**3GPP TSG SA Meeting #SA4-129-eS4-24NNNN**

**Online, 19th – 23rd August 2024**

**Source: HEAD acoustics GmbH, Nokia Corporation, Dolby Germany GmbH, Orange, Philips International B.V.**

**Title: New WID on Terminal Audio quality performance and Test methods for Immersive Audio Services, Phase 2**

**Document for:** **Discussion**

**Agenda Item: 17**

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: **Terminal Audio quality performance and Test methods for Immersive Audio Services, Phase 2**

Acronym: **ATIAS\_Ph2**

Unique identifier: TBD

Potential target Release: Rel-19

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  | 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 …

|  |  |
| --- | --- |
|  | Study  |
|  | Normative – Stage 1 |
|  | Normative – Stage 2 |
|  | Normative – Stage 3 |
| X | Normative – Other\* |

**\* Other = e.g. testing**

## 2.2 Parent Work Item

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| ATIAS | SA4 | 830005 | Terminal Audio quality performance and Test methods for Immersive Audio Services |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 1030047 | EVS Codec Extension for Immersive Voice and Audio Services (IVAS\_Codec) | Codec for immersive services to be considered in acoustic testing |
| 1040021 | EVS Codec Extension for Immersive Voice and Audio Services, Phase 2 (IVAS\_Codec\_Ph2) | Codec for immersive services to be considered in acoustic testing |
| 770022 | Test Methodologies for the Evaluation of Perceived Listening Quality in Immersive Audio Systems (LiQuImAS) | Objective test methods defined in TS 26.260 are of interest |
| 980008 | Study on Diverse audio Capturing system for End-user Devices (FS\_DaCED) | Describes audio capturing capabilities of UEs that are of interest |
|  | FS\_DaCAS? |  |

# 3 Justification

In the ATIAS work item in Rel-18, mostly basic tests were implemented in TS 26.260; more complex tests that are specific to immersive communication were planned but could not be addressed due to time constraints. However, it seems necessary to continue the work on existing and new test methods, to ensure a sufficient minimum level of user experience for upcoming immersive services (especially in contrast to conventional mono telephony). Moreover, only sparse concrete requirements have been defined in TS 26.261 to date. The majority of the requirements to date are TBD and require reconsideration.

Test methods and performance requirements for immersive UEs are subject to the *chicken or the egg* causality dilemma: on the one hand, there is a need to have them available prior to/during the development phase of UEs. On the other hand, emerging UE technology and definition of performance requirements are mutually dependent and have to be aligned.

To address these points, a Phase 2 development for the ATIAS set of specifications TS 26.260 and TS 26.261 is proposed.

# 4 Objective

The objective of this work item is to improve and extend the existing set of specifications TS 26.260 and 26.261 for testing the performance of terminals for 3GPP immersive services. These cover both conversational and non-conversational services.

The following objectives are intended to be achieved in this work item:

* Complete missing/provisional requirements for sending and receiving characteristics of terminals in TS 26.261.
* Define new test methods and performance requirements/objectives, for the assessment of capture and playback of complex sound scenes, i.e., sound scenes with more than one source and from more than one defined direction.
* Define new test methods and performance requirements/objectives for the assessment of acoustic echo control. Test methods may be either completely new or be based on existing ones for mono telephony (from e.g., TS 26.132). In the latter case, it has to be investigated if and how such methods can be adapted for UEs providing immersive audio playback and/or capture capabilities.
* Define test methods and performance requirements/objectives for the assessment of binaural rendering in receive direction, including headtracking and motion-to-sound latency. Electrical as well as acoustical interfaces should be considered.
* Consideration of aspects, that are based on other ongoing work items, such as complexity level definitions in IVAS\_Codec\_Ph2.

The following constraints should be considered in this work item:

* **Test complexity.** For the generation of sound scenes with more than one source for sending test methods, an appropriate degree of complexity regarding test methodology and equipment is crucial, also in order not to jeopardize the acceptance of the test specification in the industry.
For instance, in order to test UE behavior in diffuse sound fields, requirements on the sound field reproduction accuracy in the lab should to be defined as strict as needed, but also as flexible as possible. In order to meet the needs and capabilities of different test labs, a certain variance in loudspeaker setups and acoustic conditions could be compensated (depending on e.g., the use case, if possible).
Clever approaches are needed here.
* **UE Signal Processing.** The paradigm to be considered is that the sound field recorded by the UE is not an exact replica of all the properties of the original sound field. The UE manufacturers should have the freedom to manipulate certain properties of the sound field, e.g., to suppress background noise or increase speech intelligibility. Since the type and/or degree of such manipulations in UEs is in general unknown, this also implies that artificial test signals like e.g., noise, single/multi sine tones, sweeps, etc. should be avoided whenever possible.
* **Test Relevance.** Tests should focus on testing capture, transmission and playback of desired/dominant/foreground sound components, which are perceptually relevant aspects and can directly impact the user experience.
For instance, the analysis of captured pure diffuse noise signals provide important insights for UE developers but is psychoacoustically considered less relevant (such signals may be suppressed by UE signal processing anyways).
* **Subjective vs Objective.** New and existing test methods should be based on subjective tests whenever possible. Results showing the correlation with subjective tests are encouraged. Existing subjective test results and methods from TR 26.861 and/or TR 26.997 (including upcoming revisions) may be referenced for this purpose.
In addition, test methods/analyses based on psychoacoustic measures should be preferred over technical measures (in dB, %, …), if applicable.

# 5 Expected Output and Time scale

|  |
| --- |
| New specifications |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
| --- | --- | --- | --- | --- | --- |

|  |
| --- |
| Impacted existing TS/TR |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| 26.260 | Introducing new and revising existing test methods for testing immersive UEs | SA#109 (September 2025) |  |
| 26.261 | Definition of new and update of existing performance requirements and objectives | SA#109 (September 2025) |  |

# 6 Work item Rapporteur(s)

TBD

# 7 Work item leadership

SA4

# 8 Aspects that involve other WGs

None identified yet.

# 9 Supporting Individual Members

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| Supporting IM name |
| HEAD acoustics GmbH |
| Nokia Corporation |
| Dolby Germany GmbH |
| Orange |
| Philips International B.V. |
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