3GPP TSG-SA WG4 Meeting #132S4-250868

Japan, Fukuoka, 19 – 23 May 2025

**Source: Dolby Laboratories Inc**

**Title: Pseudo-CR on Multichannel and SBA support in WebRTC**

**Spec: 3GPP TS 26.858**

**Agenda item: 7.8**

**Document for: Decision**

**1. Introduction**

Amongst the immersive audio input formats supported by the 3GPP IVAS codec, multichannel audio (MC) and scene based audio (SBA) do not require audio metadata but do require a correct interpretation of the number and order of audio channels for correct encoding, decoding, and rendering. Multichannel and SBA audio inputs can adhere to one of multiple standards and conventions with regards to channel order. In the case of SBA, there are in addition multiple conventions for normalizing the audio channels with respect to each other. A WebRTC-based application using a codec such as IVAS for immersive audio communication requires interfaces that can provide the encoder with audio channel data in the correct format and can similarly consume and interpret the decoder’s output correctly.

A recent contribution [1] mainly examined the support of metadata-based IVAS modes in WebRTC. This CR further examines existing MC and SBA format support in WebRTC [2] and identifies specific gaps with respect to these formats.

\* \* \* First Change \* \* \* \*

### 5.4.2 Audio Format Support in WebRTC

*Editor’s Note: Also document the current audio format support.*

#### 5.4.2.1. Audio metadata support in WebRTC

The WebRTC API does not provide ways to input/output associated essential audio metadata to/from the audio codec. Moreover, the WebRTC implementation and internal APIs (e.g., the C++ API) does not contain relevant data structures for metadata handling and does not allow moving metadata between processing modules, e.g., from an audio capture (front-end) module to an encoder module.

#### 5.4.2.2. Multichannel and SBA format support in WebRTC

The WebRTC implementation, like in the chromium WebRTC source code, presently allows a maximum of 8 audio channels to be used, with the following layouts being directly mappable to layouts supported by IVAS.

|  |  |  |  |
| --- | --- | --- | --- |
| **WebRTC channel layout** | **WebRTC channel order** | **IVAS channel layout** | **IVAS channel order** |
| MONO | Centre | Mono | Centre |
| STEREO | Left, Right | Stereo | Left, Right |
| 5\_1 | Left, Right, Centre, Side Left, Side Right | 5.1 (CICP6) | Left, Right, Centre, Side Left, Side Right |
| 7\_1 | Left, Right, Centre, Side Left, Side Right, Back L, Back Right | 7.1 (CICP12) | Left, Right, Centre, Side Left, Side Right, Back Left, Back Right |

**Table 5.4-1: Mapping between WebRTC channel layout and IVAS Multichannel channel layout**

The Stereo, 5.1 and 7.1 IVAS layouts expect the same channel order as in WebRTC, such that operation in these modes should be covered. Of the remaining standard multichannel audio layouts supported in IVAS, 5.1.2 could be plausibly supported in a *custom* WebRTC application if the application repurposes one of the other existing 8-channel formats (e.g. 7\_1\_WIDE\_BACK, which still has LFE as the 4th channel). It should be noted, however, that repurposing of layouts is not an interoperable solution. Additionally, the IVAS decoder supports integrated rendering to custom MC layouts up to 16 channels, with azimuth and elevation specified for each channel. There does not appear to be support for custom MC modes in WebRTC.

In the case of SBA, there is no explicit support for these formats in the WebRTC source. However, a custom application could similarly repurpose alternative WebRTC 4- 5- and 7-channel layouts to support certain SBA modes. One such repurposing scheme could work as follows:

|  |  |  |
| --- | --- | --- |
| **WebRTC channel layout** | **WebRTC channel order** | **IVAS SBA format** |
| SURROUND | Front Left, Front Right, Front Centre | Planar FOA |
| QUAD | Front Left, Front Right, Back Left, Back Right | FOA |
| 5\_0 | Left, Right, Centre, Side Left, Side Right | Planar HOA2 |
| 7\_0 | Left, Right, Centre, Side Left, Side Right, Back L, Back Right | Planar HOA3 |

**Table 5.4-2: Custom mapping between WebRTC channel layout and IVAS SBA layout**

In this way, there would at least be a clear differentiation between the modes used for MC and for SBA.

The following non-metadata IVAS input format modes remain unmappable in the WebRTC source code due to the 8-channel limitation: 5.1.4 (CICP16), 7.1.4 (CICP19), HOA2, HOA3.

\* \* \* End of Changes \* \* \* \*

**References**

[1] S4-250580, On handling of IVAS formats in WebRTC and WebCodec API

[2] WebRTC standard, https://w3c.github.io/webrtc-pc/