**3GPP TSG-SA5 Meeting #130-e *S5-202016rev1***

**Online, , 20th Apr 2020 - 28th Apr 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **28.552** | **CR** | **0206** | **rev** | **-** | **Current version:** | **16.5.0** |  |
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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 | **x** | Core Network |  |

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| ***Title:*** | Add measurement Average RLC packet delay in the UL | | | | | | | | | |
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| ***Source to WG:*** | Ericsson LM | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_SLICE\_ePA | | | | |  | ***Date:*** | | | 2020-04-08 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
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| ***Reason for change:*** | | Measurement with respect to “Average RLC packet delay in the UL” is today missing in TS 28.552 measurement specification. This UL delay measurement is needed for evaluation of UL packet delay performance in NG-RAN.  RAN L2 measurements specification TS 38.314 have defined one measurement named “Average RLC packet delay in the UL per DRB per UE.” | | | | | | | | |
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| ***Summary of change:*** | | A measurement named “Average RLC packet delay in the UL “have been added. The measurement definition from TS 38.314 is re-used.  The UC description in A.4 have been updated with respect to need for UL delay measurements. | | | | | | | | |
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| ***Consequences if not approved:*** | | It will not be possible to monitor the UL packet delay in gNB-DU | | | | | | | | |
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| ***Clauses affected:*** | | 5.1.1.1.x (new), A.4 | | | | | | | | |
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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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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| **1st modified section** |

##### 5.1.1.1.x Average RLC packet delay in the UL

a) This measurement provides the average (arithmetic mean) RLC packet delay on the uplink, ie the delay within the gNB-DU. The measurement is optionally split into subcounters per QoS level (mapped 5QI or QCI in NR option 3) and subcounters per S-NSSAI.

b) DER (n=1)

c) This measurement is obtained according to the definition in TS 38.314 [29], named “Average RLC packet delay in the UL per DRB per UE”. Separate counters are optionally maintained for each mapped 5QI (or QCI for option 3) and for each S-NSSAI. Each measurement is an real representing the mean delay in the unit 0,1 milliseconds.

d) The number of measurements is equal to one. If the optional measurements are perfomed, the number of measurements is equal to the number of mapped 5QIs/QCIs plus the number of S-NSSAIs.

e) The measurement name has the form DRB.RlcDelayUl, DRB.RlcDelayUl.*QOS* where *QOS* identifies the target quality of service class, and DRB.RlcDelayUl.*SNSSAI,* where *SNSSAI* identifies the S-NSSAI.

f) NRCellDU.

g) Valid for packet switched traffic.

h) 5GS.

i) One usage of this measurement is for performance assurance within integrity area (user plane connection quality).

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| **Next modified section** |

# A.4 Monitoring of UL and DL user plane delay in NG-RAN

Satisfying low packet delay is of prime concern for some services, particularly conversational services like speech and instant messaging. As the performance in UL and DL differs, it is important for operators to be able to monitor the UL and DL user plane delay separately. With performance measurements allowing the operator to obtain or derive the UL and DL user plane delay information separately, the operators can pinpoint the services performance problems to specific problems in UL or DL.

The DL delay monitoring in gNB refers to the delay of any packet within NG-RAN, including air interface delay until the UE receives the packet. A gNB deployed in a split architecture, the user plane delay will occur in gNB-CU-UP, on the F1 interface, in gNB-DU and on the air interface. Therefore, the delay measurements related to the four segments needs to be monitored for the DL delay to pinpoint where end user impact from packet delay occurs.

The average DL delay needs to be measured to give a general indication of the delay performance; further more the delay distributions (into bins with delay ranges) need to be measured, to tell the occurrences about the packets with each certain range of delay and better reflect the user experience.

The UL delay monitoring in gNB refers to the delay of any packet within NG-RAN, including air interface delay until the packet leaves gNB-CU-UP. There are 4 components associated to UL delay (UL over-the-air interface delay, gNB-DU delay, F1-U delay, CU-UP delay). Therefore, the delay measurements related to these four segments needs to be monitored for the UL delay to pinpoint where end user impact from packet delay occurs. The beamforming capabilities of the NRCellDU and of the UE can be different. This might create a difference in the successful reception probability of the DL data transmitted by the gNB-DU, versus the UL data transmitted by the UE as the later might involve more retransmission than the former one. This will increase the UL over-the-air delay compared to the DL over-the-air delay.

Different network slices may have different requirements on the delay, so the delay needs to be measured for each S-NSSAI.

To further pinpoint a detected delay performance problem, the packet delay measurement separation may be based on mapped 5QI (or for QCI in case of NR option 3).

NOTE: It is an asumtion that the DL/UL delay on the F1 interface is equal, only DL measurement is defined.

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| **End of modified section** |