**3GPP TSG-SA WG4 Meeting 130S4-241800**

**Orlando, Florida, USA, November 18 - November 222024**

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| *CR-Form-v12.3* |
| **Pseudo CHANGE REQUEST** |
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|  | **26.822** | **CR** | **-** | **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 |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:***  | FS\_5G\_RTP\_Ph2 Solution KI#1 PDU Set Size overprovisioning |
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| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | SA WG 4 |
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| ***Work item code:*** | FS\_5G\_RTP\_Ph2 |  | ***Date:*** | 25-10-2024 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | 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:*** | Solution for KI #1 PDU Set Size |
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| ***Summary of change:*** | Causes of deviations between PDU Set Size at RTP sender and 5GS (i.e. UPF) are described in TS 26.522 and TR 26.822. Experimental data also showed that the deviation in most cases is less than 5 percentage points of the total PDU Set Size.NG-RAN may use the PSSize for resource allocation. For NG-RAN, a slightly smaller actual PDU Size is more problematic as additional resources need to be allocated. Overprovisioning the PDU set Size is proposed as a simple alternative to avoid complexity and problematic resource re-allocation at NG-RAN. |
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| ***Consequences if not approved:*** | Alternative solution that is simple and cost effective is not considered. Latency requirements may not be met in practical scenarios. |
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| ***Clauses affected:*** | 6.X new clause |
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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:*** |  |
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| Change 1 (ALL New Text) |

## 6.X Solution #X: PDU Set Size and Over Provisioning in RTP HE for PDU Set Marking

### 6.X.1 Key Issue mapping

This is a solution to key issue #1.

### 6.X.2 Description

#### 6.X.2.1 General

PDU Set Size is a field in the RTP Header Extension that can be used by the network to retrieve the PDU Set Size in bytes.

The accuracy of this field is a topic studied in KI #1.

Clause 6.4 contains a solution to KI #1.

A solution is also provided in TS 26.522 as well to include the IP packet overhead.

The reasons for deviation between PDU Set size at 5GS and sender are discussed in clause 6.4 and related problems in clause 5.1.

Data in 6.4 indicates that for a PDU sets of 22 Kbytes, a total deviation of up to 1000 bytes may occur i.e. up to maximum of 5 percent.

#### 6.X.2.2 Usage of PDU Set Size in NG-RAN



Figure 6.X.2.2-1

Figure 6.X.2.2-1 illustrates the signalling of PDU Set Size A from AS to UPF to NG-RAN.

Application server can add the PDU Set Size to RTP Packets using the RTP Header Extension, signalling PSSize A.

At the UPF after traversal through the network UPF may see PSSize plus or minus X (deviation due to network traversal).

This value A+-x is shared with NG-RAN with NG-RAN.

NG-RAN will allocate resources for timely transmission of the PDU Set based in this value.

This operation takes a bit of time, as NG-RANs allocates necessary resources for transmitting the PDU Set.

For this reason re-allocation is undesirable, as it may introduce additional delay.

Under-provisioning may lead to PDU Set delay budget not being met.

Therefore for NG-RAN it is better to do a *slight overprovisioning* instead of accidental *under-provisioning.*

Experiments in 6.4 and also comparing the potential header overhead, 5 percent is the upper bound, i.e. up to 1000 bytes for 23 Kb PDU Sets.

Highly accurate solutions are attempted in TS 26.522 and 6.4 with different mechanisms (out of band signalling) and taking into account specific protocol aspects such as IPv4 versus IP6 usage and IP header overhead.

However, it seems the PDU Set Size is still not fully accurate and *under-provisioning can still occur* . This implies that if an NG-RAN node receives a PDU Set Size that is too small, it allocates resources for it, but when the actually PDU Set is larger it needs to again allocate resources increasing the total delay for transmitting the PDU Set. This may lead to issues especially when the delay budget is small.

**Observation:** Even with the mechanisms in clause 6.4 and TS 26.522 PDU Set Size inaccuracy is still possible, and *under-provisioning* can occur.

Given this observation: *over-provisioning* is an alternative to avoid re-allocation of resources at NG-RAN due to under provisioning.

In this solution we propose to consider *over provisioning*, and enable explicit overprovisioning.

1. SA4 could recommend over-estimating PDU Set size by 5 percent

**Or**

 B) SA4 can align with SA2 on this matter aiming to adopt a guideline that up to 5 percent more resources may be allocated compared to the *estimated PDU Set Size* from the RTP Header Extension*.*

This would simplify TS 26.522 and avoid problematic *under provisioning*.

#### 6.X.2.3 Discussion

The following analysis of the solution is provided.

**Pro 1:** simpler solution, no out of band signalling, no need for transmission protocol specific operation.

**Pro 2:** explicit about inaccuracy, avoid under provisioning at NG-RAN.

**Con 1**: Some additional resources may be allocated in NG-RAN for PDU Set Transmission.

### 6.X.3 Proposal

Inaccuracy in PDU Set Size exists in all current proposals.

Overprovisioning can be a practical approach, mainly targeting to avoid *under provisioning*.

In this solution we propose to consider *over provisioning*, and enable explicit overprovisioning.

1. SA4 could recommend over-estimating PDU Set size by 5 percent

**Or**

 B) SA4 can align with SA-2 on this matter aiming to adopt a guideline that up to 5 percent more resources may be allocated compared to the *estimated PDU Set Size* from the RTP Header Extension*.*

This can enable simplifying TS 26.522 avoiding transport specific operations.

This solution introduces some overhead at NG-RAN,

but experimental and evaluation of the overhead in RTP packets, the overhead is bound under 5 percent of the PDU Set Size (assuming trivial issues like IP fragmentation etc. are avoided).

Communication with SA2 and RAN-2 will useful to get feedback on this solution.

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| END of Changes |