**3GPP SA4 #130 S4-241907**

**Orlando, US, November 18 - 22, 2024**

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| *CR-Form-v12.0* |
| **PSEUDO CHANGE REQUEST** |
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|  | **26.822** | **CR** | pseudo | **rev** | **-** | **Current version:** | **1.0.0** |  |
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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 |  |

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| ***Title:***  | **[FS\_5G\_RTP\_Ph2] Indicating the prediction error for data burst characteristics**  |
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| ***Source to WG:*** | Qualcomm Incorporated |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | FS\_5G\_RTP\_Ph2 |  | ***Date:*** | 11/18/2024 |
|  |  |  |  |  |
| ***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-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* *Rel-17 (Release 17)* *Rel-18 (Release 18)* |
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| ***Reason for change:*** | For Key issue #12: Enhancements of Data Burst Marking, Solution #6 and Solution #16 proposed to use an RTP header extension to signal the time to the next burst (TTNB).Solution #16 also proposed to include the Burst Size in the signaling. Both characteristics may involve prediction. It is important to have a predication accuracy measure with the prediction. |
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| ***Summary of change:*** | Proposed to add a prediction error measure to predicted TTNB and Burst Size. |
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| ***Consequences if not approved:*** | The burst characteristics conveyed by RTP header extensions are not usable for the network.  |
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| ***Clauses affected:*** |  |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  |  |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  |  |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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\* \* \* \* 1st change (all new) \* \* \* \*

## 6.x Solution #x: Indicating the prediction error for data burst characteristics

### 6.x.1 Key Issue mapping

This maps to Key Issue #12.

### 6.x.2 Time to the next data burst (TTNB) prediction error

The TTNB is determined by the time the selection of the starting point of the TTNB and the time when the next data burst is transmitted. The latter needs to be predited when TTNB is indicated in the current data burst. The prediction may have significant errors. For example, for conversational video, two factors affect the time TTNB:

* **Video encoding time:** The video encoding time depends on the complexity of the scene. At the time the TTNB is put into a packet of the current data burst, the content of the next video frame is not available yet, and the predicted time of completion of the encoding for the next video frame may be different from the actual time of completion.
* **Rate adaptation:** The frame rate is part of rate adaptation. A rate reduction request may affect when the next video frame is sent. However, at the time when TTNB is sent, the traffic source does not know if there will be a rate reduction request after TTNB is sent and before the originally planned transmission of the next video frame. This uncertainty introduces a prediction error. This issue can be avoided if the sender delays the rate adaptation until the predicted frame is transmitted.

As a result, TTNB may change dramatically in a short amount of time. As an example, again for the conversational video described in Solution #13, the packet departure times as a function of packet number based on Table Table 6.13.2.3.2-4 of clause 6.13 is plotted in Figure 6.x-1. The TTNB jumps from 17.1ms to 45.3ms only after one data burst.



Figure 6.x-1 The packet departure time vs packet ID based on Table Table 6.13.2.3.2-4 of clause 6.13.

###  6.x.2 Burst Size prediction error

The Burst Size refers to the size of the current data burst, which carries the indication of the Burst Size. There is a note in Solution #16:

*If a packager generates all packets of the burst at once, no additional delay is introduced when setting the burst size.*

However, the packager may not be able to generate all packets of the data burst at once, for example when a data burst consists of multiple PDU Sets as currently allowed by the definition of data burst in TS 23.501[3] and TS26.522[2], the PDU Sets follow their respective processes and may be generated at different times. As an example, Figure 6.x-2 shows that Burst #1 is composed of two PDU Sets. When the Burst Size is put into packet #1 of PDU Set #N, the PDU Set #(N+1) is not generated yet. Therefore, at the time packet #1 of PDU Set #N is transmitted, the traffic source needs to predict the size of PDU Set #(N+1), and the prediction comes with an error.

NOTE: The benefit of a data burst consisting of multiple PDU Sets that may be generated at different times is not clear. Revisit of the definitions of the data burst may be needed.



Figure 6.x-2 The size of PDU Set #(N+1) needs to be predicted when the Burst Size is put into packet #1 of Burst #1.

### 6.x.2 Proposed solution

**Proposal:** for potential normative work on indicating the time to the next data burst (TTNB) or the Burst Size is indicated by the user-plane, the indication of the respective prediction errors needs to be also considered when prediction is needed.

NOTE: This needs to be coordinated with SA2/RAN2.

\* \* \* \* End of 1st change \* \* \* \*