**3GPP TSG- Meeting #158 S2-2309357-merger**

**21 - 25 August, 2023, Goteborg, Sweden *revision of S2-2309357***

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **23.503** | **CR** | **1151** | **rev** | **-** | **Current version:** | 18.2.0 |  |
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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:***  | Corrections on timing info for AF QoS  |
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| ***Source to WG:*** | Samsung, Nokia, Nokia Shanghai Bell, OPPO? |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | AIMLsys |  | ***Date:*** |  2023-08-11 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***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:*** | Several corrections are introduced to clarify the functionality introduced in R18 related to timing info for AF session with required QoS for assisting AI/ML-based services.  |
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| ***Summary of change:*** | * Clarify that the PCF waits for the QoS inactivity interval and repeats the process of allocating and releasing the resources at the beginning and the end of the next QoS duration after the first QoS duration until the AF session is revoked.
* Miscellaneous editorial corrections.
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| ***Consequences if not approved:*** | * Unclear when the PCF will repeat allocating and releasing the resources.
* Unclear spec text
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| ***Clauses affected:*** | 6.1.3.22 |
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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 Changes \* \* \*

#### 6.1.3.22 AF session with required QoS

The AF may request that a data session to a UE is set up with a specific QoS (e.g. low latency or PDV) and priority handling. The AF can request the network to provide QoS for the AF session based on the service requirements with the help of a QoS Reference parameter that refers to pre-defined QoS information. Instead of the QoS Reference, the AF may provide individual QoS parameters associated to the Flow Description.

a) When the AF provides only a QoS Reference to determine the QoS parameters but no individual QoS parameters:

- When the PCF authorizes the service information from the AF, it derives the QoS parameters of the PCC rule based on the service information and the indicated QoS Reference.

NOTE 1: A SLA has to be in place between the operator and the ASP defining the possible QoS levels and their charging rates. For each of the possible pre-defined QoS information sets, the PCF needs to be configured with the corresponding QoS parameters and their values as well as the appropriate Charging key (or receive this information from the UDR).

- The AF may change the QoS by providing a different QoS Reference while the AF session is ongoing. If this happens, the PCF shall update the related QoS parameter sets in the PCC rule accordingly.

b) When the AF provides individual QoS parameters instead of a QoS Reference:

- The AF provides one or more of the following individual QoS parameters, i.e. Requested Priority, Maximum Burst Size, Requested 5GS Delay, Requested Maximum Bitrate, Requested Guaranteed Bitrate and Requested Packet Error Rate.

NOTE 2: Different combinations of individual QoS parameters with specific parameter names exist and they are described in TS 23.501 [2] (for Time Sensitive Communication), in clause 6.1.3.23 (for integration with Time Sensitive Networking) and in TS 29.514 [36].

- If the AF request for QoS is sent via the TSCTSF and the request contains a Requested 5GS Delay, the TSCTSF determines a Requested PDB considering the UE-DS-TT Residence Time (either provided by the PCF or pre-configured).

- When the PCF authorizes the service information from the AF, it derives the QoS parameters of the PCC rule based on the service information and the individual QoS parameters received from the AF and TSCTSF. The PCF should select a standardized, pre-configured or existing dynamically assigned 5QI that matches the individual QoS parameters. If no 5QI exists that matches the individual QoS parameters, the PCF generates a new dynamically assigned 5QI based on the individual QoS parameters.

- The AF may change the QoS by providing different values for the individual QoS parameters while the AF session is ongoing. If this happens, the PCF shall update the related QoS parameter sets in the PCC rule accordingly.

- The PCF may reject the individual QoS parameters received from the AF based on operator policy or impossibility to support the requested values of the individual QoS parameters. If this happens, the PCF may provide in the response to the AF one or more combinations of individual QoS parameters that can be supported.

 In addition to the QoS Reference or the individual QoS parameters described above, the AF may provide further parameters associated with the Flow Description, e.g. parameters that describe traffic characteristics as described in clause 6.1.3.23 or 6.1.3.23a and Indication of ECN marking for L4S.

 The AF may also provide the PCF with one or more QoS durations and QoS inactivity intervals, and a set of QoS parameters corresponding for each of the QoS durations to indicate the time period when the requested QoS should be applied. The PCF then provides a PCC Rule with the QoS parameters to SMF to allocate resources at the time it receives the request from the AF. The PCC Rule is removed to release the resources when the QoS duration ends. Once the resources are released, the PCF waits for the QoS inactivity interval to expire before repeating the process of allocating and releasing the resources at the beginning and the end of the next QoS duration. If no QoS parameters for any QoS duration is provided in the request received from AF, the PCF removes the PCC rule in order to release the resources at the beginning of corresponding time period. This process is repeated until the AF session is revoked. If the AF has subscribed to the PCF and resource allocation for any of the requested time windows fails, the PCF informs the AF. The notification to the AF about resource allocation failure may include the corresponding QoS duration.

NOTE X: It is assumed the timing durations provided by the AF are not overlapped.

NOTE 3: When leveraging the QoS duration and the QoS inactivity interval, both are expected to be in the order of minutes to avoid frequent signalling between RAN and PCF.

