**3GPP TSG-SA4 Meeting #133-e *S4-251xxx***

**Online, , 18th Jul 2025 - 25th Jul 2025 In revision of *S4-251355***

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **26.522** | **CR** | **0022** | **rev** | **1** | **Current version:** | **19.1.0** |  |
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| *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 | **x** | Core Network | **x** |

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| ***Title:*** | Clarification of data burst size and PDU set size accuracy | | | | | | | | | |
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| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | S4 | | | | | | | | | |
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| ***Work item code:*** | 5G\_RTP\_Ph2 | | | | |  | ***Date:*** | | | 2025-07-15 |
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| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *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)* | |
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| ***Reason for change:*** | | RAN-2 sent the reply LS indicating the more accurate data burst size and PDU set size is preferred and an accuracy of 5 percent is needed. | | | | | | | | |
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| ***Summary of change:*** | | Clarify these points and requirements in the text on data burst size and PDU set size | | | | | | | | |
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| ***Consequences if not approved:*** | | No clear guidance on using PDU set size and Data burst size | | | | | | | | |
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| ***Clauses affected:*** | | 4.2.4, 4.2.6.3 , 4.5.4, 4.5.6 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
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| ***Other comments:*** | |  | | | | | | | | |
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| ***This CR's revision history:*** | | * Put the specific requirement of 5% suggested by RAN-2 in the guidelines only not in the normative text, capitalization of PDU Set Size | | | | | | | | |

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| CHANGE 1 |

### 4.2.4 Semantics

The semantics of the fields of the RTP HE for PDU Set marking are defined as follows:

- **End PDU of the PDU Set [E] (1 bit):** This field is a flag that shall be set to 1 for the last PDU of the PDU Set and set to 0 for all other PDUs of the PDU Set.

- **End of Data Burst [D] (1 bit):** This field is a flag that shall be set to 1 for the last PDU of a Data Burst. It shall be set to 0 for all other PDUs. A Data Burst may consist of one or more PDU Sets.

NOTE 1: The bit encodes the End of Data Burst indication as per the guidelines provided in clause 4.2.6.1.

- **Reserved [R] (2 bits):** This field is reserved for future usage. It shall be set to 0 by the RTP sender and shall be ignored by the RTP receiver.

- **PDU Set Importance [PSI] (4 bits):** The PDU Set Importance field indicates the importance of this PDU Set compared to other PDU Sets within the same Multimedia Session. This information may help RAN to discard PDUs, when needed. Lower values shall indicate a higher importance PDU Set, with the highest importance PDU Set indicated by 1 and the lowest importance PDU Set indicated by 15. When the RTP sender cannot define an importance, it shall set the value to 0.

NOTE 2: A complete set of guidelines for setting the PSI field for the 3GPP audio/video codecs are provided in clause 4.2.6.2

- **PDU Set Sequence Number [PSSN] (10 bits):** The sequence number of the PDU Set to which the current PDU belongs, acting as a 10-bit numerical identifier for the PDU Set. The PSSN shall be incremented monotonically by 1 for each subsequent PDU Set.

NOTE 3: This value wraps around at 1023, however, using the 16-bit RTP packet sequence number and PSSN pair, a receiver may uniquely distinguish between any PDU Sets.

- **PDU Sequence Number within a PDU Set [PSN] (6 bits):** The sequence number of the current PDU within the PDU Set. The PSN shall be set to 0 for the first PDU in the PDU Set and incremented monotonically for every PDU in the PDU Set in the order of transmission from the sender.

NOTE 4: A receiver may use the RTP packet sequence number together with the PSN to distinguish between PDUs within a PDU Set that contains more than 64 PDUs.

- **PDU Set Size [PSSize] (24 bits):** The PDU Set Size indicates the total size of all PDUs of the PDU Set to which this PDU belongs. This field is optional and subject to an SDP signaling offer/answer negotiation, where the RTP sender shall indicate whether it will provide the size of the PDU Set for that RTP stream. If not enabled, the field shall not be present within the RTP HE. If enabled, but the RTP sender is not able to determine the PDU Set Size for a particular PDU Set, it shall set the value to 0 in all PDUs of that PDU Set. The PSSize shall indicate the size of a PDU Set including RTP/UDP/IP header encapsulation overhead of its corresponding PDUs. The PSSize shall be expressed in bytes. It is recommended to add the PDU Set Size field when the Number of PDUs in the PDU Set field is present. More details on the accuracy requirements and deriving the PDU Set size can be found in clause 4.2.6.3.

