EBU

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RECOMMENDED STRATEGY FOR ADOPTION OF NEXT-GENERATION AUDIO (NGA) TECHNOLOGY

EBU POSITION

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Recommended Strategy for Adoption of Next-Generation Audio (NGA)[1] Technology

EBU Committee	First Issued	Revised	Re-issued
TC	2018		

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Introduction

Next-generation Audio consists of one or a combination of the following production schemes[2]:

- **Channel-based Audio**: an audio representation in which the content is mixed during production to a predefined number of signal channels and each channel is associated with a loudspeaker at a specific static position;
- **Object-based Audio**: an audio representation in which elements of the content are separate and accompanied by metadata which describe their relationships and allow a renderer to generate signals most appropriate to the playback system;
- **Scene-based Audio**: an audio representation in which the content is represented by a set of coefficient signals. The scene can then be reproduced by rendering these coefficient signals to a target loudspeaker layout or headphones. An example of scene-based audio is Higher-Order Ambisonics (HOA).

A basic precept of NGA systems, be they proprietary or open-source, is that vital parts of the audio content in a programme are described by metadata that accompanies the audio from the moment it is authored to the moment it is played back on NGA-capable equipment. Metadata may cover the type of audio content (commentary, clean background effects, audio description, individually defined 'objects', scenes, speaker channels, etc.) as well as its position, level and potentially movement (which may be in three-dimensional space in case of immersive audio).

A major advantage of this approach is that NGA production and reproduction are effectively decoupled. Consequently, audio production is agnostic of the number and layout of speakers (or the use of headphones) in the reproduction environment.

For broadcasters this means that a generic NGA programme may be played back on many different reproduction systems and types of device (mobile (for example, smartphones, vehicles), stationary (for example, kitchen radio, home theatres) etc.) without the need for separate mixes for each playback scenario. This adaptation of an NGA programme to different distribution scenarios is also performed by metadata.

NGA will allow consumers to experience the content in optimized quality wherever and however they consume it. Additionally, metadata will facilitate many other valuable features, such as user-personalization of different audio elements in the NGA programme, such as their relative levels and/or their positions in space. This user control can be manifest as access services for those with disabilities.

[1] An equivalent term, 'Advanced Sound Systems' is currently used in ITU documentation.

[2] According to ITU-R BS.2051.

Recommendation

The EBU, of the view:

a. that '**Next-generation Audio**' (NGA) is the future of sound for many services, such as OTT, television and for other services, both accompanying television and for stand-alone applications;

b. that NGA offers creative and commercial opportunities for programme makers and a considerably enhanced Quality of Experience for consumers (see 'Introduction');

c. that NGA technology, if decided upon today, will be in use for many decades. It is therefore critically important to make careful technical and economically-sound choices now, for the sake of today's media and for future generations;

and considering:

d. that the EBU Technical Committee has been diligently working on NGA for five years. It has organised seminars and proof of concept trials. Its EBU study groups, working alongside standards development organizations (ITU, AES, SMPTE, FAME and ETSI) and the media industry's technology providers, have made important advances in developing essential NGA building blocks;

e. that in 2012 the ITU-R agreed on the principles of NGA systems. In 2016, the DVB consortium approved a specification for broadcast or broadband delivery of Ultra High Definition Television ('UHD-1 Phase 2') that includes elements to improve image quality and adds support of NGA codecs. Currently (December 2018) the published ETSI version of the DVB specification (TS 101 154) includes AC-4 and MPEG-H Audio systems; the addition of the DTS-UHD codec, as a third option, is still going through the ETSI process;

f. that the process of adopting NGA technology in national technical specifications has begun in 2017 for some European countries, although it is mostly still not possible to set-up an interoperable, vendor-agnostic NGA production chain;

Recommends:

1. that broadcasters should perform their own rigorous comparisons of the available technologies, in terms of feature richness, stability and workflow maturity and draw on the respected results of recognized organizations that have evaluated and tested relevant technologies. (The EBU can provide useful insights to the work carried out so far);

2. that broadcasters should adopt Recommendation ITU-R BS.2076 '**Audio Definition Model**' (ADM)[3] to describe the metadata of NGA programmes. This is to ensure that NGA works seamlessly in the expected broadcasting environment of multi-vendor systems and that NGA programmes can be exchanged between content providers;

3. that end-device manufacturers should ideally support all available NGA decoder standards in their products. With three different commercial decoder technologies to choose between, this would be the best option to avoid public confusion, slow take up of NGA, and content providers choosing systems that many of their customers cannot use. This would also allow equipment manufacturers to compete for the entire market and mitigate the necessary investments of having multiple standards;

4. and that an essential part of an NGA broadcast workflow is a vendor agnostic production and monitoring renderer. To ensure consistency, reduce problems and complexity for content providers the EBU developed the 'EBU ADM Renderer' (**EAR** – EBU Tech 3388) and recommends using it for production and monitoring

[3] The S-ADM (serial ADM) for live scenarios is expected to be published by the ITU-R in early 2019.