_meeting=178) | 2019-03-18 23:22:28 | 2019-03-23 04:50:31 | [V-PCC] Subjective crosscheck on CE 2.20  | Hossein Najaf-Zadeh, Youngho Oh, Madhukar Budagavi, Rajan Joshi,  |

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| [m47595 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47595-v1-m47595_subjective_xcheck_CE2.20.docx.zip) |   |

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| [m47609](http://wg11.sc29.org/doc_end_user/current_document.php?id=67460&id_meeting=178) | 2019-03-18 23:59:34 | 2019-03-22 09:49:25 | [V-PCC] CE2.20 Objective crosscheck of Technicolor's contribution(m44779) | Youngho Oh, DongYeon Kim, Sungryeul Rhyu |

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| [m47609 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47609-v3-m47609_v2.zip) |   |

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| [m47611](http://wg11.sc29.org/doc_end_user/current_document.php?id=67462&id_meeting=178) | 2019-03-19 00:06:12 | 2019-03-23 07:02:18 | [V-PCC] Report on CE 2.20 on improved point cloud compression through filtering of occupancy map | Youngho Oh, Hossein Najaf-Zadeh, Rajan Joshi, Madhukar Buddagavi, Sungryeul Rhyu,  |

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| [m47611 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47611-v3-m47611_v2.zip) |   |

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| [m47757](http://wg11.sc29.org/doc_end_user/current_document.php?id=67608&id_meeting=178) | 2019-03-20 07:07:01 | 2019-03-22 11:26:37 | [V-PCC] CE2.20 report on occupancy map refinement using corner-based boundary estimation | Ya-Hsuan Lee, Jian-Liang Lin, Yung-Chang Chang, Chi-Cheng Ju (MediaTek), Yi-Ting Tsai, Ching-Chieh Lin, Chun-Lung Lin (ITRI) |

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| [m47757 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47757-v2-m47757-v2.zip) |   |

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| [m47758](http://wg11.sc29.org/doc_end_user/current_document.php?id=67609&id_meeting=178) | 2019-03-20 07:09:28 | 2019-03-20 16:04:17 | [V-PCC] CE2.20 report on occupancy map refinement using bicubic interpolation | Ya-Hsuan Lee, Jian-Liang Lin, Yung-Chang Chang, Chi-Cheng Ju (MediaTek), Yi-Ting Tsai, Ching-Chieh Lin, Chun-Lung Lin (ITRI) |

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| [m47758 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47758-v1-m47758.zip) |   |

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| [m47768](http://wg11.sc29.org/doc_end_user/current_document.php?id=67619&id_meeting=178) | 2019-03-20 09:47:18 | 2019-03-20 19:43:48 | [V-PCC] Objective crosscheck of PCC CE2.20 on adaptive hole filling method for reconstructed point cloud | Erh-Chung Ke, Yi-Ting Tsai, Ching-Chieh Lin, Chun-Lung Lin |

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| [m47768 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47768-v2-m47768.zip) |   |

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| [m47805](http://wg11.sc29.org/doc_end_user/current_document.php?id=67656&id_meeting=178) | 2019-03-20 17:38:01 | 2019-03-21 05:40:36 | [V-PCC] [CE2.20 Report] Occupancy map recovery using scalable locally adaptive erosion filter | Arash Vosoughi, Sehoon Yea, Shan Liu |

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| [m47805 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47805-v1-m47805.zip) |   |

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| [m47809](http://wg11.sc29.org/doc_end_user/current_document.php?id=67660&id_meeting=178) | 2019-03-20 17:49:51 | 2019-03-22 23:41:50 | [V-PCC] CE2.20 objective crosscheck report (m44766) | Arash Vosoughi, Sehoon Yea, Shan Liu |

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| [m47809 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47809-v1-m47809-crosscheck-for-m44766.zip) |   |

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| [m47873](http://wg11.sc29.org/doc_end_user/current_document.php?id=67724&id_meeting=178) | 2019-03-21 15:06:43 | 2019-03-22 21:50:40 | [V-PCC] CE2.20 objective crosscheck on adaptive occupancy map up-sampling (m46455) | Ya-Hsuan Lee, Jian-Liang Lin, Yung-Chang Chang, Chi-Cheng Ju (MediaTek) |

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| [m47873 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47873-v1-m47873.zip) |   |

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| [m47914](http://wg11.sc29.org/doc_end_user/current_document.php?id=67765&id_meeting=178) | 2019-03-22 13:38:54 | 2019-03-22 13:42:03 | [V-PCC] P05 subjective crosscheck of CE2.20  | Erh-Chung Ke, Ching-Chieh Lin, Chun-Lung Lin |

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| [m47914 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47914-v1-m47914.zip) |   |

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| [m47476](http://wg11.sc29.org/doc_end_user/current_document.php?id=67327&id_meeting=178) | 2019-03-18 18:28:17 | 2019-03-22 18:21:01 | [V-PCC][CE] Cross-check report on CE2.22 | Jean-Claude Chevet, David Gendron, Celine Guede, Joan Llach, Yannick Olivier, Julien Ricard,  |

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| [m47476 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47476-v1-m47476_Cross-checkreportonCE2.22.zip) |   |

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| [m47598](http://wg11.sc29.org/doc_end_user/current_document.php?id=67449&id_meeting=178) | 2019-03-18 23:35:47 | 2019-03-21 18:22:53 | [V-PCC] Crosscheck of CE 2.22 of Technicolor's additional points encoding for lossless | Indranil Sinharoy |

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| [m47598 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47598-v1-m47598_cc_ce2.22_add_pts_encoding_lossless.zip) |   |

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| [m47599](http://wg11.sc29.org/doc_end_user/current_document.php?id=67450&id_meeting=178) | 2019-03-18 23:36:58 | 2019-03-20 22:40:46 | [V-PCC] Report on Core Experiment CE 2.22 on additional points encoding for lossless using geometry coordinate split | Indranil Sinharoy, Madhukar Budagavi |

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| [m47599 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47599-v1-m47599_CE2.22_additional_points_encoding_coord_split.zip) |   |

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| [m47471](http://wg11.sc29.org/doc_end_user/current_document.php?id=67322&id_meeting=178) | 2019-03-18 18:26:43 | 2019-03-20 19:52:14 | [V-PCC][CE] Proponent report on CE2.22 | Jean-Claude Chevet, David Gendron, Celine Guede, Joan Llach, Yannick Olivier, Julien Ricard,  |

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| [m47471 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47471-v1-m47471-ReportonCE2.22onadditionalpointsencodingusingmultiplepatches.docx.zip) |   |

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| [m47326](http://wg11.sc29.org/doc_end_user/current_document.php?id=67177&id_meeting=178) | 2019-03-17 21:42:00 | 2019-03-20 19:17:31 | [V-PCC] CE2.24 Related On patch coding mode signalling | Vladyslav Zakharchenko, Kangying Cai, ... |

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| [m47326 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47326-v1-m47326_v0.zip) |   |

 |
| *(Not discussed during the AhG but during the week)*Provides a comparative study of patch type signalling methods and corresponding compression modes. The comparison reveals that a patch type data unit signaling model has the best results on a predefined patch order. The flexibility to add new patch data unit types is provided in the 2nd and 3rd solutions.Resolution: adopted after crosschecking. Use a termination mode of value "14". To be integrated in TM5.1. |
| [m47274](http://wg11.sc29.org/doc_end_user/current_document.php?id=67125&id_meeting=178) | 2019-03-16 04:33:03 | 2019-03-20 13:30:34 | [VPCC][CE2.24] High Level Syntax report | J. Kim, A. M. Tourapis, K. Mammou (Apple) |

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| [m47274 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47274-v1-m47274.zip) |   |

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| [m47368](http://wg11.sc29.org/doc_end_user/current_document.php?id=67219&id_meeting=178) | 2019-03-18 07:27:16 | 2019-03-20 08:43:59 | [V-PCC] EE2.2 report | Nahid Sheikhi-Pour, Mika Pesonen, Sebastian Schwarz,  |

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| [m47368 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47368-v1-M47368_%5BV-PCC%5DEE2.2report.zip) |   |

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| **G-PCC CEs** |
| [m47790](http://wg11.sc29.org/doc_end_user/current_document.php?id=67641&id_meeting=178) | 2019-03-20 13:48:28 | 2019-03-22 15:44:19 | [G-PCC] Cross check CE 13.1 | Rufael Mekuria |

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| [m47790 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47790-v1-m44790.zip) |   |

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| [m47485](http://wg11.sc29.org/doc_end_user/current_document.php?id=67336&id_meeting=178) | 2019-03-18 18:57:04 | 2019-03-18 19:00:36 | [G-PCC] CE13.1 Report  | Danillo Graziosi |

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| [m47485 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47485-v1-m47485.zip) |   |

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| [m47227](http://wg11.sc29.org/doc_end_user/current_document.php?id=67078&id_meeting=178) | 2019-03-15 16:32:49 | 2019-03-20 19:49:45 | [G-PCC] CE13.2 report on tile and slice based coding | Yiting Shao, Jiamin Jin, Ge Li, Shan Liu |

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| [m47227 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47227-v3-m47227.zip) |   |

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| [m47285](http://wg11.sc29.org/doc_end_user/current_document.php?id=67136&id_meeting=178) | 2019-03-16 09:16:21 | 2019-03-16 09:42:59 | [G-PCC] Crosscheck report on CE13.2 of Panasonic's slice origin signalling | Yiting Shao, Qi Zhang, Ge Li |

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| [m47285 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47285-v2-m47285.zip) |   |

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| [m47456](http://wg11.sc29.org/doc_end_user/current_document.php?id=67307&id_meeting=178) | 2019-03-18 18:11:58 | 2019-03-20 22:02:49 | [G-PCC] CE13.2 cross-check by Sony of Panasonic's proposal | Alexandre Zaghetto, Danillo Graziosi |

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| [m47456 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47456-v1-m47456.zip) |   |

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| [m47398](http://wg11.sc29.org/doc_end_user/current_document.php?id=67249&id_meeting=178) | 2019-03-18 13:07:51 | 2019-03-20 18:11:48 | [G-PCC] CE13.2 Report on slice header reduction in slice partition | Noritaka Iguchi |

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| [m47398 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47398-v1-m47398_CE13.2.zip) |   |

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| [m47400](http://wg11.sc29.org/doc_end_user/current_document.php?id=67251&id_meeting=178) | 2019-03-18 13:09:08 | 2019-03-20 23:58:04 | [G-PCC] Cross check report on CE13.2 | Noritaka Iguchi |

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| [m47400 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47400-v1-m47400_CE13.2_xcheck.zip) |   |

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| [m47402](http://wg11.sc29.org/doc_end_user/current_document.php?id=67253&id_meeting=178) | 2019-03-18 13:10:09 | 2019-03-20 13:34:25 | [G-PCC] CE13.6 Report on attribute prediction strategy in TMC13 | Toshiyasu Sugio |

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| [m47402 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47402-v1-m47402_v1.zip) |   |

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| [m47933](http://wg11.sc29.org/doc_end_user/current_document.php?id=67784&id_meeting=178) | 2019-03-23 02:13:25 | 2019-03-23 18:00:56 | [G-PCC] Cross-Check of CE13.6 on attribute prediction strategy | Sehoon Yea, Arash Vosoughi, Shan Liu | [m47933](https://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47933-v1-m47933.zip) |
| [m47732](http://wg11.sc29.org/doc_end_user/current_document.php?id=67583&id_meeting=178) | 2019-03-19 18:47:13 | 2019-03-20 08:11:33 | [G-PCC] Report on Core Experiment 13.14 on Fixed-point implementation of attributes (predlift) | Valery Valentin, Khaled Mammou, Jungsun Kim, Alexis Tourapis |

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| [m47732 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47732-v1-m47732.zip) |   |

