**3GPP TSG-SA5 Meeting #130e *S5-202046***

**e-meeting 20-28 April 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **28.552** | **CR** | **0212** | **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 | **x** |

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| ***Title:*** | TS 28.552 update the precision of packet delay | | | | | | | | | |
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| ***Source to WG:*** | Huawei, Ericsson | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
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| ***Work item code:*** | 5G\_SLICE\_ePA | | | | |  | ***Date:*** | | | 2020-04-07 |
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| ***Category:*** | F |  | | | | | ***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:*** | | For the communication services which have critical requirements on network packet delay, e.g., the URLLC services, the precision of 0.1 ms is requried. Besides, the precision of packet delay in TS 38.314 defind by RAN2 is 0.1 ms. Therefore, this CR changes the precision of the packet delay in this specification. | | | | | | | | |
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| ***Summary of change:*** | | Update the precision of the packet delay. | | | | | | | | |
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| ***Consequences if not approved:*** | | The precision of the downlink packet delay is not alinged with uplink packet delay. | | | | | | | | |
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| ***Clauses affected:*** | | 5.1.1.1.3, 5.1.1.3.1, 5.1.3.3.1, 5.1.3.3.2, 5.1.3.3.3, 5.1.3.4.2 | | | | | | | | |
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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:*** | |  | | | | | | | | |
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| ***This CR's revision history:*** | |  | | | | | | | | |

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| **1st of Changes** |

##### 5.1.1.1.3 Average delay UL on over-the-air interface

a) This measurement provides the average (arithmetic mean) over-the-air packet delay on the uplink. 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 defined in TS 38.314 [29], named “Average over-the-air interface 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 a real representing the mean delay in 0.1 millisecond.

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 plus the number of S-NSSAIs.

e) The measurement name has the form DRB.AirIfDelayUl, DRB.AirIfDelayUl.*QOS* where *QOS* identifies the target quality of service class, and DRB.AirIfDelayUl.*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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| **2nd of Changes** |

##### 5.1.1.3.1 Average DL GTP packet delay between PSA UPF and NG-RAN

a) This measurement provides the average DL GTP packet delay between PSA UPF and NG-RAN. This measurement is split into subcounters per 5QI and subcounters per S-NSSAI. This measurement is only applicable to the case the PSA UPF and NG-RAN are time synchronised.

b) DER (n=1).

c) The measurement is obtained by the following method:

The UPF samples the GTP packets for QoS monitoring based on the policy provided by OAM or SMF.

NOTE: The sampling rate may vary for different S-NSSAI and different 5QIs, and the specific sampling rate is up to implementation unless given by the QoS monitoring policy.

For each DL GTP PDU (packet i) encapsulated with QFI, TEID, and QMP indicator for QoS monitoring, the gNB records the following time stamps and information (see 23.501 [4] and 38.415 [31]):

- T1 received in the GTP-U header indicating the local time that the DL GTP PDU was sent by the PSA UPF;

- T2 that the DL GTP PDU was received by NG-RAN;

- The 5QI and S-NSSAI associated to the DL GTP PDU.

The gNB counts the number (N) of DL GTP PDUs encapsulated with QFI, TEID, and QMP indicator 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 0.1 millisecond.

e) GTP.DelayDlPsaUpfNgranMean.*5QI, where 5QI* identifies the 5QI;   
GTP.DelayDlPsaUpfNgranMean.*SNSSAI, where SNSSAI* identifies the S-NSSAI.

f) EP\_N3 (contained by GNBCUUPFunction).

g) Valid for packet switched traffic.

h) 5GS.

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| **3rd of Changes** |

##### 5.1.3.3.1 Average delay DL in CU-UP

a) This measurement provides the average (arithmetic mean) PDCP SDU delay on the downlink within the gNB-CU-UP, for all PDCP packets. 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 as: sum of (time when sending a PDCP SDU to the gNB-DU at the egress PDCP layer on F1-U/Xn-U, minus time of arrival of the same packet at NG-U ingress IP termination) divided by total number of PDCP SDUs arriving at NG-U ingress IP termination. Separate counters are optionally maintained for each mapped 5QI (or QCI for option 3) and for each S-NSSAI.

d) Each measurement is areal representing the mean delay in 0.1 millisecond. The number of measurements is equal to one. If the optional QoS level subcounters and S-NSSAI subcounters are, the number of measurements is equal to sum of the number of mapped 5QIs and S-NSSAIs.

