**3GPP TSG CT WG3 Meeting #137 *C3-245090***

**Hefei, CN, 14th – 18th October, 2024**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **512** | **CR** | **1270** | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Alignment of QoS monitoring with stage-2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | , Huawei | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI19, 5GS\_Ph1-CT | | | | |  | ***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 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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | TS 23.501 states in 5.45.1: ‘QoS monitoring comprises of measurements of QoS monitoring parameters and reports of the measurement result for a QoS Flow and can be enabled based on 3rd party application requests and/or operator policies configured in the PCF.’  This requirement was further aligned in TS 23.503 with the agreed SA2 CR S2-2409206 (CR#1330), with below update: 6.1.3.21 QoS Monitoring control The AF may also request measurements for the following QoS Monitoring parameters (see clause 6.1.3.18) that are derived by PCF:  - Packet Delay Variation, as described in clause 6.1.3.26.  - Round-trip delay for two service data flows, as described in clause 5.37.4 of TS 23.501 [2].  In addition, the following AF requested QoS requirements may trigger QoS monitoring for service data flow(s):  - Round-trip latency requirement, see clause 5.37.6 of TS 23.501 [2] and clause 6.1.3.27.2.  The PCF generates the authorized QoS Monitoring policy for the service data flow based on local policy and/or AF request, including the QoS Monitoring request if received from the AF (as specified in clause 6.1.3.22 and in TS 23.502 [3]) and AF subscription requests for other QoS Monitoring parameter measurements as listed above.  Updates related to above changes are implemented in TS 29.512 impacted clauses. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Clause 4.2.3.25.1 and 4.2.6.10.1 is updated for above alignement. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Mis-alignment with stage-2. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.2.3.25.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 does not impact the open API defined in this specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

\*\*\* First Change \*\*\*

##### 4.2.3.25.1 General

The QoS Monitoring control refers to the real time measurement of QoS monitoring parameters between the UE and the UPF for a QoS flow.

NOTE 1: The AF can request measurements for one or more QoS monitoring parameters, which can trigger QoS monitoring control for service data flow(s). This clause describes QoS monitoring control for packet delay, congestion, and data rate.

If the "QosMonitoring" feature is supported, the PCF may generate the authorized QoS Monitoring data decision for the service data flow for packet delay based on the QoS Monitoring request if received from the AF and/or the local configuration, or when the feature "EnSatBackhaulCatChg" is supported, based on PCF local policy or configuration as described in subclause 4.2.3.25.2.

The PCF, when the request is received from the AF, may determine whether the QoS monitoring report is sent to the AF/NEF by the SMF bypassing the PCF or by the PCF. When the feature "ExposureToEAS" is supported and the AF indication of direct notification is received, the PCF may determine whether duplicate notification by the UPF is required, i.e., whether the QoS monitoring report is directly sent to the local AF/NEF and to the PCF/SMF. When the "UPEAS" feature is supported, the PCF may generate a Data Collection Application Identifier based on the AF request or local configuration to be used in the SMF to associate the PCC rule with a QoS monitoring event exposure subscription.

The PCF shall include within the SmPolicyDecision data structure one or more QosMonitoringData instances within the "qosMonDecs" attribute if not provided yet and, if the PCF determines that the QoS monitoring report shall be sent by the PCF from the SMF, "QOS\_MONITORING" within the "policyCtrlReqTriggers" attribute, if it has not been provisioned yet.

NOTE 2: The QoS monitoring report can be sent by the SMF to the PCF as described in clause 4.2.4.24. The QoS monitoring report of the PCF to the AF/NEF is described in 3GPP TS 29.514 [17], the QoS monitoring report of the SMF to the AF/NEF bypassing the PCF is described in 3GPP TS 29.508 [12] and the QoS monitoring report to the Local NEF/AF by the UPF is described in 3GPP TS 29.564 [50].

When the feature "NscSupportedFeatures" is supported and if the NEF/AF provided information about the support of one or more QoS monitoring related features (e.g. "QoSMonitoring" feature and "EnQoSMon" feature) on Nsmf\_EventExposure service, the PCF may also include this information within the "nscSuppFeats" attribute included within the PccRule data type.

