**3GPP TSG-SA4 Meeting #0-e (AH) RTC SWG post 130 *S4aR250019***

**Online, , 26th Nov 2024 - 5th Feb 2025**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
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|  | **26.522** | **CR** | **0006** | **rev** | **-** | **Current version:** | **18.1.0** |  |
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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 |  | Core Network | **x** |

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| ***Title:***  | RTP Header Extension for Dynamically Changing Traffic Characteristics |
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| ***Source to WG:*** | Huawei, Hisilicon |
| ***Source to TSG:*** | S4 |
|  |  |
| ***Work item code:*** | 5G\_RTP\_Ph2 |  | ***Date:*** | 2025-01-13 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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 canbe 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:*** | From TR 26.8227.13 Conclusions for Key Issue #12**Enhancements of Data Burst Marking**The following aspects are concluded as principles for normative work:- Do normative work for signaling burst size, when deterministically known, from RTP senders in a HE. |
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| ***Summary of change:*** | This CR provides support for dynamic traffic characteristics by means of RTP HE |
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| ***Consequences if not approved:*** | Recommendations from TR not met, 5GA features not supported |
|  |  |
| ***Clauses affected:*** | 4 (new section) D (new section) |
|  |  |
|  | **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 ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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| \*\*\*CHANGE (all new text) \*\*\* |

## 4.X RTP header extension for dynamically changing traffic characteristics

### 4.X.1 Description

A data burst indicates a set of multiple PDUs generated and sent in a short period of time as defined in clause 3.1 of TS 23.501 [3]. Data bursts can be present in RTP streams, such as video, audio or other RTP streams quite often, due to the periodic nature of the streams.

Knowing dynamically changing traffic characteristics regarding such as data burst size can be beneficial for the 5GS network, e.g., power saving and efficient radio resource management.

For marking dynamically changing traffic characteristics, the RTP HE for Dynamically changing Traffic Characteristics is defined in this clause.

Currently the following dynamic traffic characteristics are supported in the RTP HE for Dynamically changing Traffic Characteristics:

* Data Burst Size
* Time To Next Burst
* End of Data Burst

Dynamically changing Traffic Characteristics marking can be performed by an RTP sender, such as an Application Server (e.g., MRF), a sender UE that sends media to an RTP receiver, such as a UE, or other 5G network components.

Endpoints that support the RTP HE for Dynamically changing Traffic Characteristics can support both RTP HE formats (i.e., the one-byte and the two-byte formats) according to RFC 8285 [11].

If the RTP HE for Dynamically changing Traffic Characteristics is the only RTP HE used, the endpoints may 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].

NOTE: The headers are not shown with padding as this depends on other prospective extension elements in use, as per RFC 8285 [11] alignment specifications.

The IANA registration information for the RTP HE for RTP HE for Dynamically changing Traffic Characteristics is presented in D.Y.

### 4.X.2 Intended usage in 5GS

The solution of adding dynamically changing traffic characteristics serves the following key use case:

1) Based on the SDP negotiation, the RTP HE for Dynamically changing Traffic Characteristics is enabled. The RTP Sender or Application Server adds header extension of a dynamically changing traffic characteristic in the first few packets of a dyamic traffic characteristic.

2) The RTP HE for dynamically changing traffic characteristics is added by the packet sender potentially for groups of packets

3) The UPF or other network element detects packets that include the RTP HE for Dynamically changing traffic characteristics and marks the dynamically changing traffic characteristics into the GTP-U header of downlink packets, including the Time to Next Burst, End of Data Burst indication and data burst size.

### 4.X.3 One-byte RTP header extension format

The one-byte RTP HE for the marking of PDU Sets and End of Bursts 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

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

 | 0xBE | 0xDE | length |

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

 | ID | len | R |D| RR | BSSize

 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+

 | TTNB |

 +.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+

### 4.X.4 Two-byte RTP Header Extension Format

The two-byte RTP HE for the marking of PDU Sets and End of Bursts 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

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

 | 0x100 |appbits| length |

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

 | ID | len | R |D| RR | BSSize

 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+.+.+.+.+.+.+.+.+

 | TTNB

 +.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+.+

### 4.X.5 Semantics

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

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

- **Reserved [R] 3 bits):** This field is reserved for future usage (e.g., dynamic burst indication). It can be set to 0 by the RTP sender and can be ignored by the RTP receiver.

- **Reserved [RR] 4 bits):** This field is reserved for future usage (e.g., dynamic burst indication). It can be set to 0 by the RTP sender and can be ignored by the RTP receiver.

- **Burst Size [BSSize] (24 bits):** The Burst Size indicates the total size of the burst to be transmitted. The burst size corresponds to the size of the data burst. If the burst size is not known it is set to 0.

- **Time To Next Burst [TTNB] (16 bits):** Indicates the approximate time in milliseconds to the next burst in milliseconds. If the time to next burst is not known it is set to 0.

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 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.

NOTE 2: Additional optional fields of this Header Extension are for further study.

NOTE 3: Time To Next Burst can only be used if the jitter on N6 is negligible, further it is assumed that burst duration is less than 1 millisecond, while the time to next burst is measured on millisecond timescale.

### 4.X.6 SDP Signaling

An RTP sender capable of sending RTP HE for Dynamically changing Traffic Characteristics can use the SDP extmap attribute for RTP HE for RTP HE for Dynamically changing Traffic Characteristics in the media description of the RTP stream(s) carrying the RTP HE for RTP HE for Dynamically changing Traffic Characteristics. An RTP receiver that does not support RTP HE for Dynamic Traffic Characteristics can ignore that RTP HE when included. The signaling of the Dynamically Changing Traffic Characteristics RTP HE can follow the SDP signaling design and the syntax and semantics of the "extmap" attribute as outlined in RFC 8285.The URN for the PDU Set marking can be set to "**urn:3gpp:dynamic-traffic-characteristics:rel-19**".

The ABNF syntax for the extmap attribute for the signaling of RTP HE for Dynamically changing Traffic Characteristics is defined as follows, extending the ABNF in RFC 8285:

*extensionname = "urn:3gpp:dynamic-traffic-characteristics:rel-19"*

*format = "short" / "long"*

The extension attributes have the following semantics:

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

NOTE: Regardless if this extension attribute is present or not, the use of long or short format is determined as described by section 4.1.2 of RFC 8285, i.e., based on what format other RTP HEs use in the same RTP session, unless both endpoints announced support for handling mixed format with "a=extmap-allow-mixed" as described by section 6 of RFC 8285 [7].

Below is an example:

 a=extmap:7 dynamic-traffic-characteristics:rel-19 long

### 4.X.7 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 traffic signaling. In addition, some additional RTP packets may contain the RTP HE for dynamically changing traffic characteristics.

It is recommended that the application signals the presence of RTP HE for dynamically changing traffic characteristics out of band using SDP signaling as defined in 4.X.6.

A sender, that is scheduling to send out a group of packets, may calculate the size of the group of the packets, and then add the overhead of adding the RTP header and then update the packets to include the RTP HE for dynamically changing traffic characteristics.

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| \*\* CHANGE 2 (all new text)\*\* |

## D.Y Annex

The desired extension naming URI:

urn:3gpp:dynamic-traffic-characteristics:rel-19

A formal reference to the publicly available specification:

[TS 26.522]

A short phrase describing the function of the extension:

Marking of dynamically changing traffic characteristics such as burst size and time to next burst

Contact information for the organization or person making the registration:

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