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| [m47745](http://wg11.sc29.org/doc_end_user/current_document.php?id=67596&id_meeting=178) | 2019-03-19 22:29:08 | 2019-03-23 00:11:12 | [G-PCC] CE13.14: Crosscheck on fixed point lifting /prediction transform | Dong Tian |

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| [m47745 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47745-v1-m47745.zip) |   |

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| [m47733](http://wg11.sc29.org/doc_end_user/current_document.php?id=67584&id_meeting=178) | 2019-03-19 18:47:40 | 2019-03-20 08:08:22 | [G-PCC] Report on Core Experiment 13.15 on low complexity LOD generation | Valery Valentin, Khaled Mammou, Jungsun Kim, Alexis Tourapis |

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| [m47733 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47733-v1-m47733.zip) |   |

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| [m47324](http://wg11.sc29.org/doc_end_user/current_document.php?id=67175&id_meeting=178) | 2019-03-17 21:32:59 | 2019-03-20 20:27:32 | [G-PCC] CE13.15 Crosscheck report (Huawei) | Vladyslav Zakharchenko, Kangying Cai |

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| [m47324 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47324-v1-m47324_v0.zip) |   |

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| [m47358](http://wg11.sc29.org/doc_end_user/current_document.php?id=67209&id_meeting=178) | 2019-03-18 06:48:00 | 2019-03-21 06:17:38 | [G-PCC] CE13.15 Crosscheck report  | Hyejung Hur, Sejin Oh (LGE) |

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| [m47358 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47358-v1-m47358.zip) |   |

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| [m47350](http://wg11.sc29.org/doc_end_user/current_document.php?id=67201&id_meeting=178) | 2019-03-18 06:20:49 | 2019-03-20 06:25:35 | [G-PCC] Crosscheck of CE13.16 on Slice-based quantization control | Ohji Nakagami |

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| [m47350 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47350-v1-m47350_Xcheck_CE13.16.zip) |   |

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| [m47363](http://wg11.sc29.org/doc_end_user/current_document.php?id=67214&id_meeting=178) | 2019-03-18 07:08:18 | 2019-03-21 06:18:22 | [G-PCC] CE13.16 Crosscheck report | Hyejung Hur, HyunMook Oh, Sejin Oh (LGE) |

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| [m47363 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47363-v1-m47363.zip) |   |

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| [m47399](http://wg11.sc29.org/doc_end_user/current_document.php?id=67250&id_meeting=178) | 2019-03-18 13:08:45 | 2019-03-20 18:13:02 | [G-PCC] CE13.16 Report on slice based quantization control | Chung Dean Han, Noritaka Iguchi |

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| [m47399 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47399-v1-m47399_CE13.16.zip) |   |

 |
| *(not done in the AhG but during the week)*Two implementations are studied: Quantization Step method and delta QP method. The results are compared to original TMC13v5.0 for based line reference purposes and also among the two different implementation. A tool to tune each slice attribute individually for both prediction/lifting and RAHT transform. Delta QP implementation is slightly easier to be used as it follows the same analogy of video encoding and have slightly better performance comparing to delta quantization step implementation.Resolution: Use QP and delta QP; update the synthax accordignally. |
| [m47354](http://wg11.sc29.org/doc_end_user/current_document.php?id=67205&id_meeting=178) | 2019-03-18 06:27:26 | 2019-03-20 06:36:02 | [G-PCC] Crosscheck of CE13.17 on RUN LEVEL LAST signaling | Satoru Kuma, Ohji Nakagami |

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| [m47354 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47354-v1-m47354-CE13.17_zerorunlength.zip) |   |

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| [m47403](http://wg11.sc29.org/doc_end_user/current_document.php?id=67254&id_meeting=178) | 2019-03-18 13:10:28 | 2019-03-20 13:35:07 | [G-PCC] CE13.17 Report on RUN/LEVEL/LAST signaling in TMC13 | Toshiyasu Sugio |

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| [m47403 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47403-v1-m47403_v1.zip) |   |

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| *(not done in the AhG but during the week)*The results show constant gain of the zero run length (ZRL) coding method for encoding attribute residual value for all CTC conditions (and for both Lifting/Predicting Transform and RAHT) with no significant difference of encoding and decoding time compared with TMC13v5.Resolution: adopt ZRL method.  |
| [m47404](http://wg11.sc29.org/doc_end_user/current_document.php?id=67255&id_meeting=178) | 2019-03-18 13:10:42 | 2019-03-20 13:35:40 | [G-PCC] Cross check report on CE3.4 | Toshiyasu Sugio |

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| [m47404 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47404-v1-m47404_v1.zip) |   |

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| **V-PCC New** |
| [m47288](http://wg11.sc29.org/doc_end_user/current_document.php?id=67139&id_meeting=178) | 2019-03-16 15:24:51 | 2019-03-22 17:27:33 | [VPCC][new proposal] Removing Arithmetic coding | J. Kim, A. M. Tourapis, K. Mammou (Apple) |

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| [m47288 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47288-v2-m47288_r2.zip) |   |

 |
| In the current version of V-PCC Fixed Length and Exp-Golomb coding are used to encode high level syntax information.On the other hand, a binary arithmetic entropy coding engine is used within the patch frame data unit, because of its expected higher coding efficiency, to encode several bitstream syntax elements. It is showed that the current arithmetic entropy coding is not bringing any compression advantage, therefore it is proposed to replace it with only Fixed Length or Exp-Golomb coding.Resolution: Adopted. AP: To be crosschecked in the Validation Experiment 1. General resolution: The Validation Experiment should be conducted in the 2-3 weeks after the MPEG meeting with the objective to implement the proposed change in the software and confirm the numbers presented during the meeting.  |
| [m47289](http://wg11.sc29.org/doc_end_user/current_document.php?id=67140&id_meeting=178) | 2019-03-16 15:25:18 | 2019-03-22 17:58:43 | [V-PCC][new proposal] Signaling of projection plane  | J. Kim, A. M. Tourapis, K. Mammou (Apple) |

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| [m47289 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47289-v2-m47289_r2.zip) |   |

 |
| Proposes to replace the syntax elements, pdu\_normal\_axis and pdu\_projection\_mode with a single syntax element pdu\_projection\_plane\_index which takes the values from 0 to 5, inclusive.  It is also proposed that the syntax element dpdu\_projection\_mode is removed and that pdu\_projection\_plane\_index is directly predicted from the reference patch. The result is slightly cleaner syntax with little, if any impact in coding efficiency.Resolution: Accept the proposed syntax. Integrate in TM5.2General resolutions: - the tools discussed at this meeting are to be integrated in TM5.2. - In TM5.1 only tools from the last meeting should be integrated. |
| [m47290](http://wg11.sc29.org/doc_end_user/current_document.php?id=67141&id_meeting=178) | 2019-03-16 15:25:37 | 2019-03-20 13:01:58 | [VPCC][new proposal] PCM points placement format | J. Kim, A. M. Tourapis, K. Mammou (Apple) |

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| [m47290 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47290-v1-m47290.zip) |   |

 |
| Currently the V-PCC specification does not specify how the placement of the geometry and attribute information on the related video planes should be done when a PCM patch is signaled. Several cases are possible: place all the geometry information in a contiguous or interleaved manner on the same plane, or place on separate planes. Similar arrangements may be preferred for attribute information. Proposes a parameter that allows signaling of the patch coding mode that is used for both the geometry and attributes. Alternatively, proposes two parameters, one for the geometry, and another for the attributes, if present.Resolution: start a CE 2.25 on the PCM Points placement.  |
| [m47296](http://wg11.sc29.org/doc_end_user/current_document.php?id=67147&id_meeting=178) | 2019-03-16 18:13:24 | 2019-03-21 18:39:21 | [V-PCC] Signalling VPCC sub-frame information | Lulin Chen, Xin Wang |

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| [m47296 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47296-v1-m47296%5BV-PCC%5DSignallingVPCCsub-frameinformation.zip) |   |

 |
| Proposes to specify signalling sub-frame coded point cloud sequences in the V-PCC bitstream: - A V-PCC bitstream may contains one or more VPCC sub-frame coded sequences, i.e. a VPCC frame may contains one or more VPCC sub-frames, and a VPCC sub-frame may contains one or more tiles (or tile groups). - Each sub-frames may have their own VPCC SPS and VPCC PPS. Decoding a sub-frame needs only information from co-located sub-frames in the VPCC sequence. Therefore each VPCC sub-frame coded sequences are independently decodable. - Partitioning for parallel processing and other features at the VPCC sub-frame level and below are still relevant as if it is a regular VPCC frame. - The VPCC sub-frame boundaries are treated as a regular VPCC frame boundaries. A regular VPCC frame can be treated as a VPCC sub-frame for merging with other VPCC sub-frames.- Least modifications on the high level syntax structures when performing the VPCC sub-frame extraction and merging processing.The main idea is to split the 2D frame in several subframes to which different parameters can be associated. Resolution: nothing to do for PCC. We may formulate a set of requirements for video group. Investigation should continue. |
| [m47364](http://wg11.sc29.org/doc_end_user/current_document.php?id=67215&id_meeting=178) | 2019-03-18 07:24:42 | 2019-03-20 09:20:14 | [V-PCC] [new proposal] patch priority signalling | Mika Pesonen, Sebastian Schwarz, Payman Aflaki |

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| [m47364 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47364-v1-m47364_V-PCC_patch-priority.zip) |   |

 |
| Proposes to include a simple syntax element on a per-patch level to prioritise certain patches if decoding or rendering resources are constrained. Proposal to update Table 7Comments: the signal can be communicated through an SEI message.Resolution: there is no need to update the table, SEI message should be used. Create a SEI Priority Level. Create a new CE on designing SEI message.  |
| [m47365](http://wg11.sc29.org/doc_end_user/current_document.php?id=67216&id_meeting=178) | 2019-03-18 07:25:00 | 2019-03-21 09:20:13 | [V-PCC] [new proposal] Visibility cones | Mika Pesonen, Sebastian Schwarz, Kimmo Roimela |

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| [m47365 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47365-v2-m47365_V-PCC_visibility_cones.zip) |   |

 |
| Presents how per patch visibility could be encoded for view depended rendering of point cloud content. Patch visibility signaling is minimal (how much?)Comment: it can be signalized by using SEI messageResolution: open an EE rendering optimisation. Add the proposed method as a first topic to be investigated (visibility optimizations).  |
| [m47371](http://wg11.sc29.org/doc_end_user/current_document.php?id=67222&id_meeting=178) | 2019-03-18 07:29:56 | 2019-03-21 14:20:13 | [V-PCC] on V-PCC decoding performance | Mika Pesonen, Sebastian Schwarz,  |

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| [m47371 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47371-v3-m47371_V-PCC_on_decoding_performance.zip) |   |

 |
| Presents the new results for decoding V-PCC content on multiple devices. Based on the results it seems even with the latest chipsets there seems to be challenges on decoding the content. Nokia plans to release the source code for the V-PCC player once the new bitstream format is integrated to the test model.Resolution: nothing to do. |
| [m47419](http://wg11.sc29.org/doc_end_user/current_document.php?id=67270&id_meeting=178) | 2019-03-18 15:44:30 | 2019-03-20 19:52:57 | [V-PCC] [new proposal] Encoding per patch 3D transforms | Marius Preda, Alexis Tourapis, Rajan Joshi, Chao Cao, Khaled Mammou, Madukar Budagavi |

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| [m47419 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47419-v1-m47419.zip) |   |

 |
| Proposes to use a quaternion-based representation for rotations and to use the center of the bounding box associated with each patch as its rotation center.Comments: support for quaternion- dynamic length instead of 16 bits (for rotation) and 32 bits (for scale and offset). - what is the value of the 3D transformation per patch?Resolutions: 1. adopt the representation based on quaternions per object (global transform) and per patch2. clarify in the spec the usage of per patch and global transforms in the spec (how to use the scale). Update the TM to support these transforms.3. Validation Experiment 2.2 |
| [m47472](http://wg11.sc29.org/doc_end_user/current_document.php?id=67323&id_meeting=178) | 2019-03-18 18:27:01 | 2019-03-20 18:42:13 | [VPCC] [New proposal] global patch allocation related HLS proposal | Kangying CAI, Vladyslav Zakharchenko, Dejun ZHANG,  |