For each QosMonitoringData instance, PCF shall include:

- if the "EnQoSMon" feature is supported, the indication of the type of QoS monitoring parameter (e.g. packet delay or congestion information or data rate) within the "qosMonParamType" attribute;

- the requested QoS monitoring parameter(s) to be measured for the indicated QoS monitoring parameter types (i.e. DL/UL round trip packet delay or, if the "EnQoSMon" feature is supported, UL/DL congestion information or UL/DL data rate) within the "reqQosMonParams" attribute;

- the frequency(s) of reporting (e.g. event triggered and/or periodic) within the "repFreqs" attribute;

NOTE 3: When the "DOWNLINK\_CONGESTION" and/or "UPLINK\_CONGESTION" are included in "reqQosMonParams" attribute, only the "EVENT\_TRIGGERED" reporting frequency within the "repFreqs" attribute is applicable.

- for the case the "repFreqs" attribute includes the value "EVENT\_TRIGGERED":

a. when the "qosMonParamType" attribute is omitted or indicates packet delay:

- the delay threshold for downlink with the "repThreshDl" attribute if "reqQosMonParams" attribute includes DOWNLINK;

- the delay threshold for uplink with the "repThreshUl" attribute if "reqQosMonParams" attribute includes UPLINK; and/or

- the delay threshold for round trip with the "repThreshRp" attribute if "reqQosMonParams" attribute includes ROUND\_TRIP;

b. when the "qosMonParamType" attribute indicates data rate:

- the data rate threshold for downlink within the "repThreshDatRateDl" attribute if the "reqQosMonParams" attribute includes DOWNLINK\_DATA\_RATE; and/or

- the data rate threshold for uplink within the "repThreshDatRateUl" attribute if the "reqQosMonParams" attribute includes UPLINK\_DATA\_RATE;

c. when the "qosMonParamType" attribute indicates congestion information:

- the congestion threshold for downlink within the "repThreshConDl" attribute if the "reqQosMonParams" attribute includes DOWNLINK\_CONGESTION; and/or

- the congestion threshold for uplink within the "repThreshConUl" attribute if the "reqQosMonParams" attribute includes UPLINK\_CONGESTION; and

d. the minimum waiting time between subsequent reports within the "waitTime" attribute; and

e. if the feature "PacketDelayFailureReport" is supported, the maximum period with no QoS measurement results reported within the"repPeriod" attribute;

- for the case the "repFreqs" attribute includes "PERIODIC", the periodic time for reporting and, if the feature "PacketDelayFailureReport" is supported, the maximum period with no QoS measurement results reported within the "repPeriod" attribute;

- either the notification URI within the "notifyUri" attribute and the notification correlation id within the "notifyCorreId" attribute if the PCF determines that the notification shall be sent to the AF directly from the SMF or the notification URI within the "notifyUri" attribute, the notification correlation id within the "notifyCorreId" attribute corresponding to the Local NEF or AF and the "directNotifInd" attribute set to true if the feature "ExposureToEAS" and/or the feature "EnQoSMon" is supported and the PCF determines that the direct notification by the UPF to the Local NEF or AF is required based on the indication of direct notification received from the AF; and

NOTE 4: If the feature "ExposureToEAS" is supported and if the PCF determines to receive QoS Monitoring report while direct UPF notification is also required, the PCF can provision the "QOS\_MONITORING" policy control request trigger to the SMF together with the "directNotifInd" attribute set to true.

- the Data Collection Application Identifier within the "dataCollAppId" attribute if the "UPEAS" feature is supported and if the PCF determines that the SMF has to associate the PCC rule with a QoS monitoring event exposure subscription for that application identifier as described in 3GPP TS 29.508 [12].

If the feature "EnQoSMon" is supported, and the "qosMonParamType" attribute indicates data rate, the QosMonitoringData instance may include the averaging window within the "avrgWndw" attribute.