NOTE 5: This field may be optionally present given the signaling of the "pdu-set-size" extension attribute in the SDP offer/answer negotiation as per clause 4.2.5.

- **Number of PDUs in the PDU Set [NPDS] (16 bits):** The number of PDUs within the PDU Set indicates the total number of PDUs belonging to the same PDU Set. This field is optional and subject to an SDP signaling offer/answer negotiation, where the RTP sender may indicate whether it will provide the number of PDUs within the PDU Set for that RTP stream. If enabled, but the RTP sender is not able to determine the Number of PDUs in the PDU Set, it shall set the value to 0 in all PDUs of that PDU Set. It is recommended to add the Number of PDUs in the PDU Set field when the PDU Set Size field is present.

NOTE 6: This field may be optionally present given the signaling of the "num-pdus-in-pdu-set" extension attribute in the SDP offer/answer negotiation as per clause 4.2.5.

NOTE 7: Guidelines to set the PDU Set Size in bytes by an RTP sender are provided in clause 4.2.6.3.

NOTE 8: The use of NPDS for the NAT46/NAT64 correction is FFS.

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| CHANGE 2 |

#### 4.2.6.3 PDU Set Size Field

The PDU Set Size field may be present in the RTP HE for PDU Set marking if appropriately enabled for an RTP sender as per clause 4.2.5. In case the PDU Set Size is enabled the application shall express the PDU Set Size in bytes as per the PSSize semantics defined in clause 4.2.4.

The PDU Set Size value of a PDU Set should be determined by the RTP sender based on the RTP payload corresponding to the PDU Set, transmission path MTU Size, or alternatively, maximum RTP SDU size, and network IP transport configuration.

A more accurate PDU Set Size indication is preferred. There may be some practical limits in indicating the PDU Set Size accurately by the sender for use at the receiver, e.g. due routing related issues; in practice, a limited accuracy within a margin can still be acceptable.

NOTE: From 5GS system perspective a margin at the receiver of up to a few percent (i.e. max 5 percent) at the receiver can be tolerable.

The RTP sender should follow the corresponding steps to determine the PDU Set Size as accurately as possible:

1. The RTP sender should receive from a media encoder (e.g., a H.264/AVC encoder, a H.265/HEVC encoder) payload data corresponding to a PDU Set. It is recommended that all Non-VCL NAL units (e.g. SPS NAL unit) are handled together with the associated VCL NAL units within the same PDU Set. The size of the received payload data (*R*) should be determined in bytes.

2. The RTP sender should perform next RTP fragmentation and packetization of the payload data (*R*). The maximum size of an RTP packet SDU (*S*) should be determined given a transmission path MTU size, or alternatively, a preconfigured maximum RTP SDU payload size less than the path MTU size. The RTP sender should determine the number of RTP packets (*P*) post-fragmentation given *S* and a packetization configuration of the RTP payloader. The RTP payloader should implement the payload formatting according to the corresponding payload type of the PDU Set (e.g., RFC 6184 [5] for H.264/AVC, RFC 7798 [6] for H.265/HEVC) and the packetization configuration to yield the *P* RTP packets’ SDUs. *P* corresponds to the number of PDUs of the PDU Set.

NOTE 1: Some WebRTC implementations in commercial user agents configure a maximum RTP SDU size of 1200 bytes compliant also with the recommendations of RFC 8200 and further corresponding to an MTU Size of 1280 bytes. Other valid configurations exploiting larger MTU Size based on path MTU discovery protocols, RFC 1191, or RFC 8201, may apply up to the RTP stack implementation capabilities.

NOTE 2: It is generally assumed that the configuration of the RTP payloader ensures RTP packets resulting from packetization do not violate the MTU Size. In addition, the RTP payloader may be configured by applications to favor low-latency delivery. For example, in some cases of RTP H.264/AVC payload types, the RTP payloader may be configured to operate in packetization-mode 1 (i.e., "non-interleaved mode" as per RFC 6184 clause 6.3) to allow for RTP packets to contain NAL units in decoding order and to map an RTP packet to a single NAL unit packet (as per RFC 6184, clause 5.6), a STAP-A packet (as per RFC 6184, clause 5.7.1) or a FU-A packet (as per RFC 6184, clause 5.8). In other cases, applications may select other RTP payloader configuration up to implementation and application requirements.

3. The RTP sender should determine for each one of the *P* RTP packets the size of the RTP header overhead including any RTP HE overhead (*Rh\_p*) as configured based on the SDP offer-answer negotiation.

