**Source: DaCAS-2 Editor[[1]](#footnote-1)**

**Title: DaCAS-2 on** **test methodologies and requirements**

**Document for: Discussion & Agreement**

**Agenda item: 7.6**

# Scope

As outlined in the scope of the DaCAS WID, several points need to be considered:

1. The test methodologies and requirements are based on relevant sending side terminal audio quality test methods defined in TS 26.260.
2. The evaluation may be conducted on the databases processed by the example solution.

# Introduction

The Pdoc is structured according to the relative objectives that are in scope of DaCAS:

* Evaluation of available immersive audio capture example solutions based on relevant sending side terminal audio quality test methods defined in TS 26.260.
* Verification and potential revision of the minimum performance requirement/objective criteria for raw microphone signal performance and characteristics based on how the example solutions perform under the audio quality test methods defined in TS 26.260.
* Potential alignment with TS 26.260 and 26.261.
* In addition, potential test methodologies for subjective tests and requirements are collected

# Test methodologies

Following content is based on the input documents [1] and [2].

## 3.1 Objective Test Methodologies for Immersive Capture Audio Systems

### 3.1.1 Test conditions

### 3.1.2 Recording setups and scenarios for tests

#### Single source scenario

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To obtain suitable recordings for the evaluation, following recording scenario is proposed to be included to the database, and further made by all available target devices. The same recordings can be used for assessing the loudness, frequency response, and directional information of the target device and example solution combinations. The proposed recording scenario covers the single talker scenarios. For assessing objectively performance with double-talk and more complex sound fields, the required recording scenarios and metrics are TBD.

**Table x: Recording scenario for single sound source scenario**

|  |  |
| --- | --- |
| **No** | X (objective testing) |
| **Sound source** | Loudspeaker or HATS according to the clause 4.0.2 in TS 26.260 |
| **Source signal** | British English single talk sequence according to the ITU-T P.501 |
| **Signal characteristics** | **Language**: English**Gender**: Male, Female**Range**: 20Hz-20kHz**Length**: 35.4 s **Level:** -27 dB RMS**Sample Rate**: 48 kHz**Bit depth:** 16 bit |
| **Sound source calibration** | According to the clauses 5.4.2 and 5.5.1 of 3GPP TS 26.260 for tested UE type. |
| **Acoustic environment** | According to the clause 4.0.3 of 3GPP TS 26.260 |
| **Detailed Positioning** | **Source distance**: according to the clause 5.4.2 of 3GPP TS 26.260 for tested capture mode and UE type**Source direction**: Loudspeaker diaphragm towards the UE**Source angles**: 0°, ±30°, ±60°, ±90° |
| **Reference recording** |  |
| **Description/additional info** | More information can be found from 3GPP TS 26.260 |

Editor’s note: Provisional values in TS 26.260 [3] need to be defined for DaCAS evaluation purposes. In addition, further adaptations for the recording scenario may be needed.

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### 3.1.3 Recording database for tests

### 3.1.4 Test methods

#### 3.1.4.1 Delay

For example immersive audio solution, the delay of interest is the algorithmic delay, i.e., delay from inserting the input signal to example solution to obtaining the output signal (signal in IVAS input format). By assessing only the delay caused by the example solution, impact of testing inaccuracies and acoustic path can be mitigated. However, it is recognized, that there are many dependencies on the obtained delay of the example solution, e.g., platform where the example solution is run.

#### 3.1.4.2 Loudness

In TS 26.260 [3] section 5.6.2, potential method for assessing the send loudness of immersive audio systems is defined. The analysis is based on the Send Loudness Rating calculation according to ITU-T P.79. A reason for assessing the loudness would be to ensure sufficient level of the generated IVAS input format signal in a predefined environment.

In contrast to the specified test in TS 26.260 [3], the assessment would be done directly based on the example solution output, i.e., without any encoding/decoding and transmission. Thus, the example solution output would be directly rendered to the analysis format (Mono) via IVAS reference renderer, and the analysis would be conducted according to the specified step for the rendered example solution output signal.

In addition, other loudness metrics and/or different test conditions could be considered. For example, loudness according to ITU-T BS.1770 could be of interest with different rendered formats.

#### 3.1.4.3 Frequency response

For assessing the frequency response, similar method as defined in clause 5.6.3 of TS 26.260 [3] can be applied. Depending on the example solution output, i.e., the obtained IVAS input format, format specific calculation method can be applied according to clause 5.6.3.2. Defined test method is seen suitable as it is, excluding any assumptions regarding the reference client.

#### 3.1.4.4 Directional information

For assessing the directional information of example solutions, test methodology based on clause 5.6.4 of TS 26.260 [3] can be employed for Stereo, SBA and MASA formats. Assessment can be done directly to the example solution output, excluding any assumptions about any further transmission. If other example solution output formats would be tested, e.g., ISM, intermediate step for rendering the example solution output to a suitable format could be considered.

## 3.2 Subjective Test Methodologies for Immersive Capture Audio Systems

### 3.2.1 Test conditions

### 3.2.2 Recording setups and scenarios for test

### 3.2.3 Recording database for tests

### 3.2.4 Test methods

# Requirements

## Requirements for objective test methodologies

#### 4.1.1 Delay

#### 4.1.2 Loudness

#### 4.1.3 Frequency response

#### 4.1.4 Directional information

## Requirements for subject test methodologies

#### 4.1.1 …

**References**

1. S4aA250021: On objective performance evaluation, Nokia
2. S4-250957: On performance evaluation, Nokia
3. 3GPP TS 26.260: “Objective test methodologies for the evaluation of immersive audio systems”, Release 18
1. [Arvi Lintervo](http://arvi.lintervo@nokia.com), Nokia [↑](#footnote-ref-1)