**3GPP TSG-CT WG4 Meeting #110-eC4-223275**

**E-Meeting, 12th – 20th May 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  |  | **CR** | **0645** | **rev** |  | **Current version:** |  |  |
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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:***  | Corrections on QoS Monitoring per QoS flow |
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| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | C4 |
|  |  |
| ***Work item code:*** | TEI17 |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** |  |
|  | *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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | There were some misalignments between CT4 and SA2/RAN3 specification on the requirements to support QoS Monitoring per QoS flow.For example, TS 29.244 does't mention the setting the flag of QoS Monitoring Packet (QMP) for those QoS monitoring packet. See the following requirements as specified in clause 5.33.3.2:...*- The PSA UPF encapsulates in the GTP-U header with QFI, QoS Monitoring Packet (QMP) indicator (which indicates the packet is used for UL/DL packet delay measurement) and the local time T1 when the PSA UPF sends out the DL monitoring packets.**- The NG-RAN records the local time T1 received in the GTP-U header and the local time T2 at the reception of the DL monitoring packets.**- When receiving an UL packet from UE for that QFI or when the NG-RAN sends a dummy UL packet as monitoring response (in case there is no UL service packet for UL packet delay monitoring), the NG-RAN encapsulates QMP indicator, the RAN part of UL/DL packet delay result, the time T1 received in the GTP-U header, the local time T2 at the reception of the DL monitoring packet and the local time T3 when NG-RAN sends out this monitoring response packet to the UPF via N3 interface, in the GTP-U header of the monitoring response packet.**NOTE 1: When the NG-RAN sends the dummy UL packet as monitoring response to PSA UPF depends on NG-RAN's implementation.*...It is not clear what is the dummy GTP-U packet, it is proposed to clarify it that a dummy GTP-U packet has null T-PDU.In addition, TS 29.244 doesn't enable the UPF to use DL dummy GTP-U packets to carry the timestamp (T1), while for Periodic based QoS Monitoring, it is possible there is no DL user payload packet received, in such case, the PSA UPF seems have to use DL dummy GTP-U packets.DL PDU SESSION INFORMATION frame as specified in TS 38.415:

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| --- | --- |
|  Bits | Number of Octets |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| PDU Type (=0) | QMP | SNP | MSNP | Spare | 1 |
| PPP | RQI | QoS Flow Identifier  | 1 |
| PPI | Spare | 0 or 1 |
| DL Sending Time Stamp | 0 or 8 |
| DL QFI Sequence Number | 0 or 3 |
| DL MBS QFI Sequence Number | 0 or 4 |
| Padding  | 0-3 |

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| ***Summary of change:*** | Correct the description for QoS Monitoring per QoS flow to align with the requirements specified in TS 23.501 and TS 38.415. |
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| ***Consequences if not approved:*** | Inconsistent requirements may lead different implmentation which results in interoperability issues.  |
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| ***Clauses affected:*** | 5.24.4.3 |
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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:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\* \* \* \* First change \* \* \* \*

#### 5.24.4.3 QoS Monitoring Reporting

If the UPF is requested to perform QoS Monitoring (i.e. it receives one or more QoS Monitoring per QoS flow Control Information IEs from the SMF), the UPF shall select one or more downlink payload packets pertaining to every requested QoS flow(s) whenever available or create one or more dummy downlink GTP-U packets (i.e. G-PDU messages without a T-PDU as specified in clause 5.2.2.7 of 3GPP TS 29.281 [3]) otherwise, and insert the time stamp, and set the QoS Monitoring Packet (QMP) flag to "1" and the corresponding QoS Flow Identifer (for the requested QoS flow) into the GTP-U PDU Session Container extension header (see 3GPP TS 38.415 [34]) of these downlink packets.

When receiving the uplink packet related to the requested QoS flow(s), the UPF shall measure the packet delay(s) based on the time stamp(s) and packet delay(s) included in the GTP-U PDU Session Container extension header (see 3GPP TS 38.415 [34]) of the uplink packet, and generate a QoS monitoring report towards the SMF, if the packet delay(s) exceeds the defined Packet Delay Thresholds and Event Triggered QoS monitoring reporting is required in the reporting frequency. The UPF may send a next report only after the minimum waiting time indicated by the SMF.

An Intermediate UPF between the PSA UPF and the NG-RAN forwards any received dummy GTP-U packets together with the GTP-U PDU Session Container extension header to the next GTP-U entity.

NOTE: The dummy GTP-U packet(s) are not forwarded to the UE neither to the Packet Data Network, thus they are not measured for usage reporting.

If the Periodic QoS monitoring reporting is required in the reporting frequency, the UPF shall generate QoS monitoring report based on the Measurement Period.

The UPF shall send QoS Monitoring Report IE to the SMF in PFCP Session Report Request; several QoS Monitoring Report IEs may be present to report the packet delay(s) for multiple QoS flows. The UPF shall include the delay value (Downlink, Uplink and/or Round trip) in the QoS Monitoring Measurement IE in the QoS Monitoring Report IE. See clause 5.33.5 for reporting the QoS monitoring events directly to the Local NEF or AF.

The UPF shall continue to apply all the provisioned SRR(s) and perform the related QoS monitoring measurement(s), until getting any further instruction from the CP function.

When receiving a new threshold (Packet Delay Thresholds, Minimum Wait Time and/or Measurement Period) from the SMF for a measurement that is already ongoing in the UPF, the UPF shall consider its ongoing measurements against the new threshold to determine when to send its next QoS monitoring report to the SMF or to the Local NEF or AF (if direct reporting of QoS monitoring event applies, see clause 5.33.5).

When receiving instruction from the SMF to stop the on-going QoS monitoring, the UPF shall generate a QoS monitoring report to the SMF or to the Local NEF or AF (if direct reporting of QoS monitoring event applies, see clause 5.33.5), to report the detected packet delay(s).

At the PFCP session termination, the UPF shall include a QoS Monitoring Report IE in the PFCP Session Deletion Response or the UPF shall send a QoS monitoring event directly to the Local NEF or AF (if direct reporting of QoS monitoring event applies, see clause 5.33.5), if the reporting frequency requests a report to be generated at the PFCP session termination.

If the Event Triggered QoS monitoring reporting is required in the reporting frequency, and no time stamp is received in uplink packet for a delay exceeding the Packet Delay Thresholds, the UPF shall generate a QoS monitoring report indicating a packet delay measurement failure to the SMF or to the Local NEF or AF (if direct reporting of QoS monitoring event applies, see clause 5.33.5).

If the Periodic QoS monitoring reporting is required in the reporting frequency, and no time stamp is received in uplink packet for a delay exceeding the Measurement Period, the UPF shall generate a QoS monitoring report indicating a packet delay measurement failure to the SMF or to the Local NEF or AF (if direct reporting of QoS monitoring event applies, see clause 5.33.5).

\* \* \* \* End of changes \* \* \* \*