**Source: Bytedance**

**Title: [DaCAS] Performance Evaluation for SBA solutions**

**Document for: Discussion & Agreement**

**Agenda Item: 7.6 – DaCAS**

# 1. Introduction

In the DaCAS work plan [1], definitions of test methods for example solutions are included. Initial discussion has been triggered in [2], [3]. In this document, we propose agreement for additional objective performance test methods for Scene-Based Audio example solutions.

# 2. Objective performance evaluation

Four different test methods for assessing the sound quality of IVAS-based UEs are defined in section 5 of 3GPP TS 26.260[4], and have been discussed as evaluation methodologies for DaCAS solutions in [3]. However, these methods focus on simple sound scene evaluation where only one sound source is considered. DaCAS example solutions, on the other hand, are expected to tolerate more complex scenes with multiple sound sources.

In section 5.4 of [5], objective test methods for scene-based audio format in sending direction have been agreed. Thus, we propose those tests to objectively assess the performance of available DaCAS example solutions in SBA format. Recording scenarios with multiple sound sources are recommended to be used for the diffuse field loudness and the spatial correlation test. Single source recording in [7] are used for the Interaural Differences of Binaural Signals tests.

 2.1 Omnidirectional Loudness

Omnidirectional Loudness defined in section 4.1.3 in section 5.4 of [5] (named as diffuse field loudness) is used to measure the loudness of the W channel when recording a complex sound scene. This test allows us to evaluate an example solution regarding the ability of recording the diffuse part in a complex sound scene, separately from the directional components. This test is different from section 5.4 of [5], who focus on testing with a sound scene with high diffuseness (ambient sound field).

2.2 Spatial Correlation

Spatial correlation is used to measure the similarity per order in an SBA solution between the DUT and the reference, focusing on the directional components that are not examined in 2.1. Emperically, a higher spatial correlation leads to a better subjective experience. However, we expect that this evaluation cannot fully represent the perceptual quality of the solution and cannot replace a subjective listening test.

2.3 Interaural Differences of Binaural Signals

The Interaural Time Difference (ITD) and Interaural Level Difference (ILD) are known as good representatives of the perceptual direction in binaural signals. Hence, they are proposed as the test method for evaluating the SBA solution, given the SBA audio are rendered into binaural cues. If subjective test is agreed, clause 2.3 can be removed.

# 3. Proposal

The source proposes to agree with adding the additional objective test method to be integrated into the DaCAS-2. The source would also like to trigger the discussion on complex sound scenes testing methods for other formats than SBA.

# References

[1] S4-251169\_Work Plan for DaCAS-v0.4

[2] S4-250957 On performance evaluation

[3] S4aA250021 On objective performance evaluation

[4] 3GPP TS 26.260: “Objective test methodologies for the evaluation of immersive audio systems” version 18.1.0 Release 18

[5] S4-251364- PDoc ATIAS-2 v0.5

[6] S4-251057 - DaCAS-1 Target devices and databases v0.1

[7] S4aA250055 Single source scenario for performance evaluation