The PCF shall include the value(s) of QoS Monitoring Data ID of QosMonitoringData instance(s) within the "refQosMon" attribute of the corresponding PCC rule and provide the QoS monitoring data decision(s) together with the PCC rule if it has not been provisioned to the SMF. When the SMF receives the PCC rule, the SMF shall send a QoS Monitoring request to the PSA UPF via N4 as defined in 3GPP TS 29.244 [13] and NG-RAN via N2 signalling to request the QoS monitoring between PSA UPF and NG-RAN as defined in 3GPP TS 29.502 [22]. If the feature "ExposureToEAS" or the "EnQoSMon" feature is supported and if the SMF receives both the "QOS\_MONITORING" policy control request trigger and the indication of direct notifcation, the SMF shall request the UPF to perform duplicated notification as defined in 3GPP TS 29.244 [13]. If the "UPEAS" feature is supported, when the SMF receives the Data Collection Application Identifier within the "dataCollAppId" attribute as part of the QoSMonitoringData instance of the PCC rule, the SMF shall associate the PCC rule with the QoS monitoring event exposure subscription related to that application identifier as described in 3GPP TS 29.508 [12].

If the PCF receives the request from the local NEF/AF to disable the QoS monitoring for all the requested QoS monitoring parameters from the AF or the Local NEF, the PCF shall update the PCC rule with the "refQosMon" attribute set to NULL. The PCF may also remove the corresponding QoS Monitoring Data instance(s) if no PCC rule is referring to it.

If the PCF receives for the QoS monitoring parameter(s) the request to disable the direct event notification to the local NEF or AF by the UPF, the PCF shall determine whether the PCF or the SMF bypassing the PCF sends the QoS monitoring reports to the local AF/NEF. When no other QoS monitoring parameter is defined in the QosMonitoringData instance:

a. if the QoS monitoring reports are sent by the SMF bypassing the PCF:

- update the PCC rule with the "refQosMon" attribute referring a QosMonitoringData instance which does not include the "directNotifInd" attribute set to true and still includes the "notifyUri", and the "notifyCorreId" attributes; or

- update the corresponding QosMonitoringData instance by including the "directNotifInd" attribute set to false and still keeping the "notifyUri", and the "notifyCorreId" attributes;

b. if the QoS monitoring reports are sent by the PCF:

- update the PCC rule with the "refQosMon" attribute referring a QosMonitoringData instance which does not include the "directNotifInd", the "notifyUri", and the "notifyCorreId" attributes or update the QosMonitoringData instance by removing the "directNotifInd", the "notifyUri", and the "notifyCorreId" attributes; and

- provision the value "QOS\_MONITORING" within the "policyCtrlReqTriggers" attribute, if not previously provided.

The SMF shall request to the UPF to disable the notification to the AF/(Local)NEF via N4 for the requested QoS monitoring parameter(s) as defined in 3GPP TS 29.244 [13] and shall start sending the related notifications to PCF or to the indicated Notification URI and notification correlation Id, as applicable.

If the PCF determines that for the QoS monitoring parameter the QoS monitoring report shall be sent to the PCF from the SMF instead of sent from the SMF bypassing the PCF, the PCF shall replace the QosMonitoringData instance with an instance that does not include the "notifyUri" and the "notifyCorreId" attributes and include "QOS\_MONITORING" within the "policyCtrlReqTriggers" attribute if it has not been provisioned yet. If the PCF determines that QoS monitoring report shall be sent from the SMF bypassing the PCF instead of sent from the SMF to the PCF, the PCF shall update the QosMonitoringData instance by including the the notification URI within the "notifyUri" attribute and the notification correlation id within the "notifyCorreId" attribute, and remove the value "QOS\_MONITORING" within the "policyCtrlReqTriggers" attribute.

If the feature "QoSMonCapRepo" is supported, the PCF may include the "QOS\_MON\_CAP\_REPO" value within the "policyCtrlReqTriggers" attribute to request the SMF to report whether QoS Monitoring is no longer or can again be performed for the PCC rules that contain a QoS monitoring policy.

Editor's Note: Whether the QoS Monitoring Capability report can be applied separately to diffent QoS Monitoring Type (i.e. packet delay, congestion information, data rate, PDV, RTT, etc.) is FFS.

\*\*\* End of Changes \*\*\*