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

f) GNBCUUPFunction

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).

##### 5.1.3.3.2 Average delay DL on F1-U

a) This measurement provides the average (arithmetic mean) GTP packet delay DL on the F1-U interface. 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 as: the time when receiving a GTP packet delivery status message from the gNB-DU at the egress GTP termination, minus time when sending the same packet to gNB-DU at the GTP ingress termination, minus feedback delay time in gNB-DU, obtained result is divided by two. Separate counters are optionally maintained for each mapped 5QI (or QCI for option 3) and for each S-NSSAI.

d) Each measurement is a real representing the mean delay in 0.1 millisecond. The number of measurements is equal to one. If the optional QoS level measurement is perfomed, the number of measurements is equal to the number of mapped 5QIs.

e) The measurement name has the form DRB.PdcpF1DelayDl,   
optionally DRB.GtpF1DelayDl.*QOS* where *QOS* identifies the target quality of service, and  
optionally DRB.GtpF1DelayDl.*SNSSAI,* where *SNSSAI* identifies the S-NSSAI.

f) GNBCUUPFunction

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).

##### 5.1.3.3.3 Average delay DL in gNB-DU

a) This measurement provides the average (arithmetic mean) RLC SDU delay on the downlink within the gNB-DU, for initial transmission of all RLC packets. 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 as: sum of (time when the last part of an RLC SDU was scheduled and sent to the MAC layer for transmission over the air, minus time of arrival of the same packet at the RLC ingress F1-U termination) divided by total number of RLC SDUs arriving at the RLC ingress F1-U termination. If the RLC SDU needs retransmission (for Acknowledged Mode) the delay will still include only one contribution (the original one) to this measurement. Separate counters are optionally maintained for each mapped 5QI (or QCI for option 3) and for each S-NSSAI. Each measurement is a real representing the mean delay in 0.1 millisecond.

d) The number of measurements is equal to one. If the optional QoS level measurement is perfomed, the number of measurements is equal to the number of mapped 5QIs.

e) The measurement name has the form DRB.RlcSduDelayDl,   
optionally DRB.RlcSduDelayDl.*QOS* where *QOS* identifies the target quality of service class, and  
optionally DRB.RlcSduDelayDl.*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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| **4th of Change** |

##### 5.1.3.4.2 Average IP Latency DL in gNB-DU

a) This measurement provides the average IP Latency in DL (arithmetic mean) within the gNB-DU, when there is no other prior data to be transmitted to the same UE in the gNB-DU. The measurement is optionally split into subcounters per QoS level and subcounters per S-NSSAI.

b) DER (n=1)

c) This measurement is obtained as: sum of (time when the first piece of an RLC SDU transmitted on the air interface, minus time of arrival of the same packet at the RLC ingress F1-U termination, for IP packets arriving when there is no other prior data to be transmitted to the same UE in the gNB-DU) divided by total number of RLC SDUs arriving at the RLC ingress F1-U termination when there is no other prior data to be transmitted to the same UE in the gNB-DU. Separate counters are optionally maintained for each mapped 5QI (or QCI for option 3) and for each S-NSSAI.

d) Each measurement is a real representing the average latency in 0.1 millisecond. The number of measurements is equal to one. If the optional QoS level subcounters and S-NSSAI subcounters are measurement is performed, the number of measurements is equal to the sum of number of supported mapped 5QIs and the number of S-NSSAIs.

e) The measurement name has the form DRB.RlcSduLatencyDl,   
optionally DRB.RlcSduLatencyDl.*QOS* where *QOS* identifies the target quality of service class, and  
optionally DRB.RlcSduLatencyDl.*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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| **End of Change** |