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| [m47472 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47472-v1-m47472_GPA_HLS_v1.zip) |   |

 |
| It is not necessary to signal the reference patch index of the global matched patches into the compressed bitstream. Some bitrate reduction is shown but not full CTC results. Non significant gains are reported orally. Introduction of a new mode (skip\_mode)Comments: there is any negative effect when GPA is not used at all? Resolution: investigate the value of adding the skip\_mode in CE 2.24.  |
| [m47477](http://wg11.sc29.org/doc_end_user/current_document.php?id=67328&id_meeting=178) | 2019-03-18 18:28:55 | 2019-03-21 01:15:38 | [V-PCC][New proposal] Texture patch for Enhanced Occupancy Map for Depth | Jean-Claude Chevet, David Gendron, Celine Guede, Joan Llach, Yannick Olivier, Julien Ricard,  |

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| [m47477 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47477-v1-m47477-TexturepatchforEOM-v1.0.zip) |   |

 |
| proposes to use a new type of patch, named EOM texture patch, to group together the textures of intermediate points. By using the proposed EOM texture patch it’s possible to enable new features, like parallel reconstruction of patches, that are not possible today when EOM is enabled. The use of the EOM texture patch slightly improves compression efficiency (0.1%).Resolution: start CE 2.26 with the objective or refining the definition of the new patch mode (I\_EOM\_Attribute)  |
| [m47478](http://wg11.sc29.org/doc_end_user/current_document.php?id=67329&id_meeting=178) | 2019-03-18 18:28:55 | 2019-03-20 18:14:11 | [V-PCC] CE2.20 related: LUT based 2D occupancy map processing | Kangying CAI, Vladyslav Zakharchenko, Dejun ZHANG |

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| [m47478 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47478-v1-m47478_LUT.OM.Processing_v1.zip) |   |

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| Presented during AhG |
| [m47479](http://wg11.sc29.org/doc_end_user/current_document.php?id=67330&id_meeting=178) | 2019-03-18 18:29:31 | 2019-03-23 16:35:53 | [V-PCC][New proposal] Patch border filtering | Jean-Claude Chevet, David Gendron, Celine Guede, Joan Llach, Yannick Olivier, Julien Ricard,  |

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| [m47479 https://wg11.sc29.org/Templates/Download.png](https://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47479-v1-m47479-patchborderfiltering-v1.0.docx.zip) |

 |
| proposes a process for identifying the border points without trying to move the created 3D points but instead study the 2D patches to guarantee the conformance of the borders before the 3D points reconstruction process. The entire smoothing process is performed in 2D. The compression performances are between 1.2% to 7.9% in average. Resolution: include the proposed method in the CE 2.17 on geometry smoothing. |
| [m47480](http://wg11.sc29.org/doc_end_user/current_document.php?id=67331&id_meeting=178) | 2019-03-18 18:36:38 | 2019-03-20 18:43:12 | [V-PCC] Harmonization of global patch allocation and block to patch coding removal | Dejun ZHANG, Kangying CAI, Vladyslav Zakharchenko |

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| [m47480 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47480-v1-m47480_GPA.Harmonization_v1.zip) |   |

 |
| Two current tools are exclusive: GPA is not compatible with block-to-patch coding removal. The proposal consists in making the step of patch auxiliary information compression process patches in the same order used by GPA, and update the bestMatchIndex of each patch. The proposal is an implementation issue. Compression gains are reported. Resolution: adopted. |
| [m47496](http://wg11.sc29.org/doc_end_user/current_document.php?id=67347&id_meeting=178) | 2019-03-18 19:53:25 | 2019-03-23 09:24:23 | [V-PCC] New Contribution on Geometry Padding | Danillo Graziosi, Ali Tabatabai |

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| [m47496 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47496-v2-m47496_v2.zip) |   |

 |
| Propose to use an encoder-only 3D padding technique for positions that will be added to the reconstructed point cloud due to the coded occupancy map.Resolution: Evaluate the proposed method in CE 2.12 on Visual Quality |
| [m47499](http://wg11.sc29.org/doc_end_user/current_document.php?id=67350&id_meeting=178) | 2019-03-18 19:57:43 | 2019-03-23 09:15:26 | [V-PCC] New Contribution on Patch Packing | Danillo Graziosi, Ali Tabatabai |

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| [m47499 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47499-v2-m47499_v2.zip) |   |

 |
| present a method to temporally stabilize the position of patches during the packing process. The method is an encoder-only option, works with the bolck2patch condition and with any orientation, and provides consistent gains for all sequences. Comments: it would be interesting to obtain the results for 8 frames.Resolution: crosscheck the results in the CE 2.18 on Packing |
| [m47503](http://wg11.sc29.org/doc_end_user/current_document.php?id=67354&id_meeting=178) | 2019-03-18 20:12:07 | 2019-03-23 09:08:03 | [V-PCC] CE2.18 related new contribution - Syntax Proposal for Flexible Orientation | Danillo Graziosi, Vladyslav Zakharchenko |

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| [m47503 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47503-v1-m47503.zip) |   |

 |
| Nothing to do. |
| [m47505](http://wg11.sc29.org/doc_end_user/current_document.php?id=67356&id_meeting=178) | 2019-03-18 20:16:10 | 2019-03-23 09:19:45 | [V-PCC] New Contribution on Patch Coding | Danillo Graziosi, Ali Tabatabai |

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| [m47505 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47505-v2-m47505_v2.zip) |   |

 |
| Proposes a new patch coding method using homography transforms. Resolutions: continue the investigation in an EE 2.1. Evaluate also the current way of transmitting 3D transforms per patch. |
| [m47509](http://wg11.sc29.org/doc_end_user/current_document.php?id=67360&id_meeting=178) | 2019-03-18 20:28:08 | 2019-03-20 21:58:36 | [V-PCC] [New proposal] Comments on V-PCC CD | Ali Tabatabai, Danillo Graziosi |

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| [m47509 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47509-v1-m47509.zip) |   |

 |
| - Attribute type vs. attribute instances Resolution: Nothing to do.- Tight bounding between geometry and attributes layers. Resolution: look how HEVC is addressing the issue. Further investigation is needed. - editorials and typos. Resolution: accepted. |
| [m47539](http://wg11.sc29.org/doc_end_user/current_document.php?id=67390&id_meeting=178) | 2019-03-18 21:23:20 | 2019-03-20 22:00:07 | [V-PCC] proposal for lossless flags | Rajan Joshi, Indranil Sinharoy, Madhukar Budagavi,  |

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| [m47539 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47539-v1-m47539.zip) |   |

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| TODO |
| [m47541](http://wg11.sc29.org/doc_end_user/current_document.php?id=67392&id_meeting=178) | 2019-03-18 21:28:39 | 2019-03-20 21:57:41 | [V-PCC] Clarification of tool behavior for more than two layers | Rajan Joshi, Madhukar Budagavi |

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| [m47541 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47541-v1-m47541.zip) |   |

 |
| Many of the tools included in the study text of V-PCC CD are specified only for the case of two layers. One reason for this is that the TMC2 test model software has only supported up to two layers so far. This document specifies how the tools corresponding to sps\_pixel\_deinterleaving\_flag, and sps\_enhanced\_occupancy\_map\_for\_depth\_flag may be extended to handle a PCC bitstream with more than two layers.For pixel deinterleaving extension the proposal is that only the layers with even index are coded. Resolution: adopted.For the enhanced occupancy map for depth two options are proposed. Resolution: adopt option 2. Software implementation to be done as a mandate of CE2.26.Comments: debate on keeping in the spec the possibility of using more than two layers.General resolution: V-PCC specification in its 1st version will only consider two layers. New resolutions in the light of this general resolution: the proposals from this contribution are rejected (the cases are not valid anymore). |
| [m47576](http://wg11.sc29.org/doc_end_user/current_document.php?id=67427&id_meeting=178) | 2019-03-18 22:26:29 | 2019-03-21 07:44:58 | [V-PCC][New proposal] On occupancy map coding | Lukasz Litwic |

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| [m47576 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47576-v1-m47576_On_Occupancy_Map_Coding.zip) |   |

 |
| Shows that reduction of 1 decoder instance for occupancy map video is possible by using available chroma samples in geometry video to carry occupancy map. First results show compression performance gains against anchor with full resolution occupancy map. Against CTC anchor results show losses apart from D2 metric which is consistent across tested sequences. Comments: mixing occupancy map with geometry and consider it as equivalent with chroma components looks artificial. Apple: from the design point of view, mixing information is not a good idea.Samsung: encoding decisions that are made on luma (related to depth) may not be appropriate for occupancy.Resolution: mixing the three types of information (geometry, attributes and occupancy maps) together is not a good design. The group decides to keep the current approach.  |
| [m47593](http://wg11.sc29.org/doc_end_user/current_document.php?id=67444&id_meeting=178) | 2019-03-18 23:08:41 | 2019-03-20 18:18:59 | [V-PCC] [New Proposal] On occupancy map trimming | Hossein Najaf-Zadeh, Madhukar Budagavi, Rajan Joshi, Youngho Oh |

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| [m47593 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47593-v1-m47593.zip) |   |

 |
| V-PCC allows to sub-sample the occupancy map by a factor equal to the occupancy precision before encoding. In the decoder, the occupancy map is up-sampled back to original resolution. Prior to sub-sampling the original occupancy map, partially filled blocks of 4x4 points (for occupancy precision = 4) are filled with 1. As a results, after up-sampling the occupancy map at the decoder, all the points in the block of 4x4 points will be used to reconstruct the point cloud. These extra points generated due to the limited occupancy precision have an adverse impact on the reconstructed point cloud and often result in visual artifacts and losses in objective scores. The extension of the original occupancy map often occurs at boundary blocks where the block of 4x4 points are neighbor to empty blocks. V-PCC contains some techniques to filter the up-sampled occupancy map and remove invalid points from the occupancy map at the decoder. This contribution introduces a method for occupancy map trimming while retaining valid points. Resolution: add the proposed method in CE 2.20. Continue the subjective evaluation in CE 2.20Friday morning resolution : the following methods should be investigated in CE2.20 : P01, P02, P03, P05, m47766. The CE should allow comparing the performances of some combination of methods. |
| [m47600](http://wg11.sc29.org/doc_end_user/current_document.php?id=67451&id_meeting=178) | 2019-03-18 23:40:44 | 2019-03-20 23:42:06 | [V-PCC][New Proposal] Grid-based partitioning  | Esmaeil Faramarzi, Madhukar Budagavi, Rajan Joshi |

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| [m47600 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47600-v1-m47600-VPCC-Grid_based_partitioning-Samsung-v1.zip) |   |

 |
| Proposes a new method for smoothing out the partitioning (clustering) indices of points over the point cloud surface.Encoder only. Impact on speed. Reduction of memory usage.Resolution: start a CE 2.27 on Encoder speed up |
| [m47608](http://wg11.sc29.org/doc_end_user/current_document.php?id=67459&id_meeting=178) | 2019-03-18 23:48:47 | 2019-03-20 23:11:28 | [V-PCC] [New Proposal] V-PCC extension for mesh coding | Sungryeul Rhyu, Madhukar Budagavi, Rajan Joshi,  |

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| [m47608 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47608-v1-m47608_V-PCC_Mesh_Coding_Extension.zip) |   |

 |
| Proposes to construct a new method to handle animated mesh compression by using the framework set up by V-PCC Resolution: start an Exploration Experiment. Document the content collection and potential requirements |
| [m47612](http://wg11.sc29.org/doc_end_user/current_document.php?id=67463&id_meeting=178) | 2019-03-19 00:08:45 | 2019-03-20 21:26:58 | [V-PCC][ New Proposal] Use 6 direction on delta D1 mode | Youngho Oh, Rajan Joshi, Madhukar Budagavi, Sungryeul Rhyu |

