**3GPP TSG- Meeting # *rev1***

**20-28 April 2020, E-meeting**

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| *CR-Form-v11.4* |
| **CHANGE REQUEST** |
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|  | **28.552** | **CR** | **0216** | **rev** | **-** | **Current version:** | **16.5.0** |  |
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| *For* [***HELP***](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 measurements related to UL packet delay between NG-RAN and UE |
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| ***Source to WG:*** | Intel |
| ***Source to TSG:*** | S5 |
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| ***Work item code:*** | 5G\_SLICE\_ePA |  | ***Date:*** | 2020-04-10 |
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| ***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 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-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:*** | The DL packet delay between NG-RAN and UE (including the delay at gNB-CU-UP, on F1-U and on gNB-DU and the delay over Uu interface) is one significant part of the e2e delay that has impact to users’ experience for some types of services (e.g., URLLC). The measurements on DL packet delay between NG-RAN and UE are missing. |
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| ***Summary of change:*** | Added measurements on DL packet delay between NG-RAN and UE |
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| ***Consequences if not approved:*** | The DL packet delay between NG-RAN and UE cannot be monitored. |
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| ***Clauses affected:*** | 5.1.1.1.x (new), 5.1.1.1.y (new) |
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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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| **1st Modified Section** |

##### 5.1.1.1.x Average UL delay between NG-RAN and UE

a) This measurement provides the average UL packet delay between NG-RAN and UE, which is the average of the summed delay incurred in NG-RAN (including the delay at gNB-CU-UP, on F1-U and on gNB-DU) and the delay over Uu interface. This measurement is split into subcounters per 5QI and subcounters per S-NSSAI.

b) DER (n=1).

c) The measurement is obtained by the following method:

 The gNB performs the GTP PDU packet delay measurement for QoS monitoring per the GTP PDU monitoring packets received from UPF, and records the following time stamps and information included in the GTP-U header of each GTP PDU monitoring response packet (packet i) sent to UPF (see 23.501 [4] and 38.415 [31]):

- The UL Delay Result from UE to NG-RAN indicating the uplink delay measurement result which is the sum of the delay incurred in NG-RAN (including the delay at gNB-CU-UP, on F1-U and on gNB-DU) and the delay over Uu interface (see 38.415 [31], and the UL Delay Result is denoted by in the present document);

- The 5QI and S-NSSAI associated to the GTP PDU monitoring response packet.

 The gNB counts the number (N) of GTP PDU monitoring response packets for each 5QI and each S-NSSAI respectively, and takes the following calculation for each 5QI and each S-NSSAI:

d) Each measurement is a real representing the average delay in 0.1ms.

e) DRB.DelayUlNgranUeAve.*5QI, where 5QI* identifies the 5QI;
DRB.DelayUlNgranUeAve.*SNSSAI, where SNSSAI* identifies the S-NSSAI.

f) NRCellCU (for non-split and 2-split scenario);
GNBCUUPFunction (for 3-split scenario).

g) Valid for packet switched traffic.

h) 5GS.

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| **Next Modified Sections** |

##### 5.1.1.1.y Distribution of UL delay between NG-RAN and UE

a) This measurement provides the distribution of UL packet delay between NG-RAN and UE, which is the delay incurred in NG-RAN (including the delay at gNB-CU-UP, on F1-U and on gNB-DU) and the delay over Uu interface. This measurement is split into subcounters per 5QI and subcounters per S-NSSAI.

b) DER (n=1).

c) The measurement is obtained by the following method:

 The gNB performs the GTP PDU packet delay measurement for QoS monitoring per the GTP PDU monitoring packets received from UPF, and records the following time stamps and information included in the GTP-U header of each GTP PDU monitoring response packet (packet i) sent to UPF (see 23.501 [4] and 38.415 [31]):

- The UL Delay Result from UE to NG-RAN indicating the uplink delay measurement result which is the sum of the delay incurred in NG-RAN (including the delay at gNB-CU-UP, on F1-U and on gNB-DU) and the delay over Uu interface (see 38.415 [31], and the UL Delay Result is denoted by in the present document);

- The 5QI and S-NSSAI associated to the GTP PDU monitoring response packet.

 The gNB increments the corresponding bin with the delay range where the falls into by 1 for the subcounters per 5QI and subcounters per S-NSSAI.

d) Each measurement is an integer representing the number of GTP PDUs measured with the delay within the range of the bin.

e) DRB.DelayUlNgranUeDist.*5QI.Bin,* where *Bin* indicates a delay range which is vendor specific, and *5QI* identifies the 5QI;
DRB.DelayUlNgranUeDist.*SNSSAI.Bin,* where *Bin* indicates a delay range which is vendor specific, and *SNSSAI* identifies the S-NSSAI.

f) NRCellCU (for non-split and 2-split scenario);
GNBCUUPFunction (for 3-split scenario).

g) Valid for packet switched traffic.

h) 5GS.

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| **End of Modified Sections** |