**3GPP TSG- Meeting # *rev2***

**20-28 April 2020, E-meeting** *Revision of S5-201182*

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| *CR-Form-v11.4* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **28.552** | **CR** | **0191** | **rev** | **2** | **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 |  | Core Network | **X** |

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| ***Title:*** | Add measurements related to DL delay between PSA UPF and UE | | | | | | | | | |
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| ***Source to WG:*** | Intel, ETRI | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***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 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:*** | | The end to end DL delay in 5G networks between UE and PSA UPF has direct impact to users’ experience for some types of services (e.g., URLLC). In case the PSA UPF and NG-RAN are time synchronised, the DL delay between PSA UPF and UE can be measured at PSA UPF.  The measurements on the DL delay between PSA UPF and NE can be used to evaluate the user plane delay performance in 5G networks and users’ experience. | | | | | | | | |
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| ***Summary of change:*** | | Added measurements on DL one way packet delay between PSA UPF and UE. | | | | | | | | |
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| ***Consequences if not approved:*** | | The DL packet delay between PSA UPF and UE cannot be monitored. | | | | | | | | |
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| ***Clauses affected:*** | | 5.4.x (new), A.x (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** |

### 5.4.x One way packet delay between PSA UPF and UE

#### 5.4.x.1 DL packet delay between PSA UPF and UE

##### 5.4.x.1.1 Average DL packet delay between PSA UPF and UE

a) This measurement provides the average DL packet delay between PSA UPF and UE. This measurement is split into 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 performs QoS monitoring per the request received from SMF during PDU Session Establishment or Modification procedure.

NOTE: The UPF may sample the GTP packets for QoS monitoring, the specific sampling rate is up to implementation

For each received GTP PDU monitoring response packet (packet i) for QoS monitoring, the PSA UPF records the following time stamps and information included in the GTP-U header (see 23.501 [4] and 38.415 [31]):

- T1 indicating the local time the DL GTP PDU monitoring packet was sent by the PSA UPF;

- T2 indicating the local time that the DL GTP PDU monitoring packet was received by NG-RAN;

- The DL Delay Result from NG-RAN to UE indicating the downlink 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 DL Delay Result is denoted by in the present document);

- The S-NSSAI associated to the DL GTP PDU monitoring response packet.

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

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

e) GTP.DelayDlPsaUpfUeMean.*SNSSAI,* where *SNSSAI* identifies the S-NSSAI.

f) EP\_N3 (contained by UPFFunction);   
EP\_N9 (contained by UPFFunction).

g) Valid for packet switched traffic.

h) 5GS.

##### 5.4.x.1.2 Distribution of DL packet delay between PSA UPF and UE

a) This measurement provides the distribution of DL packet delay between PSA UPF and UE. This measurement is split into 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 performs QoS monitoring per the request received from SMF during PDU Session Establishment or Modification procedure.

NOTE: The UPF may sample the GTP packets for QoS monitoring the specific sampling rate is up to implementation.

For each received DL GTP PDU monitoring response packet (packet i) for QoS monitoring, the PSA UPF records the following time stamps and information included in the GTP-U header (see 23.501 [4] and 38.415 [31]):

- T1 indicating the local time the DL GTP PDU monitoring packet was sent by the PSA UPF;

- T2 indicating the local time that the DL GTP PDU monitoring packet was received by NG-RAN;

- The DL Delay Result from NG-RAN to UE indicating the downlink 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 DL Delay Result is denoted by in the present document);

- The S-NSSAI associated to the DL GTP PDU monitoring response packet.

The PSA UPF 1) takes the following calculation for each GTP PDU monitoring response packet for each S-NSSAI, and 2) increment the corresponding bin with the delay range where the result of 1) falls into by 1 for the subcounter 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) GTP.DelayDlPsaUpfUeDist.*SNSSAI.bin,* where *Bin* indicates a delay range which is vendor specific, and *SNSSAI* identifies the S-NSSAI.

f) EP\_N3 (contained by UPFFunction);   
EP\_N9 (contained by UPFFunction).

g) Valid for packet switched traffic.

h) 5GS.

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| **Next Modified Sections** |

# A.x Monitoring of one way delay between PSA UPF and UE

The end to end DL/UL delay in 5G networks between UE and PSA UPF has direct impact to users’ experience for some types of services (e.g., URLLC). In case the PSA UPF and NG-RAN are time synchronised, the DL/UL delay between PSA UPF and UE can be measured at PSA UPF.

The measurements on the DL/UL delay between PSA UPF and NE can be used to evaluate the user plane delay performance in 5G networks and users’ experience.

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| **End of Modified Sections** |