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| [m47612 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47612-v1-m47612.zip) |   |

 |
| The VPCC uses the different methods to select the projection direction depending on how the D1 value is generated. The 6 direction method is used in the case of the absolute D1 mode and the Per Patch Projection is used in the case of delta D1 mode.Proposes to apply the 6 direction method in delta D1 mode. The benefit will be the simplification of the spec and the software. The impact is minor (some benefits for Queen).Comments: there is a consensus to remove delta coding for D1. Resolution: Approval of removing delta mode for D1. To integrate on top of TM6 and to update the spec accordingly (syntax and profiles). Friday morning discussion: removing delta coding for D1 has other implications: need if 2x framerate decoder or penalties in compression. Final resolution: keep delta D1 coding and add in CE 2.29 the evaluation of using 6 directions on delta D1 mode. Adopt the bug fix in TM6. |
| [m47621](http://wg11.sc29.org/doc_end_user/current_document.php?id=67472&id_meeting=178) | 2019-03-19 03:47:44 |  | [V-PCC][new proposal] Related to CE2.18: improvement on patch packing | Yiling Xu, Yingzhan Xu, Wenjie Zhu, Li Li, Zhu Li |  |
| withdrawn |
| [m47688](http://wg11.sc29.org/doc_end_user/current_document.php?id=67539&id_meeting=178) | 2019-03-19 11:30:05 | 2019-03-20 17:41:25 | [VPCC] On patch frame parameter set | Yong He, Ahmed Hamza (InterDigital) |

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| [m47688 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47688-v1-m47688VPCCOnpatchframeparameterset.zip) |   |

 |
| Proposes to consolidate multiple higher level parameter set reference in patch frame parameter set into a single referencing structure to facilitate robust implementation.Resolution : adopt solution #1. To be handled by editors.  |
| [m47749](http://wg11.sc29.org/doc_end_user/current_document.php?id=67600&id_meeting=178) | 2019-03-20 01:38:27 | 2019-03-20 20:52:28 | [V-PCC] A tile group design for V-PCC | A. M. Tourapis, J. Kim, K. Mammou (Apple) |

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| [m47749 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47749-v1-m47749.zip) |   |

 |
| Introduces the concept of tile groups. A region can be obtained by grouping together several tiles. The groups of tiles are encoded independently. Currently the entire patch\_frame sequence should be decoded. With the proposed method it is possible to only decode the patch\_frame data needed for a group of tiles. Resolution: add the proposed method in the CE on Tiles (CE 2.19). |
| [m47759](http://wg11.sc29.org/doc_end_user/current_document.php?id=67610&id_meeting=178) | 2019-03-20 07:10:06 | 2019-03-20 15:50:31 | [V-PCC] New proposal on smoothing points near depth gap | Ya-Hsuan Lee, Jian-Liang Lin, Yung-Chang Chang, Chi-Cheng Ju (MediaTek), Yi-Ting Tsai, Ching-Chieh Lin, Chun-Lung Lin (ITRI) |

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| [m47759 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47759-v1-m47759.zip) |   |

 |
| Proposes to apply smoothing process also on the points which have depth difference between the neighboring pixels in the geometry frame. The detection of these points is conducted in the 2D domain. Some subjective inspection on the quality is presented. Comments: the objective gains are low. The number of the points affected by the proposal is low (0,1-0,2%). Resolution: add the proposed method in CE 2.17 and investigate the possibility to consider smoothing as a post-processing tool. |
| [m47766](http://wg11.sc29.org/doc_end_user/current_document.php?id=67617&id_meeting=178) | 2019-03-20 09:25:51 | 2019-03-20 19:49:47 | [V-PCC][New proposal] Bounding box shifting for occupancy map generation | Sheng-Po Wang, Yi-Ting Tsai, Ching-Chieh Lin, Chun-Lung Lin(ITRI)​, Ya-Hsuan Lee, Jian-Liang Lin, Yung-Chang Chang, Chi-Cheng Ju(MediaTek) |

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| [m47766 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47766-v2-m47766_r2.zip) |   |

 |
| Proposes a method to shift the occupancy map bounding box during patch generation in order to reduce number of occupied position in the occupancy map. The proposed method can decrease the number of output points and enhance reconstruction accuracy. The simulation results report that the BD-rate reduction achieves 1.5% and 3.0% for AI test condition in terms of D1 and D2 for geometry, respectively. Encoder only tool.Resolution : evaluate the proposed method in 2.20 |
| [m47772](http://wg11.sc29.org/doc_end_user/current_document.php?id=67623&id_meeting=178) | 2019-03-20 10:18:52 | 2019-03-20 19:42:58 | [V-PCC] [New proposal] Patch Expansion for Improving Visual Quality | Erh-Chung Ke, Sheng-Po-Wang, Yi-Ting Tsai, Ching-Chieh Lin, Chun-Lung Lin(ITRI), Ya-Hsuan Lee, Jian-Liang Lin, Yung-Chang Chang, Chi-Cheng Ju(MediaTek) |

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| [m47772 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47772-v2-m47772.zip) |   |

 |
| Proposes a patch expansion method to improve visual quality with a small bitrate increase. Encoder only tool.Resolution : add in the CE 2.12 Visual quality |
| [m47786](http://wg11.sc29.org/doc_end_user/current_document.php?id=67637&id_meeting=178) | 2019-03-20 12:38:28 | 2019-03-23 07:35:22 | A proposal to support hologram object compression using PCC | Euee S. Jang, Jisoo Hong, Youngmin Kim, Sunghee Hong |

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| [m47786 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47786-v1-m47786.zip) |   |

 |
| Presents a possible use-case of point cloud data with complex field data for the support of **computer-generated hologram** . It is necessary to add support for phase and amplitude. Comments : V-PCC can handle the data format used for phase and amplitude, however a better understanding on the physical interpretation of this data is needed. Metrics should also be defined.Resolution : Continue as an exploration activity.  |
| [m47799](http://wg11.sc29.org/doc_end_user/current_document.php?id=67650&id_meeting=178) | 2019-03-20 17:30:31 | 2019-03-21 05:16:13 | [V-PCC] [New proposal] Selective geometry smoothing inside patches | Arash Vosoughi, Sehoon Yea, Shan Liu |

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| [m47799 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47799-v1-m47799.zip) |   |

 |
| The current V-PCC standard applies the smoothing only to the patch boundaries. It shows that it is beneficial to apply the smoothing inside the patches too because the quantization errors impact the reconstructed geometry values within the patches as well as the patch boundaries. Proposes to apply smoothing inside the patches in a selective manner so that minimal additional computational complexity is incurred. Comment: the solution can be seen as a post-processing tool. Resolution: add the proposed method in CE 2.17 and investigate the possibility to consider smoothing as a post-processing tool.  |
| [m47800](http://wg11.sc29.org/doc_end_user/current_document.php?id=67651&id_meeting=178) | 2019-03-20 17:31:33 | 2019-03-21 05:19:12 | [V-PCC] [New proposal] Distance-weighted color transfer | Arash Vosoughi, Sehoon Yea, Shan Liu |

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| [m47800 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47800-v1-m47800.zip) |   |

 |
| Improved the color transfer of V-PCC by increasing the number of candidate points and computing the distance-weighted average rather than an unweighted one. It is an encoder only tool.Resolution: crosscheck the results within CE 2.17 by including the possibility to select only points that have similar colors. Subjective testing should be conducted. |
| [m47801](http://wg11.sc29.org/doc_end_user/current_document.php?id=67652&id_meeting=178) | 2019-03-20 17:32:22 | 2019-03-21 05:21:40 | [V-PCC] [New proposal] Improved missed points coding using flexible scanning | Arash Vosoughi, Sehoon Yea, Shan Liu |

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| [m47801 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47801-v1-m47801.zip) |   |

 |
| The missed points generated by the V-PCC (either for lossless or lossy) are traversed according to the nearest neighbor rule and put in an image that is compressed by the HEVC. The missed points signal can thus be regarded as a non-stationary time-series with local correlations. The order by which this time-series is put in an image can significantly impact the coding gain. Proposes two strategies to change the anchor raster scan order: instead of jumping between consecutive lines from end of the first one to the beginning of the second one, to jump from the end of the first one to the end of the second one.Show that some coding gains are achieved for both lossless and lossy scenarios. The results are not presented globally (with respect to the entire bitstream size) but only the reduction for the PCM patches only. Resolution: include in CE 2.25 |
| [m47802](http://wg11.sc29.org/doc_end_user/current_document.php?id=67653&id_meeting=178) | 2019-03-20 17:33:17 | 2019-03-21 05:23:18 | [V-PCC] [New proposal] Improved boundary identification | Arash Vosoughi, Sehoon Yea, Shan Liu |

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| [m47802 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47802-v1-m47802.zip) |   |

 |
| Improved the boundary identification to obtain more lou diss borders. It looks like a bug fix.Resolution: check during the week if the original algorithm for detecting borders has a bug. Report on the finding Thursday. Generate R5 results.Friday morning resolution: align the software with the text.  |
| [m47806](http://wg11.sc29.org/doc_end_user/current_document.php?id=67657&id_meeting=178) | 2019-03-20 17:43:56 | 2019-03-21 05:27:21 | [V-PCC][New proposal] Bug fix for grid smoothing and color pre-smoothing | Arash Vosoughi, Sehoon Yea, Shan Liu |

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| [m47806 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47806-v1-m47806.zip) |   |

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| Resolution: Grid smoothing bux fix adopted. |
| [m47807](http://wg11.sc29.org/doc_end_user/current_document.php?id=67658&id_meeting=178) | 2019-03-20 17:44:46 | 2019-03-21 05:28:41 | [V-PCC][New proposal] Bug fix for color pre-smoothing | Arash Vosoughi, Sehoon Yea, Shan Liu |

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| [m47807 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47807-v1-m47807.zip) |   |

 |
| Color pre-smoothing is currently bypassed when grid smoothing is enabled according to the CTC.Resolutions:Accept the bug fix and update the TM. Update the CTC to disable color smooth. Start an investigation on the need to keep color pre-smoothing (mandate of CE 2.17). Investigate the use of other color domains (other than RGB).  |
| [m47826](http://wg11.sc29.org/doc_end_user/current_document.php?id=67677&id_meeting=178) | 2019-03-20 23:18:58 | 2019-03-20 23:20:36 | Patch precedence for low delay V-PCC decoding | Jungsun Kim, Alexis Tourapis, Khaled Mammou |

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| [m47826 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47826-v1-m47826_PatchprecedenceforlowdelayV-PCCdecoding.docx.zip) |   |

 |
| V-PCC exploits the 2D bounding box information associated with patches in order to deduce the block to patch map. The decoding order of the patches is fixed and requires decoding the patch information of all the patches in order to be able to determine the blocks associated with any patch. Such constraint is not adapted for low-delay decoding scenarios, where we would like to start decoding and rendering patches as soon as possible.Proposal introduce a new flag to control the patch precedence when updating the block to patch map.Comments : there is a need to investigate the impact in compression results. The proposed method may have an impact on other tools. There is no impact on patch packing. Resolution : to validate in CE 2.24 |
| [m47853](http://wg11.sc29.org/doc_end_user/current_document.php?id=67704&id_meeting=178) | 2019-03-21 10:30:18 | 2019-03-21 10:38:21 | [V-PCC] V-PCC unit and parameter set design | Byeongdoo Choi, Sehoon Yea, Arash Vosoughi, Shan Liu |

