3GPP TSG-SA4 Meeting S4-211529

10th-19th November 2021

**Agenda item** 11.5

**Source:** Tencent

**Title:** Audio mixing of multiple streams in ITT4RT

**Document for** Agreement

# Introduction

The previous version of this contribution was discussed during SA#115. In that meeting two solutions were provided:

1. The use of RTCP header extensions for signaling audio gains, which was agreed at that meeting.
2. The use of SDP for signaling audio again for which questions were raised about the management of the SDP bandwidth during the session if this option is used.

With further investigation, we concluded that even the SDP signalling of the audio gain updates are occasional (e.g. at most every 5 minutes on average), it is difficult to characterize their impact on the additional SDP bandwidth. Therefore, we removed this option from this contribution.

Therefore, we propose the RTP header extension solution to be included in a separate dCR. As we discussed in the previous meeting, if and when IVAS provides a solution for signalling the audio gains, then this solution is not needed and the dCR doesn’t need to go to CR. Otherwise, we propose the dCR to be submitted as a Release 17 CR.

# Y.X Recommended audio mixing gains

An ITT4RT-Tx client may specify recommended gains for mixing of its transmitted audio streams and update these recommended gains during a session. An ITT4RT-Rx client may or may not use such recommended mixing gains to scale the audio streams prior to mixing.

An ITT4RT-Tx client may for example send the recommended mixing gains r0, r1, .., rN for the audio sources a0 (360 video) and a1, a2, .., aN (overlay videos) of that sender to recommend a mix at the receivers to be r0\*a0+r1\*a1+……+rN\*aN.

If an ITT4RT-Rx client negotiated to receive recommended audio mixing gains and the ITT4RT-Tx client chooses to send these mixing gains, the ITT4RT-Tx client shall indicate each audio mixing gain value to the ITT4RT-Rx client using RTP header-extensions (see Y.X.1).

## Y.X.1 RTP header extension for audio mixing gain

A recommended audio mixing gain for an audio stream shall be indicated by the following RTP header extension:

 0 1

 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5

 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

 | ID | len=0 |audio-mixing-gain|

 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

Audio mixing gain using One-Byte Header Format

The 4-bit ID is the local identifier of this element. The 4-bit length is the number, minus one, of data bytes of this header extension element following the one-byte header. The URI for declaring the audio mixing gain header extension in a Session Description Protocol (SDP) extmap attribute [95] and mapping it to a local identifier is:

 urn:3gpp:audio-mixing-gain

The audio mixing gain is expressed in dB as a signed integer in the range "-127" to "0" (hence the numerical values directly represent the gain in dB). A value of “-128” indicates muting the channel. The meaning of positive values other than 0 is undefined and shall be ignored if received.

An ITT4RT-Tx client may repeat the header extension over multiple RTP packets to improve the likelihood of successful transmission as described in [RFC 8285]. The number of header extension transmissions (for the same mixing gain) should therefore depend on the probability of delivery.

# O.6 urn:3gpp:audio-mixing-gain

The desired extension naming URI:

 urn:3gpp:audio-mixing-gain

A formal reference to the publicly available specification:

 3GPP TS 26.114

A short phrase describing the function of the extension:

 Signalling of the audio mixing gain header extension for the sent audio, see clause Y.X.1

Contact information for the organization or person making the registration

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# Proposal

The proposal is to include the above section (Y.X and O.6) into a separate dCR from the current ITT4RT dCR.