**SA WG2 Meeting #154-AH-eS2-221**

**January 16th – 20th, 2023, Electronic (revision of S2-221XXXX)**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **23.503** | **CR** |  | **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:***  | UL-DL traffic delay coordination for RT latency |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | S2 |
|  |  |
| ***Work item code:*** | XRM |  | ***Date:*** | 2022-11-1 |
|  |  |  |  |  |
| ***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:*** | This CR aims at specifying 5GC Support to meet the very low Round-Trip latency requirement with the variable and unbalanced uplink/downlink latency overhead. |
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| ***Summary of change:*** | * AF shall provide RT Latency as one of the service requirement parameters to PCF.
* PCF shall generate separate PCC for UL and DL with split PDB based on RT latency.
* PCF shall enable QoS monitoring to see if the UL+DL PDBs are within acceptable RT latency
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| ***Consequences if not approved:*** | No support for meeting round-trip latency in XRM, as concluded in TR 23.700-60, clause 8.6 |
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| ***Clauses affected:*** | 6.1.3.22 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 23.501 CR ...  |
| ***affected:*** |  | **x** |  Test specifications |  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*FIRST CHANGE*

#### 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 jitter) 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 RT Latency Indication.

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.

- When the PCF authorizes the service information from AF which contains, RT Latency Indication along with Requested 5GS Delay, it shall derive 2 PCC rules, one for UL and another one for DL Service Data Flow. PCF determines the 5QIs of each flow considering the UL and DL combined delay budget is within the allowed RT Latency based on PDBs associated with each 5QI.

NOTE 3: In this release of the specification, the PCF uses local policy to determine the Packet Error Rate in order to select the most appropriate 5QI accordingly.

- 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.

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.

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 and Requested Guaranteed Flow Bitrate.

NOTE 4: In this Release of the specification, the PCF uses local policy to determine the Packet Error Rate in each of the Requested Alternative QoS Parameter Sets.

 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).

NOTE 2: 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.*NEXT CHANGE (1)*

#### 6.1.3.X Policy control for high data rate low latency service

##### 6.1.3.X.1 Uplink-Downlink transmission coordination to meet RT latency

As specified in clause 5.37.X of TS 23.501 [2], to support high data rate low latency services with deterministic round trip latency, two flows over the 5G network may be established such that the 5GS can assign PDB to each flow based on the Requested RT latency. The Policy control for these two flows may associate QoS monitoring policy for delay tracking (as specified in clause 6.1.3.21). The PCF, based on QoS monitoring results on any flow shall readjust the PDB on the other associated flow. The PCF needs to ensure, the updated PCC rules are based on monitored delay, and the PDBs for both flows in UL and DL direction should meet the required RT latency. If subscribed by AF for non-fulfillment of Round-trip Latency, PCF shall notify AF incase, PDB re-adjustment is not possible to sustain the required Round-trip latency.

*END OF CHANGES*