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| [m47853 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47853-v1-M47853.zip) |   |

 |
| 4 proposals are made :P1 : Definition of V-PCC units (editorial)P2 : Encapsulation and carriage methods of VCL/non-VCL NAL unitsP3 : Parameter set activation processP4 : Parameter set extension mechanismResolutions : continue the investigation based on the latest version of the V-PCC |
| [m47895](http://wg11.sc29.org/doc_end_user/current_document.php?id=67746&id_meeting=178) | 2019-03-21 23:04:34 | 2019-03-21 23:12:28 | [V-PCC][New proposal] Generalized Enhanced Occupancy Map for Depth | Jean-Claude Chevet, David Gendron, Celine Guede, Joan Llach, Yannick Olivier, Julien Ricard,  |

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| [m47895 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47895-v1-m47895-GeneralizedEOMfD.zip) |   |

 |
|   Resolution: Start an CE and compare the proposed method with existent solution in terms of bitrate and complexity.  |
| [m47899](http://wg11.sc29.org/doc_end_user/current_document.php?id=67750&id_meeting=178) | 2019-03-22 07:53:46 | 2019-03-22 08:02:09 | [V-PCC] Proposed syntax design for frame partitioning | Byeongdoo Choi, Sehoon Yea, Arash Vosoughi, Shan Liu |

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| [m47899 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47899-v1-M47899.zip) |   |

 |
| Suggests few HLS design choices and a tentative syntax design for V-PCC frame partitioning. Comments : similar concepts are addressed by CE on Tiles. Resolution: consider signaling information for Tiles in SEI message. BoG should work on defining the SEI message and to review Thursday.  |
| [m47932](http://wg11.sc29.org/doc_end_user/current_document.php?id=67783&id_meeting=178) | 2019-03-23 01:13:28 | 2019-03-23 01:16:33 | [V-PCC][New proposal] Bugfix for CW.AI test condition of TMC2 | Jean-Claude Chevet, David Gendron, Celine Guede, Joan Llach, Yannick Olivier, Julien Ricard,  |

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| [m47932 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47932-v1-m47932-BugfixforCW.AItestconditionofTMC2.zip) |   |

 |
| Discussed during the AhG.TMC2 versions v5 and v4 are affected by the CW.AI bug; versions v3 and earlier, which did not use the SCC profile, are not affected.Friday morning resolution: adopted and update the CTC.  |
| **G-PCC New** |
| [m47352](http://wg11.sc29.org/doc_end_user/current_document.php?id=67203&id_meeting=178) | 2019-03-18 06:23:23 | 2019-03-20 03:56:35 | [G-PCC] (New proposal) Spatial scalability support for G-PCC | Ohji Nakagami, Satoru Kuma |

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| [m47352 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47352-v1-m47352_GPCC_ScalableLifting.zip) |   |

 |
| In G-PCC WD5, the spatial scalability is supported only for the geometry point cloud coding. Several changes for the Lifting scheme are proposed in order to support the attribute coding scalability. The result shows the spatial scalability is achieved with roughly 10% total bitstream increase compared to the CTC anchor. The proposal is also evaluated in a simultaneous coding scenario (all LODs are encoded and stored separately), and it shows 30% bitrate reduction compared to the simultaneous case.Comments: the comparison does not look fair because the simultaneous coding scenario is not the appropriate way to handle LODs. A more continuous (incremental method) can be use instead and therefore the numbers in terms of compression are better than the ones of the simultaneous coding scenario Resolution: Sony and Apple will work together during the week and come with a proposal on setting up the evaluation experiment. Two ways of generating the LODs are considered : a) based on different quantisation and b) based on distance. Note that in b) when the points from all LODs are merged, the original point lou dis obtained. Resolution : to add the proposed method in CE 13.15 on LOD generation |
| [m47357](http://wg11.sc29.org/doc_end_user/current_document.php?id=67208&id_meeting=178) | 2019-03-18 06:45:47 | 2019-03-20 18:51:33 | [G-PCC][New proposal]An intra prediction scheme based on neighbors’ geometric distribution | Honglian Wei, Yiting Shao, Ge Li, Shan Liu,  |

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| [m47357 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47357-v1-m47357.zip) |   |

 |
| Two different neighbors sets are used for prediction of attributes instead of one.The compression gains are minor (mainly <1%, sometimes it may go up to 4% for Chroma). Resolution: it is too early to start a formal CE based on the gain presented. |
| [m47378](http://wg11.sc29.org/doc_end_user/current_document.php?id=67229&id_meeting=178) | 2019-03-18 09:34:05 | 2019-03-20 16:44:14 | [G-PCC][new proposal] On an improvement of RAHT to exploit attribute correlation | S. Lasserre, D. Flynn |

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| [m47378 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47378-v1-m47378OnanimprovementofRAHTtoexploitattributecorrelation.zip) |   |

 |
| The proposed method adds an inter-depth up-sampling method per 2x2x2 node to the RAHT process for coding attributes. The up-sampling is used as a predictor for AC coefficients. Significant gains are obtained when compared with existent RAHT (up to 50% reduction). The results are different for Luma and Chroma (usually gain for Luma and lost for Chroma). Comments: there are evidences that correlation exists between AC coefficients at different depths.Resolution: start a CE 13.18 on RAHT AC prediction.  |
| [m47397](http://wg11.sc29.org/doc_end_user/current_document.php?id=67248&id_meeting=178) | 2019-03-18 13:07:22 |  | [G-PCC] Description of new tool of combine/split frame for Combine Coding | Noritaka Iguchi, Toshiyasu Sugio |  |
| Several consecutive frames are combined and coded together (the tool was presented at the last meeting). The frame index is encoded as an attribute per point. The contribution introduces the software implementing the tool. Resolution: the software will be integrated starting from TM5.1 |
| [m47401](http://wg11.sc29.org/doc_end_user/current_document.php?id=67252&id_meeting=178) | 2019-03-18 13:09:19 | 2019-03-21 02:27:50 | [G-PCC] Quantization Parameter table in Attribute Coding | Noritaka Iguchi, Chung Dean Han |

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| [m47401 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47401-v2-m47401_QPTable.zip) |   |

 |
| Proposes a QP table that converts QP to Qstep. No implications or minor gains (probably coming from a bug) on the compression results. A similar proposal is done in contribution m47507 by Sony. Resolution: adopt the proposal and crosscheck the implementation. Update Wed: crosscheck done.Revisit Friday. |
| [m47405](http://wg11.sc29.org/doc_end_user/current_document.php?id=67256&id_meeting=178) | 2019-03-18 13:10:59 | 2019-03-20 13:36:13 | [G-PCC] Bug report on binary tree based LoD and RAHT in TMC13 | Toshiyasu Sugio, Noritaka Iguchi |

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| [m47405 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47405-v1-m47405_v1.zip) |   |

 |
| Signals a bug on the coding process of binary tree based LoD and RAHT in case of a few 3D points in a slice. Proposal to not apply RAHT for slices with 1 point. It is equivalent with duplicating the point and apply RAHT. Resolution: David will check which method is easier to implement.  |
| [m47406](http://wg11.sc29.org/doc_end_user/current_document.php?id=67257&id_meeting=178) | 2019-03-18 13:11:09 | 2019-03-20 13:36:42 | [G-PCC] Unification of CE13.15 and single layer LoD in TMC13 | Toshiyasu Sugio |

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| [m47406 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47406-v1-m47406_v1.zip) |   |

 |
| Proposes a flag which activates Fixed sampling based LoD generation evaluated in CE13.15, and a parameter which indicates the number of sampling points.It has an impact on the software implementation but not on the specification. Resolution: accept the proposal in the software implementation after crosscheck by David (if not done during the week it should be one of the AhG mandate).  |
| [m47507](http://wg11.sc29.org/doc_end_user/current_document.php?id=67358&id_meeting=178) | 2019-03-18 20:20:17 | 2019-03-20 23:59:26 | [G-PCC] New contribution on quantization parameter definition | Ali Tabatabai, Alexandre Zaghetto, Danillo Graziosi |

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| [m47507 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47507-v1-m47507.zip) |   |

 |
| Adopted |
| [m47508](http://wg11.sc29.org/doc_end_user/current_document.php?id=67359&id_meeting=178) | 2019-03-18 20:23:34 | 2019-03-20 20:34:14 | [G-PCC] CE13.14 related contribution – comments on fixed point implementation | Alexandre Zaghetto, Ali Tabatabai, Danillo Graziosi |

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| [m47508 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47508-v1-m47508.zip) |   |

 |
| Code refactoring. Will be handled by the Software coordinator.  |
| [m47795](http://wg11.sc29.org/doc_end_user/current_document.php?id=67646&id_meeting=178) | 2019-03-20 16:40:56 | 2019-03-20 16:43:20 | [G-PCC][new proposal] On adding a coding layer to RAHT to obtain lossless attribute coding | S.Lasserre, D.Flynn |

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| [m47795 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47795-v1-m47795OnaddingacodinglayertoRAHTtoobtainlosslessattributecoding.zip) |   |

 |
| RAHT cannot perform lossless coding on attributes. Proposal to add a coding layer to RAHT in roder to support lossless. A near-lossless extension is also proposed. The resulted method is less performant than lossless lift (increase of 5-30%). Comments: The complexity of the proposed method should be assessed. There is an interest of adding lossless mode for RAHT?Resolution: Start an EE 13.3 on lossless RAHT. |
| [m47796](http://wg11.sc29.org/doc_end_user/current_document.php?id=67647&id_meeting=178) | 2019-03-20 16:59:26 | 2019-03-20 17:05:45 | Region of Interest Coding for RAHT | Gustavo Sandri, Victor F. Figueiredo, Philip A. Chou, Ricardo de Queiroz |

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| [m47796 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47796-v1-m47796-v1-region-of-interest-coding-for-raht.zip) |   |

 |
| Introduces Region-of-Interest (ROI) coding for point cloud attributes, using an input-weighted distortion measure where the weights are determined by the ROI. RAHT is still applied on the entire point setResolution: Continue the investigation and compare with a slice based approach. |
| [m47821](http://wg11.sc29.org/doc_end_user/current_document.php?id=67672&id_meeting=178) | 2019-03-20 20:34:17 | 2019-03-20 20:46:39 | [G-PCC][New proposal] Direct mode of attributes coding for low complexity point cloud compression | Pu Li, Xiaozhen Zheng, Jiafeng Chen, Wenyi Wang, Lu Yu |

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| [m47821 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47821-v1-m47821.zip) |   |

 |
| Proposes a direction coding method for point cloud’s attributes that can reduce both encoder and decoder computation complexity. Comments: The proposed mechanism has huge impact on compression results. Similar complexity reduction can be obtained by current tools by applying some restrictions. Resolution: continue the study of reducing the complexity by using the current tools.  |
| [m47827](http://wg11.sc29.org/doc_end_user/current_document.php?id=67678&id_meeting=178) | 2019-03-20 23:55:37 | 2019-03-21 00:03:59 | G-PCC Bypass coding of bypass bins | D. Flynn, S. Lasserre |

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| [m47827 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47827-v1-m47827_v1.zip) |   |

 |
| Presents an approach to so-called bypass coding that bypasses the arithmetic codec completely without incurring additional o Disng overheads. No impact on the compression results. Processing time is not presented but reduction of time (of 10%-20%) is reported. Resolution: update CE 13.10 to investigate the impact. |
| [m47828](http://wg11.sc29.org/doc_end_user/current_document.php?id=67679&id_meeting=178) | 2019-03-20 23:58:29 | 2019-03-23 09:11:49 | [G-PCC][New Proposal] Implicit Occupancy Derivation | Hyejung Hur, Sejin Oh(LGE), Jongseok Lee, Hansol Choi, JooHyung Byeon, Donggyu Sim |

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| [m47828 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47828-v1-m47828.zip) |   |

 |
| proposes implicit occupancy derivation method in order to reduce unnecesary zero occupancy signaling, which are caused from outside of content bounding box.There is no impact on the compression performances. There is no reduction of the complexity.Comments : adding conditions in the geometry loop can be expensive.Resolution : nothing to do. |
| [m47834](http://wg11.sc29.org/doc_end_user/current_document.php?id=67685&id_meeting=178) | 2019-03-21 04:30:30 | 2019-03-22 09:45:32 | [G-PCC] Delta QP for Layer of Lifting/Predicting and Raht Transform | Dean Han, Noritaka Iguchi |

