**3GPP TSG- Meeting # *S4-250515***

**, – merge of S4-250515 and S4-250508**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | , Samsung Electronics, CO., LTD | | | | | | | | | |
| ***Source to TSG:*** | S4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The conclusion of KI#9 and KI#14 (traffic detection of multiplexed media flows) from TR 26.822 are as follows:  The following aspects are concluded as principles for normative work:  - Based on response from SA2, normative work on multiplexed RTP streams may be needed. Furthermore, it is recommended to add guidelines to TS 26.522 [2] for RTP senders that use multiplexing. There may be potential normative aspects to be added to TS 26.510 [50].  When multiple RTP media streams are multiplexed in an RTP session, each media stream can be identified using the identification-tag (the values of "mid" attribute) in the SDP information. The RTP SDES header extension for MID make it possible for a 5G System or an RTP receiver to associate each PDU or PDU Set to a media stream when the the PDUs in a PDU Set carry the RTP SDES header extension for MID. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | This CR provides support to include RTP SDES header extension for MID defined in RFC 9143 to be included in PDUs when multiple RTP media streams are multiplexed into a data flow. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Recommendations from work item description are not met, key 5GA features are not supported. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 4.6 (new) and Annex C | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

First change

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] ITU-T Rec H.264 (08/2021): "Advanced video coding for generic audiovisual services" | ISO/IEC 14496-10:2022: "Information technology – Coding of audio-visual objects – Part 10: Advanced Video Coding".

[3] ITU-T Rec H.265 (08/2021): "High efficiency video coding" | ISO/IEC 23008-2:2023: "High Efficiency Coding and Media Delivery in Heterogeneous Environments – Part 2: High Efficiency Video Coding".

[4] IETF RFC 3550 (2003): "RTP: A Transport Protocol for Real-Time Applications", H. Schulzrinne, S. Casner, R. Frederick and V. Jacobson.

[5] IETF RFC 6184 (2011): "RTP Payload Format for H.264 Video", Y.-K. Wang, R. Even, T. Kristensen, R. Jesup.

[6] IETF RFC 7798 (2016): "RTP Payload Format for High Efficiency Video Coding (HEVC)", Y.-K. Wang, Y. Sanchez, T. Schierl, S. Wenger, M. M. Hannuksela.

[7] 3GPP TR 26.928: "Extended Reality (XR) in 5G".

[8] 3GPP TR 26.998: "Support of 5G glass-type Augmented Reality / Mixed Reality (AR/MR) devices".

[9] IETF RFC 768 (1980): "User Datagram Protocol", J. Postel.

[10] IETF RFC 5761 (2010): "Multiplexing RTP Data and Control Packets on a Single Port", C. Perkins, M. Westerlund.

[11] IETF RFC 8285 (2017): "A General Mechanism for RTP Header Extensions", D. Singer, H. Desineni, R. Even.

[12] 3GPP TS 23.501: "System architecture for the 5G System (5GS)".

[13] IETF RFC 5905 (2010): "Network Time Protocol Version 4: Protocol and Algorithms Specification”, D. Mills, J. Martin, J. Burbank, W. Kasch.

[14] IEEE 1588-2019 – IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems, June 2020.

[15] IETF RFC 4574 (2006): "The Session Description Protocol (SDP) Label Attribute", O. Levin, G. Camarillo.

[16] IETF RFC 3611 (2003): "RTP Control Protocol Extended Reports (RTCP XR)", T. Friedman, R. Caceres, A. Clark.

[17] 3GPP TS 26.119: "Media Capabilities for Augmented Reality".

[18] IETF RFC 7656 (2015): "A Taxonomy of Semantics and Mechanisms for Real-Time Transport Protocol (RTP) Sources ", J. Lennox, K. Gross, S. Nandakumar, G. Salgueiro, B. Burman.

[19] IETF RFC 5888 “The Session Description Protocol (SDP) Grouping Framework”, G. Camarillo et al.

[20] ISO/IEC 60559:2020: “Floating-point arithmetic”.

[21] 3GPP TR 26.114: "IP Multimedia Subsystem (IMS); Multimedia Telephony; Media handling and interaction".

[22] IETF RFC 7941 "RTP Header Extension for the RTP Control Protocol (RTCP) Source Description Items".

[23] IETF RFC 9143 "Negotiating Media Multiplexing Using the Session Description Protocol (SDP)".

second change (All new)

## 4.6 RTP SDES Header Extension for MID

When an RTP sender is transmitting different media streams in a multiplexed data flow, the 5GS network needs to identify the PDU’s belonging to the respective media streams, for enabling differentiated QoS handling (i.e. mapping multiplexed streams to differnet QoS Flows). The RTP SDES header extension for MID described in Annex C.2 make it possible for an RTP receiver or 5G System to associate each RTP stream with a specific identification-tag.

An RTP sender may use the BUNDLE attribute defined in RFC 9143 [23] in SDP negotiation to multiplex the media streams, particularly in case SSRC is not available before the RTP session is started. Endpoints that support the bundle mechanism for multiplexed RTP streams shall include the RTP SDES HE for MID for identifying the media streams. Endpoints that support the RTP SDES HE for MID shall support both RTP HE formats (i.e., the one-byte and the two-byte formats) according to RFC 7941 [22].

