**3GPP TSG SA4#121 SP-221401**

**Toulouse, France, 14-18 November 2022**

**Source: Dolby Laboratories Inc., Fraunhofer IIS, VoiceAge Corporation, Samsung Electronics Co., Ltd, Philips International B.V., ETRI, Qualcomm incorporated, Panasonic Holdings Corporation, Nokia Corporation**

**Title: New WID on 5GMS Audio codec for 5G-Advanced**

**Document for: Approval**

**Agenda Item: 6.2**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

# Title: 5G Media Streaming Audio codec phase 2 for 5G-Advanced

## Acronym: 5GMS\_Audio\_Ph2

## Unique identifier: -

Potential target Release: Rel-18

## 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Affects:** | UICC apps | ME | AN | CN | Others (specify) |
| **Yes** |  | X |  | X |  |
| **No** | X |  | X |  | X |
| **Don't know** |  |  |  |  |  |

## 2 Classification of the Work Item and linked work items

### 2.1 Primary classification

This work item is a …

|  |  |
| --- | --- |
| X | Feature |
|  | Building Block |
|  | *Work Task* |
|  | Study Item |

### 2.2 Parent Work Item

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| 5GMS3 | SA4 | 840001 | 5G Media Streaming stage 3 |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work Items (if any) |
| Unique ID | Title | Nature of relationship |
|  |  |  |

## 3 Justification

The 5G Media Streaming stage 3 specification work done in Rel-16 limited the audio formats to a selection among legacy PSS specification TS 26.234. It is important for the industry be able to rely on an efficient and high-performance set of specified audio codecs and formats for streaming services over 5G-Advanced networks and devices.

The purpose of the various 5G Media Streaming profiles is to specify interoperability points for various classes of 5G capable devices and services. While these are not mandated for any type of 5G devices, it is important that vendors and content providers can claim compliance to certain profiles and their normative requirements to ensure interoperability and performance of streaming services. Furthermore, for these profiles to be relevant for 5G streaming over 5G-Advanced networks, it is also important that they rely on state-of the art efficient and high-performance audio codecs and formats with wide industry support.

The xHE-AAC® [[1]](#footnote-1) codec features and performances over HE-AAC v2 (aka “eAAC+ stereo”) and AMR-WB+ are well documented:

- Audio Engineering Society [Convention Paper 8654 at 132nd Convention](https://www.aes.org/e-lib/browse.cfm?elib=16292), *MPEG Unifed Speech and Audio Coding - The ISO/MPEG Standard for High-Efficiency Audio Coding of all Content Types*, Max Neuendorf et al.

- Technical Paper, Extended HE-AAC – Bridging the gap between speech and audio coding, Fraunhofer Institute for Integrated Circuits IIS

Technical resources are also available at AAC Audio Tests Site:

* AAC Audio Playback Tests, Fraunhofer IIS. Website url: <https://www2.iis.fraunhofer.de/AAC/index.html>

xHE-AAC is supported by iOS and AOS devices and by many service providers like e.g. Netflix:

- Fraunhofer IIS Annual Report 2020*, Apple, Amazon, and Android products with xHE-AAC*. Website Url: <https://www.iis.fraunhofer.de/en/profil/jb/2019/apple-amazon-android-with-xhe-aac.html>

- Netflix Technology Blog, *Optimizing the Aural Experience on Android Devices with xHE-AAC*. Website url: <https://netflixtechblog.com/optimizing-the-aural-experience-on-android-devices-with-xhe-aac-c27714292a33>

A new Audio Operation Point with support of the “xHE-AAC” codec should be defined. In that context, “xHE-AAC” is a combination of the MPEG-D “Extended high efficiency AAC profile” and the MPEG-D “Dynamic Range Control profile”. The “Extended high efficiency AAC profile” is defined in clause 4.5.4 of ISO/IEC 23003-3:2020 Information technology - MPEG audio technologies - Part 3: Unified speech and audio coding. The “Dynamic Range Control profile” is defined in Annex I of ISO/IEC 23003-4:2020 “Information technology - MPEG audio technologies - Part 4: Dynamic range control”.

To guarantee interoperability 3GPP specifications should contain appropriate normative provisions (i.e. may, should or shall support) applicable to 5GMS Clients for the support of the Audio Operation Points when the relevant profiles are supported: i.e. eAAC+ and the newly defined xHE-AAC Operation Point if streaming default and Television (TV) profiles are supported and 3GPP MPEG-H Audio if 360 Virtual Reality (VR) profiles are supported.

## 4 Objectives

The purpose of this Work Item is to upgrade relevant 5GMS streaming, TV and VR audio profiles in specifications of 5G-Advanced in Rel-18.

1. to specify a new Audio Operation Point in TS 26.117 with support for the xHE-AAC codec to improve efficiency and performance for Audio content of 5G Media streaming services over 5G-Advanced networks and devices.
2. to review and, when appropriate, possibly modify requirements (i.e. may, should or shall support) in TS 26.511 applicable to 5GMS Clients for the support of Audio operation Points.

## 5 Expected Output and Time scale

|  |
| --- |
| **New specifications** *{One line per specification. Create/delete lines as needed}* |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
|  |  |  |  |  |  |

|  |
| --- |
| **Impacted existing TS/TR** *{One line per specification. Create/delete lines as needed}* |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| *26.117* | Introduction of xHE-AAC Audio operation point | *99 (March 2023)* |  |
| *26.511* | Upgrade of audio profiles for 5G-Advanced | *99 (March 2023)* |  |

## 6 Work item Rapporteur(s)

Frédéric Gabin (Dolby Labs) – frederic.gabin@dolby.com

## 7 Work item leadership

SA4

## 8 Aspects that involve other WGs

None

## 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| Dolby Laboratories Inc.  |
| Fraunhofer IIS |
| VoiceAge Corporation |
| Samsung Electronics Co., Ltd |
| Philips International B.V. |
| ETRI |
| Qualcomm incorporated |
| Panasonic Holdings Corporation |
| Nokia Corporation |
|  |

1. xHE-AAC® is a registered trademark of Fraunhofer in Germany and other countries and is used with Fraunhofer’s permission. [↑](#footnote-ref-1)