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| [m47834 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47834-v1-m47834_%5BG-PCC%5D_DeltaQP_on_Layer_v3.zip) |   |

 |
| A method to [allow individual QP value settings for each LoD layer](https://www.writeurl.com/text/8u3awt6gsalo0a9l8fs0/tjby8r6tqtp1dt5d7rhn/xapjmh8004dudjfc0mx9) of Lifting/Predicting Transform or RAHT layer. The compression results are not presented.Comments : adding local control of QP may be needed. Performing different QP the LOD level is not necessarily the best method.Resolution : further study is needed. Revisit the contribution Thursday is compression results can be obtained. Start a CE 13.19 on LOD specific quantisation |
| [m47835](http://wg11.sc29.org/doc_end_user/current_document.php?id=67686&id_meeting=178) | 2019-03-21 05:17:36 | 2019-03-21 18:32:35 | [G-PCC] [New Proposal] Weighted Median Prediction for Attribute Coding | Sehoon Yea, Arash Vosoughi, Shan Liu |

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| [m47835 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47835-v5-m47835.zip) |   |

 |
| In current G-PCC attributes coding, LoD of each 3D points is generated based on the distance of each points, then the attributes value of 3D points in each o Dis encoded by applying prediction in LoD-based order.Proposes to use a weighted median of candidate attribute values instead of RDO ?!Resolution : continue the investigation in the EE 13.1 (see above) Prediction strategy |
| [m47836](http://wg11.sc29.org/doc_end_user/current_document.php?id=67687&id_meeting=178) | 2019-03-21 05:20:35 | 2019-03-21 18:31:22 | [G-PCC] [New Proposal] Weighted-Median-Index Coding for Attribute Prediction  | Sehoon Yea, Arash Vosoughi, Shan Liu |

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| [m47836 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47836-v1-m47836.zip) |   |

 |
| A specific way of coding the predictor index is proposed to specify the neighboring sample of choice for the anchor RDO method. For the reflectance data under the CY (near-lossless attribute coding) test category, it achieves the overall average BD-gains of up to -2.8% (MSE) and -1.3%(Hausdorff).Resolution : continue the investigation in the EE 13.1 (see above) Prediction strategy |
| [m47837](http://wg11.sc29.org/doc_end_user/current_document.php?id=67688&id_meeting=178) | 2019-03-21 05:22:22 |  | [G-PCC] New Proposal | Sehoon Yea, Arash Vosoughi, Shan Liu |  |
| Withdrawn |
| [m47838](http://wg11.sc29.org/doc_end_user/current_document.php?id=67689&id_meeting=178) | 2019-03-21 05:24:05 | 2019-03-21 14:55:59 | [G-PCC] [New Proposal] Interframe Prediction for Attribute Coding | Sehoon Yea, Arash Vosoughi, Shan Liu |

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| [m47838 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47838-v1-m47838.zip) |   |

 |
| Resolution: include the tool in the EE 13.2 Inter-prediction |
| [m47863](http://wg11.sc29.org/doc_end_user/current_document.php?id=67714&id_meeting=178) | 2019-03-21 11:33:28 | 2019-03-22 10:07:30 | Initial Point selection for LoD generation in TMC3 | H. Yuan, H. Liu(ShanDong univ.),  |

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| [m47863 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47863-v2-m47863.zip) |   |

 |
| Not presented. |
| **V-PCC Profiles and Conformance** |
| [m47370](http://wg11.sc29.org/doc_end_user/current_document.php?id=67221&id_meeting=178) | 2019-03-18 07:29:27 | 2019-03-20 13:19:30 | [V-PCC] CE P.0 report | Sebastian Schwarz, Alexis Tourapis, Khaled Mammou, Jungsun Kim, Ali Tabatabai, Euee S. Jang, Rajan Laxman Joshi, Marius Preda, Madhukar Budagavi, Joan Llach, Ralf Schäfer, Ohji Nakagami, Vladyslav Zakharchenko, Danillo Graziosi,  |

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| [m47370 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47370-v1-M47370_P0_profiles_report.zip) |   |

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| See below |
| [m47545](http://wg11.sc29.org/doc_end_user/current_document.php?id=67396&id_meeting=178) | 2019-03-18 21:34:57 | 2019-03-20 23:28:26 | [V-PCC] Request for a new profile capable of lossless coding | Rajan Joshi, Madhukar Budagavi |

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| [m47545 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47545-v1-m47545.zip) |   |

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| See below |
| [m47617](http://wg11.sc29.org/doc_end_user/current_document.php?id=67468&id_meeting=178) | 2019-03-19 01:32:29 | 2019-03-20 18:33:06 | V-PCC conformance signaling | Jill Boyce |

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| [m47617 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47617-v1-M47617.zip) |   |

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| See below |
| [m47734](http://wg11.sc29.org/doc_end_user/current_document.php?id=67585&id_meeting=178) | 2019-03-19 18:49:52 | 2019-03-20 22:08:34 | [V-PCC] Thoughts on V-PCC Profiles | Ralf Schaefer, Joan Llach |

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| [m47734 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47734-v1-ThoughtsonV-PCCprofiles.zip) |   |

 |
| See below |
| We are now discussing contribution m47734Suggests the definition of additional profiles based on agreed use cases. A synthesis of the V-PCC use cases is presented. Proposal to work on 5 profiles : Real Time Communication, Low Complexity AR/VR, Low Complexity AR/VR with CI (Creative Intend), Main AR/VR, Main AR/VR with CI (Creative Intend).We are now discussing contribution m476171. The V-PCC codec lacks syntax elements that allow easy derivation of the number of 3D points represented in a coded picture, without decoding the picture.

Comments : it could be useful to have this information in the V-PCC bitstream (per frame).2. Suggests to help low powerful devices to only render xx% from the point cloud event if a full decoder is done. Resolution : nothing to do for the moment. Revisit when conformance point B is more clear. We are now discussing contribution m47545Requests a profile that can support lossless functionality.Discussion :- we need support from various companies in order to create a profile.- the basic profile addresses mobile applicationResolution : add in the CE on profile a mandate on defining High Quality Point Cloud Profile (up to lossless). |
| **Unclassifiable and mysterious** |
| [m47752](http://wg11.sc29.org/doc_end_user/current_document.php?id=67603&id_meeting=178) | 2019-03-20 04:11:20 |  | [V-PCC] | Junsik Kim |  |
| withdrawn |

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| **Late contributions** |

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| [m47962](http://wg11.sc29.org/doc_end_user/current_document.php?id=67813&id_meeting=178) | 2019-03-24 12:02:08 | 2019-03-26 10:41:11 | [V-PCC] An SEI design for V-PCC | A. M. Tourapis, J. Kim, K. Mammou, J. Llach, S. Yea, A. Vosoughi, B. Choi |

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| [m47962 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47962-v1-m47962.zip) |

 |
| Proposal to reuse the same mechanism of SEI message as in video. Proposal to introduce the SEI message at the level of patch\_sequence\_unit\_payload. It is also proposed to specify SEI messages in a new part of MPEG-I. Resolution: adopt the idea of using SEI messages for PCC. Add SEI messages as a topic for the joint group with Systems. |

 Bas du formulaire

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| [m47987](http://wg11.sc29.org/doc_end_user/current_document.php?id=67838&id_meeting=178) | 2019-03-25 16:59:40 | 2019-03-25 20:25:30 | [V-PCC] CE2.20-related on harmonization of m44779 and m46389 | Ya-Hsuan Lee, Jian-Liang Lin, Yung-Chang Chang, Chi-Cheng Ju (MediaTek), Yi-Ting Tsai, Ching-Chieh Lin, Chun-Lung Lin (ITRI) |

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| [m47987 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47987-v2-m47987_r1.zip) |  |
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 |
| Resolution: investigate the proposed method in CE 2.20. CE 2.20 resolution: it is possible to propose combination of tools and to evaluate the performances against other methods and anchor. |

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| [m48044](http://wg11.sc29.org/doc_end_user/current_document.php?id=67895&id_meeting=178) | 2019-03-28 23:26:10 |  | [V-PCC] Signalling nominal attribute bitdepth | Rajan Joshi, Alexis Tourapis, Madhukar Budagavi, Jungsun Kim, Khaled Mammou, Vladyslav Zakharchenko, Danillo Graziosi |
| It is needed to indicate the 2D bitdepth per attribute in the bitstream for the case when the original bitdepth is not the same as the one indicated by the video decoder. Resolution : adopted. The correct synthax should be proposed by the editors.  |

Haut du formulaire

## General resolution related to the input contributions

The contributions proposing new tools that have impact on the bitstream syntax must contain a section introducing the modification (syntax and semantics).

Bas du formulaire

# PCC issues not related to contributions

## How the complexity should be reported

* + Execution time reflects moderately the complexity
	+ Add a theoretical study of the complexity
	+ Quantify the impact in terms of memory usage and memory traffic
	+ Analyze the suitability of the hardware implementation
	+ Analyze the potential for parallelization
	+ Highlight the implications with respect to the video codec type used
	+ The current CTC should also have a Complexity section

## Software management

* There is an interest in providing access to the CE SW to the 3DG/MPEG participants, not only to the CE participants
* Migration to git
	+ First step: install an MPEG server to support git (gitlab)
	+ Second step: mirror on github when the group decides
	+ Software for Ces is not public (stays in gitlab only)
* PCC software coordinators
	+ TMC13
		- Software coordinator: David,
		- Help team: Ohji, Phil, Khaled, Vlad,
	+ TMC2:
		- Software coordinator: Julien,
		- Help team: Khaled/Valery, Madhukar/x, Vlad/Dejun, Ohji
	+ Pc\_error:
		- Dong
	+ PCC Player
		- Julien
* Coordinators should actively improve the quality of the software
* Coding guidelines should be produced
* A statement should be made at the beginning of each meeting that contributors transfer the copyright to ISO/IEC (same as for HEVC)
* Software License: the following text should be used:

*The copyright in this software is being made available under the BSD License, included below. This software may be subject to other third party and contributor rights, including patent rights, and no such rights are granted under this license.*

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## BoG report on Tiles for G-PCC

Adopted, CE description updated.

## Profiles, level and tiers

“Base” profile looks mature but additional work is needed. It will be done in the CE P.0.

It is a consensus on the necessity of defining a “High quality” profile. Work should be done in the CE to better define it.