If the AF provides an explicit indication (i.e. Indication of ECN marking for L4S) that the UL and/or DL of the service data flow supports ECN marking for L4S or the PCF decides, based on local configuration, that the service data flow supports ECN marking for L4S, then the PCF may explicitly, or implicitly (based on PCF/SMF local configuration), indicate to the SMF to enable for ECN marking for L4S. The PCF decision may be taken, based on local configuration in PCF and SMF and L4S traffic detection result. If L4S support is detected on the UL and/or DL traffic of the service data flow, the QoS flow is enabled with ECN marking for L4S, see clause 5.37.3 of TS 23.501 [2].

The AF may provide a Round-Trip (RT) latency indication together with a single direction delay requirement between the UE and the PSA UPF expressed as the QoS Reference or the individual QoS parameters. The RT latency indication indicates the application flow needs to meet the RT latency requirement that does not exceed twice the single direction delay requirement between the UE and the PSA UPF expressed by the QoS Reference parameter or the individual QoS parameter.

The PCF generates a PCC Rule with service data flow filter (including IP Packet Filter set as in clause 5.7.6.2 of TS 23.501 [2]) or Ethernet Packet Filter set as in clause 5.7.6.3 of TS 23.501 [2]) derived from the Flow Descriptions provided by the AF, the derived PCC rule QoS parameters such a 5QI, ARP, GBR and MBR (see clause 6.3.1 for all possible PCC rule QoS parameters) and the associated TSC Assistance Container as received from the TSN AF or TSCTSF.

When the PCF authorizes the service information including the RT latency indication from the AF, the PCF shall generate two separate PCC rules, one for UL SDF and the other for DL SDF. The PCF derives the 5QI values of these two PCC rules considering the sum of UL and DL delay budgets does not exceed the RT latency requirement. Besides, the PCF may enable QoS monitoring to track the RT latency and may adjust the UL PDB and DL PDB to meet the requested RT latency as described in clause 6.1.3.27.

For TSC QoS, the PCF derives the 5QI value as defined in clause 5.27.3 of TS 23.501 [2], the PCF derives the MBR using the Requested Maximum Bitrate provided by the AF and sets the GBR equal to the MBR unless the AF provides a Requested Guaranteed Bitrate, in which case the MBR and GBR are set separately.

If the PCF gets informed about Policy Control Request Triggers relevant for the AF session, the PCF shall inform the AF about it as defined in clause 6.1.3.18.

If an AF session can adjust to different QoS parameter combinations, the AF may provide Alternative Service Requirements in a prioritized order (indicating the preference of the QoS requirements with which the service can operate) in addition to the QoS Reference or individual QoS parameters. Alternative Service Requirements contain:

- When the AF requests the network to provide QoS with a QoS Reference, one or more QoS Reference parameters in a prioritized order.

- When the AF requests the network to provide QoS with individual QoS parameters, one or more Requested Alternative QoS Parameter Set(s) in a prioritized order. Each Requested Alternative QoS Parameter Set is comprised of the following individual parameters: Requested 5GS Delay, Requested Guaranteed Flow Bitrate and Requested Packet Error Rate.

 If the AF request is sent via the TSCTSF, the TSCTSF determines a Requested PDB considering the Requested 5GS Delay and the UE-DS-TT Residence Time.

An AF that provides Alternative Service Requirements shall also subscribe to receive notifications from the PCF for successful resource allocation and when the QoS targets can no longer (or can again) be fulfilled as described in clause 6.1.3.18.

When the PCF authorizes the service information from the AF and generates a PCC rule, it shall also derive Alternative QoS Parameter Sets for this PCC rule based on the QoS Reference parameters or the Requested Alternative QoS Parameter Sets in the Alternative Service Requirements. If the AF provided Requested Alternative QoS Parameter Sets in the request, the PCF may reject any of the Requested Alternative QoS Parameter Sets it has received based on operator policy or impossibility to support the requested values of the individual parameters. If this happens, the PCF may provide in the response to the AF one or more Requested Alternative QoS Parameters Sets that can be supported.

The PCF shall enable QoS Notification Control and include the derived Alternative QoS parameter sets (in the same prioritized order indicated by the AF) in the PCC rule sent to the SMF. When the PCF notifies the AF that QoS targets can no longer be fulfilled, the PCF shall include the QoS Reference parameter or the set of Requested Alternative QoS Parameters corresponding to the Alternative QoS parameter set referenced by the SMF, or an indication that the lowest priority QoS Reference or the lowest priority set of Requested Alternative QoS Parameters of the Alternative Service Requirements cannot be fulfilled (as described in clause 6.1.3.18).

The PCF may generate policies to request to monitor the DL Periodicity associated N6 jitter and include it into a PCC rule based local policy. Based on the received PCC rule or local configuration, the SMF indicates UPF to monitor and report the requested traffic characteristics as described in clause 5.20c in TS 23.501 [2]. The N6 jitter measurement is not triggered if the Burst Arrival Time (as described in the clause 5.27.2 in TS 23.501 [2]) is received.

NOTE 4: The AF behaviour is out of the scope of this TS but can include adaptation to the change of QoS (e.g. rate adaptation) as well as application layer signalling with the UE.

The AF may change the Alternative Service Requirements while the AF session is ongoing. If this happens, the PCF shall update the Alternative QoS parameter sets in the PCC rule accordingly.

The AF may indicate to the PCF that the UE does not need to be informed about changes related to Alternative QoS Profiles. With this indication received from the AF, the PCF decides whether to disable the notifications to the UE when changes related to the Alternative QoS Profiles occur and sets the Disable UE notifications at changes related to Alternative QoS Profiles parameter in the PCC rule accordingly.

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