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Liaison Statement from SC 29/WG 07 to 3GPP SA4 on MPEG-I Video-based Point Cloud Compression subjective verification tests [SC 29/WG 07 N 258]

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In accordance with Recommendation 5.3.1 at the 5th WG 07 Meeting, 2021-10-11/15, the SC 29 Secretariat sends this liaison statement to 3GPP SA4. [Requested action: For SC 29's information]

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MPEG 3D Graphics Coding

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To 3GPP SA4

SC29/WG7 would like to update you regarding the progress of its ongoing work in MPEG-I Video-based Point Cloud Compression (V-PCC).

The V-PCC standard leverages video compression technologies and the video eco-system in general (hardware acceleration, transmission services, and infrastructure), while enabling new kinds of applications. The V-PCC draft standard specifies several profiles that leverage existing AVC and HEVC implementations, which may make them suitable to be implemented on existing and emerging end-user platforms. The standard is also extensible to recent video specifications such as Versatile Video Coding (VVC) and Essential Video Coding (EVC). The current V-PCC test model encoder implementation shows compression performances in the range of 100:1 to 300:1 using the HEVC coding specification, while achieving good perceptual quality. Real-time decoding and rendering of V-PCC bitstreams has also been demonstrated on current mobile hardware.

SC29/WG7 issued at the 136th MPEG meeting a subjective verification testing assessment of V-PCC. The testing was performed using rigorous subjective assessment methods proven in 2D video evaluation. For doing so, the dynamic 3D point cloud test sequences are rendered to 2D videos by following a preselected camera path. Four profiles have been subjectively tested: one profile with a very simple reconstruction in 3D space and 3 profiles with a more sophisticated reconstruction in 3D space. The first profile used HEVC as the underlying video codec while the latter used either HEVC or VVC as the underlying video codec. The test results confirm that all tested V-PCC profiles show considerable compression gain compared to the selected anchor codec PCL (Point Cloud Library). Further, the test confirms that by the simple replacement of the underlying video codec (VVC instead of HEVC) and by keeping the point cloud codec unchanged, compelling gains can be achieved. The tested confirmed also that good visual quality (MOS scores between 7 and 8) can be achieved with bitrates between 15Mbps and 25Mbps. V-PCC is specified in ISO/IEC 23090-5:2021 - Information technology — Coded representation of immersive media — Part 5: Visual volumetric video-based coding (V3C) and video-based point cloud compression (V-PCC).

SC29/WG7 hopes that this information is of interest to you and that you may consider this technology during the development of next generation video standards.