**3GPP TSG-WG SA2 Meeting #154  *S2-2210848r01***

**Toulouse, France, Nov 14 – 18, 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **23.502** | **CR** | **3653** | **rev** | **-** | **Current version:** | **17.6.0** |  |
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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 |  | Core Network | **X** |

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| ***Title:***  | QoS Monitoring for dynamic satellite backhaul delay control |
|  |  |
| ***Source to WG:*** | Samsung, Xiaomi |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | 5GSATB |  | ***Date:*** | 2022-11-14 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-18 |
|  | *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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | It is concluded in clause 8.1 of TS 23.700-27 on PCC/QoS control enhancement considering dynamic satellite backhaul. |
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| ***Summary of change:*** | Introduce signallings that indicate satellite backhaul with dynamic delay is used in N3 interface, and signallings for QoS Monitoring on GTP-path initiation in CN. |
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| ***Consequences if not approved:*** | QoS monitoring to measure the packet delivery latency on N3 interface for a PDU session which is carried over satellite backhaul with dynamic delay is not supported. |
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| ***Clauses affected:*** | 4.4.2.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **x** |  |  Other core specifications  | TS 23.501 CR 3816TS 23.503 CR 0791 |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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

\* \* \* \* Next change \* \* \* \*

4.4.2.2 N4 Session Level Reporting Procedure

This procedure is used by the UPF to report events related to an N4 session for an individual PDU Session. The triggers for event reporting were configured on the UPF during N4 Session Establishment/Modification procedures by the SMF.

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**Figure 4.4.2.2-1: N4 Session Level Reporting procedure**

1. The UPF detects that an event has to be reported. The reporting triggers include the following cases:

(1) Measurement information reporting (Usage Report).

 Measurement information shall be collected in the UPF and reported to the SMF as defined in clause 5.8 and clause 5.12 of TS 23.501 [2].

NOTE 1: The Usage Report is also used for the reporting of other events or information. For details refer to clause 7.5.8.3 of TS 29.244 [69].

(2) Start of traffic detection (Usage Report).

 When traffic detection is requested by SMF and the start of traffic is detected for a Packet Detection Rule (PDR) as described in clause 5.8 of TS 23.501 [2], the UPF shall report the start of traffic detection to the SMF and indicate the corresponding PDR rule ID.

(3) Stop of traffic detection (Usage Report).

 When traffic detection is requested by SMF and the end of traffic is detected for a PDR as described in clause 5.8 of TS 23.501 [2], the UPF shall report the stop of traffic detection to the SMF and indicate the corresponding PDR rule ID.

(4) Detection of 1st downlink packet for a QoS Flow of a PDU Session with UP Connection deactivated (Downlink Data Report).

 When UPF receives the first downlink packet for a QoS Flow but no N3/N9 tunnel for downlink data transmission exists and the buffering is performed by the UPF, it shall report the detection of 1st downlink packet to SMF also indicating the QoS Flow for which the downlink packet was received (for the purpose of downlink data notification). The UPF shall also report the DSCP of the packet if the PDU Session type is IP (to support the Paging Policy Differentiation feature described in clause 5.4.3 of TS 23.501 [2]).

(5) Detection of PDU Session Inactivity for a specified period (User Plane Inactivity Report).

 When an Inactivity Timer for a PDU Session is provided by SMF during N4 Session Establishment/Modification procedure and the UPF detects the PDU Session has no data transfer for a period specified by the Inactivity Timer, it shall report PDU Session Inactivity to the SMF.

NOTE 2: As described in clause 4.3.7, an Inactivity Timer to the UPF is not provided by the SMF for always-on PDU Sessions.

(6) The UL, DL or round trip packet delay measurement reporting (Session Report).

 When the QoS Monitoring for URLLC is enabled for the QoS Flow, the UPF calculates the UL, DL or round trip packet delay of the QoS Flow. If the redundant transmission on N3/N9 interfaces is activated, the UPF performs packet delay monitoring for both UP paths and reports the packet delay of the two UP paths respectively. When the reporting trigger(s) is satisfied, e.g. the measured packet delay value exceeds the reporting threshold, or the reporting period expires, or the PDU Session is released, the UPF reports the calculated packet delay value(s) to the SMF. When receiving the measurement reports from the UPF, the SMF sends the reports to the target, i.e. either to the PCF or to the AF (may be via NEF), according to the information for QoS Monitoring for URLLC received in the PCC rules. If the PCF received the report, the PCF sends the reports to the AF, based on the procedure as defined in clause 4.16.5.1.

 When the QoS Monitoring for dynamic satellite backhaul delay control is enabled for the GTP-U path, the UPF calculates the UL, DL, or round trip packet delay of the GTP-U path. When the reporting trigger(s) is satisfied, e.g. the measured packet delay value exceeds the threshold values, or the reporting period expires, or the PDU Session is released, the UPF reports the calculated packet delay value(s) to the SMF. When receiving the measurement reports from the UPF, the SMF sends the reports to the target, i.e. either to the PCF or to the AF (may be via NEF), according to the information for QoS Monitoring for dynamic satellite backhaul delay control received in the PCC rules.

(7) TSC Management Information available (TSC Management Information).

 When TSC management information is available, the UPF shall provide the TSC management information in the TSC Management Information to the SMF as defined in clause 5.8.2.11.14 of TS 23.501 [2].

(8) Discard Downlink Traffic detection (Downlink Data Report).

 When discarded downlink traffic detection is requested by SMF for a PDR and the first downlink packet is discarded after being buffered for this PDR as described in clause 5.8.3.2 of TS 23.501 [2], the UPF shall report the discarded downlink traffic detection to the SMF and indicate the corresponding PDR rule ID (for the purpose of downlink data delivery status notification).

(9) Buffered Downlink Traffic detection (Downlink Data Report).

 When buffered downlink traffic detection is requested by SMF for a PDR and the first downlink packet is buffered for this PDR as described in clause 5.8.3.2 of TS 23.501 [2], the UPF shall report the buffered downlink traffic detection to the SMF and indicate the corresponding PDR rule ID (for the purpose of downlink data delivery status notification).

2. The UPF sends an N4 session report message (N4 Session ID, list of [Usage Report, Downlink Data Report, Session Report, User Plane Inactivity Report, TSC Management Information]) to the SMF.

3. The SMF identifies the N4 session context based on the received N4 Session ID and applies the reported information for the corresponding PDU Session. The SMF responds with an N4 session report ACK message.

\* \* \* \* Next change \* \* \* \*

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