NOTE 3: It may be possible for different PDUs in a PDU Set to contain distinct RTP HE besides the common RTP HE for PDU Set marking such that *Rh\_p* may differ among different PDUs of a PDU Set.

4. The RTP sender should further determine per RTP packet the size of the UDP/IP headers overhead associated with an OS UDP socket sending out the RTP packets. This may be done by the RTP sender using UDP socket options available programmatically over OS network stack API calls or based on SDP-configured IP endpoints and corresponding transmission IP addresses. The RTP sender should determine the type of the underlying IP version used for transport, i.e., IPv4 or IPv6, and determine accordingly the IP header overhead (*Ih\_p*) for each encapsulated RTP packet. If IPv4 options are configured for the UDP socket, or alternatively, if IPv6 header extensions are sent over the UDP socket, the RTP sender should consider the additional incurred size these have to the IP header overhead (*Ih\_p*) of each RTP packet. The RTP sender should consider a fixed size UDP header overhead (*Uh*) of 8 bytes for each RTP packet.

NOTE 4: In case no IPv4 header options are used, the RTP sender should consider *Ih\_p* corresponding to 20 bytes per RTP packet for IPv4. Whereas, in case no IPv6 extension headers are used, the RTP sender should consider *Ih\_p* corresponding to 40 bytes per RTP packet for IPv6.

NOTE 5: For example, in case of Linux-based open-source OSs, any additional IPv4 options up to 40 bytes may be set and accessed programmatically based on socket API calls, the RTP sender implementation is expected to determine additional optional overheads to the IP header overhead, *Ih\_p*.

5. The RTP sender should determine the PDU Set Size as the sum in bytes of all RTP/UDP/IP headers overhead of each one of the *P* packets and the received RTP payload corresponding to the PDUs of the PDU Set, e.g., *PSSize =R +* (*Ih\_p + Uh\_p + Rh\_p*). The value should be indicated in the PSSize field of the RTP HE for PDU Set marking for all PDUs of the PDU Set before the corresponding RTP PDUs are sent over the UDP socket.

In case any of the above steps fails to determine for a PDU Set any of the *Ih\_p*, *Uh\_p*, *Rh\_p*, *P*, or *R*,the RTP sender should set the PSSize to 0 for the PDU Set.

NOTE 6: The PDU Set Size guidelines above are generally applicable to video and audio media payload types.

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| CHANGE 3 |

### 4.5.4 Semantics

The semantics of the fields of the RTP HE for marking dynamically changing traffic characteristics are defined as follows:

- **Reserved [R] 8 bits):** This field is reserved for future usage, it shall be set to 0 by the RTP sender and shall be ignored by the RTP receiver.

- **Burst Size [BSSize] (24 bits):** The Burst Size indicates the total size of the burst to be transmitted (in bytes (including the overhead of the RTP Header).). the burst size is not known it shall be set to 0. Clause 4.5.6 provides an additional guideline for setting this field in practice.

NOTE 1: If a packager generates all packets of the burst at once, no additional delay is introduced when setting the burst size, as the packets can be marked with the complete burst size. If this is not the case (e.g. multiple frames combined in one burst) a delay as large as the burst duration could be introduced by marking the entire burst. Therefore, this approach may not be suitable for all types of packagers/encoders, especially those that gradually produce packets additional latency may be introduced if the size is not known in advance.

- **Time To Next Burst [TTNB] (16 bits):** Indicates the approximate time in tenth of milliseconds to the next burst. If the time to next burst is not known, it shall be set the reserved value 65535.

NOTE: The definition of time to next burst in this context is for further study

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| CHANGE 4 |

### 4.5.6 Guidelines forsignallingdynamically changing traffic characteristics

It is recommended that the first several RTP packets and the last few packets contain the dynamically changing traffic characteristics signalling. In addition, some additional RTP packets may contain the RTP HE for dynamically changing traffic characteristics.

The RTP sender/application may decide on how frequently to add the RTP HE for dynamically changing traffic characterstics based on different factors such as estimated packet losses or other network conditions. The RTP HE for dynamically changing traffic characteristics are consumed by the core network, i.e., the UPF, as defined in 3GPP TS 23.501 [12], clause 5.37.10.

For data burst size indication, the best possible estimate or calculation is preferred. Guidelines in clause 4.2.6.3 for PDU Set size calculation can also be used for computing the data burst size in a comparable way with similar accuracy requirements. In practice, an error margin up to a few percent (e.g. max 5 percent) at the receiver is recommended to enable benefits of utilizing this value in the 5G System.