## CE descriptions

|  |  |  |
| --- | --- | --- |
| **Title** |  | **Coordinator** |
| CE 0.2 on Content | continue | Ohji |
| ~~CE 0.3 on PCC distortion metric~~ | ~~closed~~  | ~~Julien~~ |
| CE P.0 on profiles | new | Sebastian |
|  |  |  |
| ~~CE 3.4 on neighbor-dependent entropy coding in TMC13~~ | ~~closed~~ | ~~Séb~~ |
| ~~CE 13.1 on Lossy Attributes coding~~ | ~~closed~~ | ~~Danillo~~ |
| CE 13.2 on Point cloud slice based coding | continue | Yiting |
| ~~CE 13.5 on inter-prediction on geometry coding~~ | ~~continue~~ | ~~David~~ |
| ~~CE 13.6 on Attribute Prediction strategies~~  | ~~closed~~ | ~~Toshiyasu~~ |
| CE 13.10 on entropy coding simplification | continue | David |
| CE 13.14 on fixed point implementation | continue | David |
| CE 13.15 on LOD generation | continue | Ohji |
| ~~CE 13.16 on Slice-based quantization control~~ | ~~closed~~ | ~~Han Chung~~  |
| ~~CE 13.17 on RUN, LEVEL, LAST~~ | ~~closed~~ | ~~Toshiyasu~~ |
| CE 13.18 on RAHT AC prediction | new | Séb |
| CE 13.19 on LOD specific quantisation | new | Dean |
|  |  |  |
| EE 13.1 on prediction strategies for attributes coding | continue  | Sehoon  |
| EE 13.2 on inter-prediction | new | Sehoon |
| EE 13.3 on lossless RAHT | new | Séb |
| EE 13.4 on G-PCC performance evaluation | new | Vlad |
|  |  |  |
| ~~CE 2.8 on patch segmentation~~ | ~~closed~~ | ~~Rajan~~ |
| ~~CE 2.9 on occupancy map coding~~ | ~~closed~~ | ~~Rajan~~ |
| ~~CE 2.10 on metadata coding for max depth signaling~~ | ~~closed~~ | ~~Jungsun~~ |
| ~~CE 2.11 on spatial adaptive reconstruction~~  | ~~closed~~ | ~~Celine~~ |
| CE 2.12 on Visual Quality | continue | Danillo |
| CE 2.15 on Attributes Coding | continue | Sebastian |
| ~~CE 2.16 on upsampling and downsampling~~ | ~~continue~~ | ~~Jungsun~~ |
| CE 2.17 on Smoothing | continue | Julien |
| CE 2.18 on patch packing | continue | Danillo |
| CE 2.19 on tiles | continue | Alexis |
| CE 2.20 occupancy map 2D filters | continue | Kangying |
| ~~CE 2.21 on duplicated points~~  | ~~new~~ | ~~Julien~~ |
| ~~CE 2.22 on missing points encoding for lossless~~ | ~~closed~~  | ~~Joan~~ |
| ~~CE 2.23 on video frame size modification~~ |  |  |
| CE 2.24 on High Level syntax | continue  | Vlad |
| CE 2.25 on PCM Points placement | new | Jungsun |
| CE 2.26 on Enhanced Occupancy Map | new | Joan |
| CE 2.27 on Encoder speed up | new | Rajan |
| CE 2.28 on Designing Conformance Units and SEI message | new | Alexis |
| CE 2.29 on Delta D1 projection directions | new | Rajan |
|  |  |  |
|  |  |  |
| EE 2.1 on 3D motion estimation | continue | Junsik Kim |
| ~~EE 2.2 on one layer patch generation~~ | ~~closed~~ | ~~Mika~~ |
| ~~EE 2.3 on Surface light field (part of CE 2.15)~~ | ~~new~~ | ~~Mika~~ |
| EE 2.4 on homography representation of per patch transform | New | Danillo |
| EE 2.5 rendering optimisation | new | Sebastian |
| EE 2.6 mesh coding with V-PCC | new | Madhukar |
|  |  |  |
| VE 2.1 on removing arithmetic encoder | New | Jungsun |

All CEs should indicate what are the modifications in the WD in order to facilitate the integration in case of adoption.

The participants are highly encouraged to use the 3DG reflector for discussing specific CE issues.

## CE time line

2019-03-29 MPEG #126 meeting ends.

2019-04-15 G-PCC : Expected date for release of finalized CE description, CTC

2019-04-15 G-PCCv6 software.

2019-04-19 Expected date for release of cross-verified G-PCCv6.0 software and

anchors

2019-04-15 V-PCC Expected date for release of finalized CE description, CTC

2019-05-10 V-PCCv6 software.

2019-05-08 Expected date for release of cross-verified V-PCCv5.0 software and

anchors

2019-05-27 G-PCC CE Software and results are released to cross-checkers

2019-06-26 G-PCC Preliminary feedback from cross-checkers to proponents

2019-06-19 V-PCC CE Software and results are released to cross-checkers

2019-06-26 V-PCC Preliminary feedback from cross-checkers to proponents

2019-07-03 MPEG document upload deadline

2019-07-08 MPEG #126 (Geneva) meeting starts.

Resolution:

* it is recommended to respect the CE time line.
* It is recommended to provide 32 frames results in order to facilitate the crosscheck.

## Requirements update

* No update during the 125th meeting
* Joint meeting with Requirements and discussion related to Profiles

## WD and CD

The two editing teams :

* G-PCC:
	+ Coordinator: Ohji,
	+ Help team: Khaled, Vlad, Toshiyasu, David
* V-PCC:
	+ Coordinator: Khaled,
	+ Help team Rajan, Joan, Sebastian S, Ali, Ohji, Vlad, Alexis

V-PCC Official editors: Khaled, Rajan, Joan, Sebastian S, Ali, Ohji, Vlad, Alexis

G-PCC Official editors: Ohji, Khaled, David, Toshiyasu and Vladyslav

## Liaisons

### On G-PCC

No liaison activity.

### On V-PCC

No liaison activity.

## Publications

none

## Press release

**Point Cloud Compression – MPEG promotes its Geometry-based
Point Cloud Compression (G**‑**PCC) technology to the Committee Draft (CD) stage**

At its 126th meeting, MPEG promoted its Geometry-based Point Cloud Compression (G‑PCC) standard to Committee Draft (CD) stage. G‑PCC addresses lossless and lossy coding of time-varying 3D point clouds with associated attributes such as color and material properties, this technology being appropriate especially for sparse point clouds. MPEG’s Video-based Point Cloud Compression (V‑PCC), which reached the CD stage in October 2018, addresses the same problem but for dense point clouds, by projecting onto planes the (typically dense) 3D point clouds, and then processing the resulting sequences of 2D images with video compression techniques. G‑PCC’s generalized approach, which directly codes the 3D geometry to exploit any redundancy found in the point cloud itself, is complementary to V‑PCC’s and particularly useful for sparse point clouds representing large environments.

Point clouds are typically represented by extremely large amounts of data, which is a significant barrier for mass market applications. However, the relative ease to capture and render spatial information compared to other volumetric video representations makes point clouds increasingly popular to present immersive volumetric data. The current implementation of a lossless, intra-frame G‑PCC encoder provides a compression ratio up to 10:1 and acceptable quality lossy coding of ratio up to 35:1.

By providing high-level immersiveness at currently available bitrates, the G‑PCC standard will enable several applications such as 3D mapping, indoor navigation and autonomous driving, advanced AR with environmental mapping, and cultural heritage.

The G‑PCC CD can be found at <http://mpeg.chiariglione.org/meetings/126>.

# IoMT

## Input contributions

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| [m47753](http://wg11.sc29.org/doc_end_user/current_document.php?id=67604&id_meeting=178) | 2019-03-20 04:19:38 | 2019-03-20 04:41:02 | Report on MPEG-IoMT reference software provision | Sang-Kyun Kim, Min Hyuk Jeong, Hoe Yong Jin |

|  |  |
| --- | --- |
| [m47753 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47753-v1-M47753_MPEG-IoMTRef.SWImplementaionTable.zip) |   |

 |
| [m47754](http://wg11.sc29.org/doc_end_user/current_document.php?id=67605&id_meeting=178) | 2019-03-20 04:24:37 | 2019-03-20 04:42:06 | Instruction manual for MPEG-IoMT reference software implementation | Sang-Kyun Kim, Min Hyuk Jeong, Hoe Yong Jin |

|  |  |
| --- | --- |
| [m47754 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47754-v1-M47754_Ref.SWmanual.zip) |   |

 |
| [m47781](http://wg11.sc29.org/doc_end_user/current_document.php?id=67632&id_meeting=178) | 2019-03-20 12:28:30 | 2019-03-20 12:42:59 | Rerefence Software related to SyncedVideoType for IoMT Time Synchronizer | Shin Kim, Kyoungro Yoon,  |

|  |  |
| --- | --- |
| [m47781 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47781-v2-M47781_SyncedVideoType_RefSoftware.zip) |   |

 |
| [m47782](http://wg11.sc29.org/doc_end_user/current_document.php?id=67633&id_meeting=178) | 2019-03-20 12:31:22 | 2019-03-20 12:33:34 | Reference Software related to VideoContentClassType for IoMT Video Content Class Generator | Shin Kim, Kyoungro Yoon |

|  |  |
| --- | --- |
| [m47782 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47782-v2-M47782_VideoContentClassType_RefSoftware.zip) |   |

 |
| [m47783](http://wg11.sc29.org/doc_end_user/current_document.php?id=67634&id_meeting=178) | 2019-03-20 12:35:03 | 2019-03-20 12:35:53 | Modification of Analyzed Music Frequency Type for IoMT Music Frequency Analyzer | Seung Woo Kum, Jaewon Moon, Hyo-Chul Bae, Shin Kim, Yegi Lee, Kyoungro Yoon |

|  |  |
| --- | --- |
| [m47783 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47783-v1-M47783_ModificationofAnalyzedMusicFrequencyTypeforIoMT.docx.zip) |   |

 |
| [m47785](http://wg11.sc29.org/doc_end_user/current_document.php?id=67636&id_meeting=178) | 2019-03-20 12:37:14 | 2019-03-20 12:38:29 | Reference Software of AnalyzedMusicFrequencyType for IoMT Music Frequency Analyzer | Seung Woo Kum, Jaewon Moon, Hyo-Chul Bae, Shin Kim, Yegi Lee, Kyoungro Yoon |

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| --- | --- |
| [m47785 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47785-v1-M47785_AnalyzedMusicFrequencyType_RefSoftware.zip) |   |

 |
| [m47787](http://wg11.sc29.org/doc_end_user/current_document.php?id=67638&id_meeting=178) | 2019-03-20 12:39:36 | 2019-03-20 12:40:31 | Reference Software of SetColorLightType for IoMT Light | Seung Woo Kum, Jaewon Moon, Hyo-Chul Bae, Shin Kim, Yegi Lee, Kyoungro Yoon,  |

|  |  |
| --- | --- |
| [m47787 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47787-v1-M47787_setColorLightType_RefSoftware.zip) |   |

 |
| [m47788](http://wg11.sc29.org/doc_end_user/current_document.php?id=67639&id_meeting=178) | 2019-03-20 12:41:33 | 2019-03-20 12:42:30 | Reference Software of SocialEventType for IoMT Social Event Detector | Seung Woo Kum, Jaewon Moon, Hyo-Chul Bae, Shin Kim, Yegi Lee, Kyoungro Yoon |

|  |  |
| --- | --- |
| [m47788 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47788-v1-M47788_SocialEventType_RefSoftware.zip) |   |

 |
| [m47839](http://wg11.sc29.org/doc_end_user/current_document.php?id=67690&id_meeting=178) | 2019-03-21 05:29:35 | 2019-03-21 05:31:17 | Revised WD of MPEG-IoMT Part 4 Reference software and conformance | Sang-Kyun Kim, Min Hyuk Jeong |

|  |  |
| --- | --- |
| [m47839 http://wg11.sc29.org/Templates/Download.png](http://wg11.sc29.org/doc_end_user/documents/126_Geneva/wg11/m47839-v1-M47839_RevisionofWDofIoMTReferenceSoftwareandConformance.zip) |   |

 |
| [m47915](http://wg11.sc29.org/doc_end_user/current_document.php?id=67766&id_meeting=178) | 2019-03-22 13:39:09 |  | Towards an MPEG IoMT white paper | Mihai Mitrea, Marius Preda,  |  |

## IoMT Liaison

* No activity

# MPEG-V

No activity

# Joint meetings

During the week, 3DG had several joint meetings with Requirements and Systems.

## Scene graph

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S, A, 3G | Scene graph | Wed | 14:00 | 15:00 | A |

Decision to start on designing how PCC can be connected to glTF and BIFS.

## PCC Systems

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S, 3G | PCC Systems | Wed | 14:00 | 15:00 | 3 |

A new media type is introduced: volumetric visual data ‘volm’. A new codec type for V-PCC patch data.

Discussions and answers concerning a set of questions formulated by Systems experts.

Resolution: Need to organize a f2f intermediate meeting for the AhG on Systems for PCC.