NOTE: Not every RTP packet is required to send MID in the RTP SDES HE.

Third change

Annex C (informative):

C.1 RTP Header Extension for Absolute Sender Time

The information below is about the "RTP Header Extension for Absolute Sender Time" and it was retrieved from https://webrtc.googlesource.com/src/+/refs/heads/main/docs/native-code/rtp-hdrext/abs-send-time on January 31, 2024.

Absolute Send Time

The Absolute Send Time extension is used to stamp RTP packets with a timestamp showing the departure time from the system that put this packet on the wire (or as close to this as we can manage). Contact [solenberg@google.com](mailto:solenberg@google.com) for more info.

Name: "Absolute Sender Time" ; "RTP Header Extension for Absolute Sender Time"

Formal name: <http://www.webrtc.org/experiments/rtp-hdrext/abs-send-time>

SDP "a=name": "abs-send-time" ; this is also used in client/cloud signaling.

Not unlike [RTP with TFRC](http://tools.ietf.org/html/draft-ietf-avt-tfrc-profile-10#section-5)

Wire format: 1-byte extension, 3 bytes of data. total 4 bytes extra per packet (plus shared 4 bytes for all extensions present: 2 byte magic word 0xBEDE, 2 byte # of extensions). Will in practice replace the “toffset” extension so we should see no long term increase in traffic as a result.

Encoding: Timestamp is in seconds, 24 bit 6.18 fixed point, yielding 64s wraparound and 3.8us resolution (one increment for each 477 bytes going out on a 1Gbps interface).

Relation to NTP timestamps: abs\_send\_time\_24 = (ntp\_timestamp\_64 >> 14) & 0x00ffffff ; NTP timestamp is 32 bits for whole seconds, 32 bits fraction of second.

Notes: Packets are time stamped when going out, preferably close to metal. Intermediate RTP relays (entities possibly altering the stream) should remove the extension or set its own timestamp.

## C.2 RTP SDES Header Extension for MID

### C.2.1 Description

When multiple RTP media streams are multiplexed in an RTP session, each media stream can be identified using the identification-tag (the values of "mid" attribute) in the SDP information using the BUNDLE attribute defiend RFC 8843. RFC 7941 [22] has defined an RTP SDES header extension to understand the RTP senders source identity and synchronization context. RFC 9143 [23] has defined a new RTP SDES header extension for MID by extending the RTP SDES header extension to carry the 'MID' RTCP SDES item as described in clause C.2.4, in RTP packets.

The RTP SDES header extension for MID make it possible for an RTP receiver or 5G System to associate each RTP stream with a specific "m=" section in the SDP with which a receiver has associated an identification-tag. The payload, containing the identification-tag, of the RTP SDES header extension element can be encoded using either the 1-byte or the 2-byte header according to RFC 7941 [22]. The identification-tag payload is UTF-8 encoded, as in SDP.

If the RTP SDES HE for MID is the only RTP HE used, the endpoints shall use the 1-byte header format. If other 2-byte RTP HE elements are used in the same RTP stream, then the 2-byte header shall be used, unless the "a=extmap-allow-mixed" is successfully negotiated through SDP offer/answer, as described by RFC 8285 [11].

### C.2.2 One-byte RTP header extension format

The one-byte RTP SDES RTP HE is defined as follows:

0 1 2 3

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

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

| ID | len | SDES item text value ... |

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

Figure 4.6.2-1: One-byte header extension format for SDES items

### C.2.3 Two-byte RTP header extension format

The two-byte RTP SDES RTP HE is defined as follows:

0 1 2 3

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

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

| ID | len | SDES item text value ... |

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

Figure 4.6.2-2: Two-byte header extension format for SDES items

### C.2.4 MID RTCP SDES Item

The RTCP SDES item for MID is defined as follows:

0 1 2 3

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

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

| MID=15 | length | identification-tag ...

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

Figure 4.6.2-3: RTCP SDES item for MID

### C.2.5 Semantics

The semantics of the RTP SDES HE for MID are defined as follows:

- identification-tag**:** The identification-tag payload is UTF-8 encoded, as in SDP.

### C.2.5 SDP Signaling

RFC 9143 defined the extension URN in the "RTP SDES Compact Header Extensions" subregistry of the "RTP Compact Header Extensions" sub-registry. The URN for the RTP SDES Header Extension for MID shall be set to “**urn:ietf:params:rtp-hdrext:sdes:mid**” as defined in RFC 9143.

The ABNF syntax for the extmap attribute for the signaling of RTP SDES HE for MID is as follows:

*extensionname = "* *urn:ietf:params:rtp-hdrext:sdes:mid"*

*format = "short" / "long"*

The extension attributes have the following semantics:

- format: indicates if the RTP SDES HE for MID uses the 1-byte (short) or the 2-byte (long) format. This extension attribute can not be included more than once.

Below is an example:

a=extmap:1 urn:ietf:params:rtp-hdrext:sdes:mid long

End of changes