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Coding of audio, picture, multimedia and hypermedia information

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CODING OF MOVING PICTURES AND AUDIO

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Source **Convener**

Title **Liaison Statement to 3GPP on MPEG-H 3D Audio**

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WG11 is pleased to inform 3GPP of the status of its recently completed specification, ISO/IEC 23008-3:2015, MPEG-H 3D Audio. 3D Audio is a base specification and four amendments, that has been revised into a Second Edition text, to be published in 2018. The 3D Audio specification provides a fully normative path from bitstream to loudspeaker or headphone presentation to the user, thus ensuring that the user enjoys high-quality entertainment. In addition, it defines an output interface from the core audio decoder permitting use of other renderers.

In addition to being a component of the MPEG-H family of specifications, the Low Complexity Profile of MPEG-H 3D Audio is the codec of the 3D audio baseline profile defined in ISO/IEC 23090-2, MPEG-I, Omnidirectional Media Format (OMAF). This permits fully interactive viewing of 360 movies with audio components as channels, objects or Higher Order Ambisonics (HOA) scenes.

A component of ISO/IEC 23090 MPEG-I, Coded Representation of Immersive Media, is Part 4, Immersive Audio Coding, in which MPEG-H 3D Audio is expected to be the core compression engine, with new technology to be specified for flexible rendering to support interactive 6 degrees of freedom motion of the user in a virtual world.

MPEG-H 3D Audio was developed to support coding of audio scenes as audio channels, audio objects, Higher Order Ambisonics (HOA), and any combination thereof. MPEG-H 3D Audio enables personalization and interactivity and provides solutions for loudness normalization and dynamic range control. MPEG-H 3D Audio can also be used to compress and transmit stereo and 5.1 audio content with improved bitrate efficiency when compared to legacy codecs.

Concerning the performance of MPEG-H 3D Audio, in January 2017 WG11 published the results of verification tests that assessed the performance of the Low Complexity Profile of MPEG-H 3D Audio, and the MPEG-H 3D Audio Verification Test Report is attached for your information. Seven test sites participated in the tests with a total of 288 listeners. This resulted in a data set of 15576 individual scores.

To briefly summarize the tests and results: four subjective tests were conducted to assess performance of the Low Complexity Profile of MPEG-H 3D Audio. The tests covered a wide

range of bit rates and use cases (i.e. from 22.2 down to 2.0 channel presentations). The verification test showed that:

- When coding highly immersive content (22.2 and 7.1+4H channel presentations) at 768 kb/s bit rate, MPEG-H 3D Audio easily achieves "ITU-R High-Quality Emission," quality, as needed in broadcast applications.
- When coding immersive content (7.1+4H and 5.1+2H channel presentations) at medium bit rates of 512 kb/s, 384 kb/s and 256 kb/s bit rates, and when coding immersive or conventional content at low bit rates, ranging from 256 kb/s (for 5.1+2H) to 48 kb/s (for stereo), MPEG-H 3D Audio achieves a quality of "Excellent" on the MUSHRA subjective quality scale.
- When presenting immersive content (7.1+4H and 5.1+2H channel presentations) coded at 384 kb/s via headphones, MPEG-H 3D Audio with binaural rendering achieves a quality of "Excellent" on the MUSHRA subjective quality scale.

A complete description of the subjective tests and the associated results can be found in the attached MPEG-H 3D Audio Verification Test Report.

WG11 hopes that this information will be helpful to 3GPP as it continues its work in telecommunications standardization.

Reference:

WG 11 N 16584
MPEG-H 3D Audio Verification Test Report

http://wg11.sc29.org/doc_end_user/documents/117_Geneva/wg11/w16584.zip