**3GPP TSG-SA1 Meeting #99e** S1-22xxxx

**Electronic Meeting, 22 Aug - 1 Sept 2022**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **22.261** | **CR** | xxxx | **rev** | **-** | **Current version:** | **18.6.1** |  |
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| *For* ***[HE](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_blank)******[LP](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_blank)*** *on using this form: comprehensive instructions can be found at  <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:*** | New requirements for QoS monitoring | | | | | | | | | |
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| ***Source to WG:*** | ZTE Corporation | | | | | | | | | |
| ***Source to TSG:*** | SA1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | MeasureData | | | | |  | ***Date:*** | | | 2022-06-14 |
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| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)*  *Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Nowadays, some periodic deterministic communication service required by vertical industries, such as motion control and high speed current differential protection, have stringent communication service performance requirements in latency. For motion control, an immediate disruption will be caused if one packet is delayed, and for differential current protection, the protection relay will enter a blocking mode if it cannot receive one packet within in a certain period of time, which may cause a false trip. In many practical applications, the delay problems are not caused by the communication network. Therefore, the network operators need to prove this to the vertical industry users when there is service fault or disruption. Packet-level QoS monitoring refers to support QoS monitoring of all the packets in a QoS flow. It can be used to prove that the delay is not caused by the communication network for services such as motion control and high speed current differential protection. In addition, it also helps determine whether the delay is caused by which part inside the 3GPP network, e.g. air interface, CU/DU interface, NG interface.  However, the current existing QoS monitoring and monitoring result reporting requirements do not support a granularity of packet level. The reported monitoring results may be the average results of several packets, which will lead to inaccurate evaluation and false fault detection. In addition, mechanisms shall be supported for operators and vertical industry users to start and stop QoS monitoring and reporting of a specified data packet to avoid network burden. Therefore, new requirements are needed to reflect this new demand from vertical industries and operators.  On the other hand, the existing refresh rate requirement for QoS monitoring is not clear, i.e. who can specify the refresh rate and whether the collection rate and monitoring result reporting refresh rate are the same. To avoid network burden and process cost, it is necessary to clarify further. | | | | | | | | |
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| ***Summary of change:*** | | New requirements are introduced in clause 6.23.2 to support QoS monitoring with packet granularity.  - The QoS monitoring and reporting per data packet shall be supported.  - Mechanisms to enable an authorized application/network entity to start and stop QoS monitoring per data packet shall be supported.  A NOTE is added to clarify the existing refresh rate requirement for QoS monitoring. | | | | | | | | |
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| ***Consequences if not approved:*** | | QoS monitoring is not able to support packet granularity for network operators and vertical industry users.  QoS monitoring refresh rate requirement is not clear. | | | | | | | | |
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| ***Clauses affected:*** | | 6.23.2 | | | | | | | | |
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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:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

**------------------------------------------------------Start of the change-----------------------------------------------------**

### 6.23.2 Requirements

The 5G system shall provide a mechanism for supporting real-time E2E QoS monitoring within a system.

NOTE 1: The end points in E2E are the termination points of the communication service within the boundary of the 5G system.

The 5G system shall support combined QoS monitoring for a group of UEs.

NOTE 1A: Combined monitoring stands for the monitoring of several UEs for which the monitoring results are reported together. An example for combined QoS monitoring is that the 5G networks monitors the service bit rates of all connections associated with the group of UEs.

The 5G network shall provide an interface to an application for QoS monitoring (e.g. to initiate QoS monitoring, request QoS parameters, events, logging information).

The 5G system shall be able to provide real time QoS parameters and events information to an authorized application/network entity.

NOTE 2: The QoS parameters to be monitored and reported can include latency (e.g. UL/DL or round trip), jitter, and packet loss rate.

The 5G system shall be able to log the history of the communication events.

NOTE 3: The communication history may include timestamps of communication events and position-related information. Examples of such information are the positions of UEs and of radio base stations associated with communication events. Communication events include instances when the required QoS is not met.

The 5G system shall support different levels of granularity for QoS monitoring (e.g. per flow or set of flows).

The 5G system shall be able to provide event notification upon detecting an error that the negotiated QoS level cannot be met/guaranteed.

The 5G system shall be able to provide information that identifies the type and the location of a communication error (e.g. cell ID).

The 5G system shall be able to provide notification of communication events to authorized entities per pre-defined patterns.

NOTE 4: An example for a communication event is that the service bit rate drops below a pre-defined threshold for QoS parameters. When such an event occurs, the authorized entity is notified, and the event is logged.

The 5G system shall support event-based QoS monitoring.

NOTE 5: An example for a triggering event is a position change of the pertinent UE. A position change can, for instance, be inferred from a 5G position service that tracks the UE.

The 5G system shall be able to respond to a request from an authorized entity to provide real-time QoS monitoring information within a specified time after receiving the request (e.g., within 5 s).

NOTE 6: The response time can be specified by the user.

The 5G system shall support real time QoS monitoring with a specified update/refresh rate.

NOTE 7: The update/refresh rate can be specified by the user. The update/refresh rates for monitoring and reporting can be different.

The 5G system shall be able to provide statistical information of service parameters and error types while a communication service is in operation.

NOTE 8: The time span for collection and evaluation of statistical values can be specified by the user.

The 5G system shall provide information on the current availability of a specific communication service in a particular area (e.g. cell ID) upon request of an authorized entity.

The 5G system shall provide a means by which an MNO informs a third party of network events (failure of network infrastructure affecting UEs in a particular area, etc.).

Based on MNO policy, the 5G system shall provide a mechanism to automatically report service degradations, communications loss, and sustained connection loss in a specific geographic area (e.g., a cell sector, a cell or a group of cells) to a third party.

NOTE 9: These reports use a standard format. The specific values, thresholds, and conditions upon which alarms occur can include the measured values for end-to-end latency, service bit rate, communication service availability, end-to-end latency jitter, etc. for a UE, the UE’s location, and the time(s) during which the degradation occurred.

The 5G system shall provide a mechanism for an authorised third party to report to an MNO service degradations, communication loss, and sustained connection loss.

NOTE 10: These reports use a standard format. The specific values, thresholds, and conditions upon which alarms occur can include the measured values for end-to-end latency, service bit rate, communication service availability, end-to-end latency jitter, etc. for a UE, the UE’s location, and the time(s) during which the degradation occurred.

NOTE 11: What the MNO does with such reports is out of scope of 3GPP.

The 5G system shall support QoS monitoring with granularity of data packet corresponding to a specific type.

The 5G system shall be able to provide real time QoS parameters (e.g. latency) of data packet(s) of a specific QoS flow to an authorized application/network entity.

The 5G system shall be able to provide a mechanism for an authorized application/network entity to start QoS monitoring with granularity of data packet.

The 5G system shall be able to provide a mechanism for an authorized application/network entity to stop QoS monitoring with granularity of data packet.

**-----------------------------------------------------End of the change-------------------------------------------------------**