**Source: DaCAS-1 Editor\***

**Title:** **Permanent Document on** **target devices for DaCAS**

**Document for: Discussion & Agreement**

**Agenda Item: 7.6**

# 1 Introduction

The DaCAS work item [1] aims to design example immersive audio capture solutions for target UE devices, enabling the development of end-to-end solutions for IVAS audio applications. To address the diversity of user equipment (UE) designs and acoustic requirements, proponents have proposed some target device types in [1] and [2]. The agreed potential target devices can be divided into two categories:

* Category 1: Prototype configurations for theoretical validation and possible future device deployment.
  + Device A serves as an idealized accessory device with free-field approximation capabilities, enabling algorithm development without device-specific tuning.
  + Device B represents a practical smartphone design with a non-planar microphone array, highlighting the need for tuning in complex geometries.
* Category 2: Commercial smartphone-based designs for possible legacy device deployment. Complementing the prototypes, proposal of mainstream smartphone configurations to ensure example solutions align with current market available devices.

This permanent document proposes a framework for describing the target devices which are used to collect corresponding example solutions.

# 2 Structure

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4.2 Device Types

4.2.1 Device type 1: Four-Microphone Prototype Device

4.2.1.1 Overview

4.2.1.2 Four-Microphone Prototype Device A

4.2.1.3 Four-Microphone Prototype Device B

4.2.1.4 Device electro-acoustical characteristics

4.2.2 Device type 2: Three-Microphone Smartphone device

4.2.2.1 Overview

4.2.2.2 Detailed parameters

4.2.2.3 Device electro-acoustical characteristics

4.2.3 Device type 3: Four-Microphone Smartphone device 1

4.2.3.1 General

4.2.3.2 Detailed parameters

4.2.3.3 Device electro-acoustical characteristics

4.2.4 Device type 4: Four-Microphone Smartphone device 2

4.2.4.1 Overview

4.2.4.2 Detailed parameters

4.2.4.3 Device electro-acoustical characteristics

4.2.5 Device type 5: Three-Microphone XR HMD device

4.2.5.1 Overview

4.2.5.2 Detailed parameters

4.2.5.3 Device electro-acoustical characteristics

4.3 Database

4.3.1 Principle of scenarios and database design

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4.3.3.2 Database for target devices

# 3 Content

# 2.1 General

UEs are the target devices for immersive audio capture, proposals highlight the need for devices that enable spatial audio processing while addressing legacy hardware constraints. Key goals include standardizing documentation (e.g., coordinate systems for microphone placement) and accommodating diverse form factors. Two primary device categories emerge: analytical prototypes for free-field modeling and practical designs mimicking mainstream smartphones.

2.2 Device Types

2.2.1 Device type 1: Four-Microphone Prototype Device

TBD

2.2.2 Device type 2: Three-Microphone Smartphone device

TBD

2.2.3 Device type 3: Four-Microphone Smartphone device 1

TBD

2.2.4 Device type 4: Four-Microphone Smartphone device 2

TBD

* + 1. Device type 5: Three-Microphone XR HMD device

TBD

4.3 Database

4.3.1 Principle of scenarios and database design

The following should be considered when designing the databases:

4.3.1.1 Recording scenario types

There are three recording scenario types proposed as follows:

**Device characterization**

* Recordings targeted to identify electro-acoustical characteristics of proposed target devices. For example, to identify device frequency response, etc.

**Development recordings**

* Recordings targeted to facilitate spatial capture algorithm development and potential tuning.

**Evaluation recordings**

* Recordings targeted to evaluate example solutions, including subjective and objective evaluation. For objective evaluation, alignment with TS 26.260 is expected.

Above categories should not be understood as strictly orthogonal scenarios, as it is expected that certain scenarios/recordings may be useful for multiple purposes. Furthermore, while other recording scenario types may be anticipated than what is presented here, it is seen useful to consider whether and how the proposed recording scenarios would fit into the above recording scenario types.

4.3.1.2 Recommendations on defining recording scenarios

Along the above recording scenario types, different recording scenarios for different purposes are anticipated. To ensure definition of meaningful and useful recording scenarios, at least following aspects should be considered when defining new recording scenarios:

* Varying recording scenarios should be represented, from simple single source scenarios to complex scenarios, and from free-field conditions to reverberant conditions.
* For the sake of reproducibility, high quality loudspeakers with well-defined source signals should be favored when possible.
* For device characterization, algorithm development, and objective evaluation purposes, controlled rooms in terms of reverberation and room frequency response should be favored. Referencing existing specifications is recommended, if applicable.
* For subjective evaluation purposes, vast number of varying environments should be represented. Number of proposed recording scenarios in indoor and outdoor environments should be in balance.
* Additional care should be taken when describing and defining the positioning of sound sources and UE.

4.3.1.3 The relationships of the three templates

The relationships of the three templates are illustrated in Figure 1 below. Furthermore, cross-referencing between the databases should be favored in general, in order to reduce redundancy.

Target device database

Target device No

Type

Size

Shape

…

Recordings database

Recording item No

Target device No

Rec scenario No

UE orientation

…

Recording scenarios database

Recording scenario No

Sound source

Signal characteristics

Playback level calibration

…

**Figure x – Templates/databases relationship**

4.3.2 Recording setups and scenarios

Refer to the attached file: Template for recording setups and scenarios-V2.1.xlsx

4.3.3 Database for target devices

4.3.3.1 Requirement for database

The following should be considered when recording the databases:

* The raw microphone signals must be recorded, i.e., any noise reduction or other audio pre-processing of the DUT must be disabled or by-passed
* The turntable, stand, and DUT mounting should have only minimal acoustic effects (e.g., no microphones should be blocked, minimal acoustic footprint)
* The microphone channel ordering of the DUT, the DUT orientation, the turntable rotation direction, and the 0° position must be documented (if possible, with photos)
* The characteristics of the test signals shall be documented and provided in the database.

4.3.3.1 Mandatory recording scenarios

The following recording scenarios shall be provide for each target device :

TBD

4.3.3.2 Database for target devices

Refer to the attached file: Template for recordings database-V2.1.xlsx

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# 3 Conclusion

This permanent document is used to track the progress of the target devices , scenarios , database and template for DaCAS.

**References**

1. S4aA250006: Proposal of a target device
2. S4-250745: Proposal of new potential target devices for DaCAS