## PCC and 3DoF+

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| V, 3G | PCC and 3DoF+ | Thu | 11:00 | 12:00 | 3 |

Input for 3DoF+ is a set of color+depth images and camera parameters. There is a phase of reducing the number of views. The remaining views are encoded as video+depth.

Similarities: patch encoding as video + depth. In 3DoF+ the occupancy is not an additional channel but inherited from the packing.

Differences:

- for 3DoF+ encoding of the occupancy map in the separate channel has an important cost

- the content target by 3DoF+ is more environment like and not object like as is the case for PCC

Resolution: mandate of the AhG to analyze the commonalities and differences.

## PCC and Video

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| V, 3G | PCC and Video | Thu | 17:00 | 18:00 | 3 |

Brainstom session on potential new requirements to video coding from PCC

# General issues

## General discussion

### Reference Software

It is recalled that the source code of both decoder AND encoder should be provided as part of the Reference Software for all technologies to be adopted in MPEG standards. Moreover, not providing the complete software for a published technology shall conduct to the removal of the corresponding technical specification from the standard.

Currently all the AFX tools published in the third edition are supported by both encoder and decoder implementation.

### Web site

The new web site is available at <http://wg11.sc29.org/3dgraphics/>. It is a blog-based web site and all members are allowed to post.

# Resolutions from 3DG

## MPEG-I (ISO/IEC 23090 - Coded representation of immersive media)

### Part 5 - Video-based Point Cloud Compression

### The 3DG subgroup recommends approval of the following documents

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Title** | **In Charge** | **TBP** | **Available** |
|  | **ISO/IEC 23090-5 - Video-based Point Cloud Compression** |  |  |  |
| **18474** | **Common Test Conditions for PCC** | **Sebastian Schwarz** | **N** | **2019-04-05** |
| **18475** | **V-PCC Test Model v6** | **Julien Ricard** | **N** | **2019-05-03** |
| **18477** | **V-PCC performance evaluation and anchor results** | **Julien Ricard** | **N** | **2019-05-10** |
| **18479** | **Continous improvement of Study Text of ISO/IEC CD 23090-5 Video-based Point Cloud Compression** | **Alexandros Tourapis** | **N** | **2019-04-26** |
| **18481** | **CE 2.12 on visual quality** | **Danillo Graziosi** | **N** | **2019-04-15** |
| **18482** | **CE 0.2 on content** | **Ohji Nakagami** | **N** | **2019-03-29** |
| **18484** | **CE 2.15 on attributes coding support** | **Sebastian Schwarz** | **N** | **2019-04-15** |
| **18485** | **CE 2.19 on V-PCC tiles** | **Arash Vosoughi** | **N** | **2019-04-15** |
| **18487** | **V-PCC Codec description** | **Vladyslav Zakharchenko** | **N** | **2019-06-13** |
| **18491** | **CE 2.20 occupancy map 2D filters** | **Kangying CAI** | **N** | **2019-04-15** |
| **18493** | **EE 2.1 on 3D motion estimation** | **Junsik Kim** | **N** | **2019-04-15** |
| **18494** | **New ideas on establishing PCC profiles** | **Ralf Schaefer** | **N** | **2019-04-12** |
| **18495** | **CE P.0 on profiles** | **Sebastian Schwarz** | **N** | **2019-04-15** |
| **18496** | **CE 2.17 on Smoothing** | **Julien Ricard** | **N** | **2019-04-15** |
| **18497** | **CE 2.24 on High Level syntax** | **Vladyslav Zakharchenko** | **N** | **2019-04-15** |
| **18498** | **Configurations for V-PCC CEs and EEs** | **Madhukar Budagavi** | **N** | **2019-03-29** |
| **18499** | **CE 2.18 on patch packing** | **Danillo Graziosi** | **N** | **2019-04-15** |
| **18502** | **Draft DoC for ISO/IEC CD 23090-5 Video-based Point Cloud Compression** | **Rajan Joshi** | **N** | **2019-05-17** |
| **18507** | **CE 2.25 on PCM Points placement** | **Jungsun Kim** | **N** | **2019-04-15** |
| **18508** | **CE 2.26 on Enhanced Occupancy Map** | **Joan Llach** | **N** | **2019-04-15** |
| **18509** | **CE 2.27 on Encoder speed up** | **Rajan Joshi** | **N** | **2019-04-15** |
| **18510** | **CE 2.28 on Designing Conformance Units and SEI message** | **Alexandros Tourapis** | **N** | **2019-04-15** |
| **18511** | **EE 2.4 on homography representation of per patch transform** | **Danillo Graziosi** | **N** | **2019-04-15** |
| **18512** | **EE 2.5 rendering optimisation** | **Sebastian Schwarz** | **N** | **2019-04-15** |
| **18513** | **EE 2.6 mesh coding with V-PCC** | **Madhukar Budagavi** | **N** | **2019-04-15** |
| **18514** | **VE 2.1 on removing arithmetic encoder** | **Jungsun Kim** | **N** | **2019-03-30** |
| **18519** | **Working Draft 1.0 of V-PCC Profiles** | **Sebastian Schwarz** | **N** | **2019-04-12** |
| **18531** | **CE 2.29 on Delta D1 projection directions** | **Rajan Joshi** | **N** | **2019-04-15** |

|  |  |  |
| --- | --- | --- |
|  |  | 3DG sub-group would like to thank Finland, France, Japan, Korea and US for their constructive ballot comments on V-PCC |

### Part 9 - Geometry-based Point Cloud Compression

### The 3DG subgroup recommends approval of the following documents

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Title** | **In Charge** | **TBP** | **Available** |
|  | **ISO/IEC 23090-9 - Geometry-based Point Cloud Compression** |  |  |  |
| **18473** | **G-PCC Test Model v6** | **David Flynn** | **N** | **2019-04-15** |
| **18476** | **G-PCC performance evaluation and anchor results** | **David Flynn** | **N** | **2019-04-19** |
| **18478** | **Text of ISO/IEC CD 23090-9 Geometry-based Point Cloud Compression** | **Ohji Nakagami** | **N** | **2019-06-14** |
| **18480** | **CE 13.2 on Point cloud tile and slice based coding** | **Yiting Shao** | **N** | **2019-04-15** |
| **18483** | **CE 13.10 on entropy coding evaluation** | **David Flynn** | **N** | **2019-04-15** |
| **18486** | **G-PCC codec description** | **Toshiyasu Sugio** | **N** | **2019-05-31** |
| **18488** | **CE 13.14 on fixed point implementation** | **David Flynn** | **N** | **2019-04-15** |
| **18489** | **CE 13.15 on LOD generation** | **Ohji Nakagami** | **N** | **2019-04-15** |
| **18490** | **EE 13.1 on prediction strategies** | **Sehoon Yea** | **N** | **2019-04-15** |
| **18503** | **CE 13.18 on RAHT AC prediction** | **David Flynn** | **N** | **2019-04-15** |
| **18504** | **CE 13.19 on LOD specific quantisation** | **Dean Han** | **N** | **2019-04-15** |
| **18505** | **EE 13.2 on inter-prediction for attributes coding** | **Sehoon Yea** | **N** | **2019-04-15** |
| **18506** | **EE 13.3 on lossless RAHT** | **David Flynn** | **N** | **2019-04-15** |
| **18520** | **EE 13.4 on G-PCC performance evaluation** | **Vladyslav Zakharchenko** | **N** | **2019-05-10** |

|  |  |  |
| --- | --- | --- |
|  |  | 3DG sub-group recommends to appoint Ohji Nakagami, Khaled Mammou, David Flynn, Toshiyasu Sugio and Vladyslav Zakharchenko as editors of ISO/IEC 23090-9 Geometry-based Point Cloud Compression |

## MPEG-IOMT (ISO/IEC 23093 - Internet of Media Things)

### Part 2 - IoMT Discovery and Communication API

### The 3DG subgroup recommends approval of the following documents

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Title** | **In Charge** | **TBP** | **Available** |
|  | **ISO/IEC 23093-2 - IoMT Discovery and Communication API** |  |  |  |
| **18524** | **Text of ISO/IEC FDIS 23093-2 IoMT Discovery and Communication API** | **Sang-Kyun Kim** | **N** | **2019-04-12** |
| **18529** | **DoC on ISO/IEC DIS 23093-2 IoMT Discovery and Communication API** | **Sang-Kyun Kim** | **N** | **2019-03-29** |

|  |  |  |
| --- | --- | --- |
| 2 |  | 3DG subgroup would like to thank Korea, France and Japan for comments on ISO/IEC DIS 23093-2 IoMT Discovery and Communication API |

### Part 3 - IoMT Media Data Formats and API

### The 3DG subgroup recommends approval of the following documents

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Title** | **In Charge** | **TBP** | **Available** |
|  | **ISO/IEC 23093-3 - IoMT Media Data Formats and API** |  |  |  |
| **18525** | **Text of ISO/IEC FDIS 23093-3 IoMT Media Data Formats** | **Sang-Kyun Kim** | **N** | **2019-04-12** |
| **18530** | **DoC on ISO/IEC DIS 23093-3 IoMT Media Data Formats** | **Sang-Kyun Kim** | **N** | **2019-03-29** |

|  |  |  |
| --- | --- | --- |
|  |  | 3DG subgroup would like to thank Korea and Japan for comments on ISO/IEC DIS 23093-3 IoMT Media Data Formats |

### Part 4 - IoMT Reference Software and Conformance

### The 3DG subgroup recommends approval of the following document

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Title** | **In Charge** | **TBP** | **Available** |
|  | **ISO/IEC 23093-4 - IoMT Reference Software and Conformance** |  |  |  |
| **18526** | **Text of ISO/IEC CD 23093-4 IoMT Reference Software and Conformance** | **Sang-Kyun Kim** | **N** | **2019-04-12** |

# AhGs

|  |  |
| --- | --- |
|  **Name** | **AhG on Point Cloud Coding** |
| **Mandates** | 1. Finalize editing of V-PCC Study of CD and G-PCC CD
2. Update the TMs (SW and documentation) during the editing period
3. Coordinate activities on the V-PCC Reference SW and G-PCC Reference SW
4. Update the CTC and provide updated anchor points
5. Conduct the PCC Core Experiments, Exploration Experiments and Validation Experiment
6. Solicit contributions on profiles and conformance for V-PCC
7. Solicit contributions on additional PCC use cases
8. Coordinate scientific and technical dissemination of PCC
9. Coordinate communications of PCC to fairs, exhibitions, workshops and prepare a public web-site with relevant information about PCC
10. Solicit additional data sets for all categories
 |
| **Chairmen** | Ralf Schaefer (Chair), Khaled Mammou, Madhukar Budagavi |
| **Duration** | Until 127th MPEG Meeting |
| **Reflector(s)** | mpeg-3dgc AT gti. ssr. upm. es |
| **Subscribe** | To subscribe, send email to https://mx.gti.ssr.upm.es/mailman/listinfo/mpeg-3dgc |
|  |  |  |  |
| **Meeting** | Saturday before the MPEG meeting | Room Size | 70: 09h00 to 18h00 |
| **Meeting** | Sunday before the MPEG meeting | Room Size | 70: 09h00 to 18h00 |
|  |  |

|  |  |
| --- | --- |
| **Name** | **AhG on IoMT** |
| **Mandates** | 1. Analyse the FDISs and recommend further improvements
2. Solicit contributions related to IoMT White paper
3. Coordinate the activities related to IoMT Reference Software
 |
| **Chairmen** | Mihai Mitrea, Sang-Kyun Kim, Sungmoon Chun |
| **Duration** | Until 127th MPEG Meeting |
| **Reflector(s)** | MIoTW@lists.aau.at |
| **Subscribe** | http://lists.uni-klu.ac.at/mailman/options/MIoTW |
|  |  |  |  |
| **Meeting** | Sunday before the MPEG meeting  | Room Size | 20 |
| 14h00 to 18h00 |  |

# Closing of the Meeting

See you in Göteborg.