**3GPP TSG SA WG2 Meeting #137ES2-2002044**

**February 24 - 27, 2020, Electronic meeting (rev. of S2-2001606, merges** [**S2-2002289**](file:///C%3A%5CUsers%5Cecembpa%5COneDrive%20-%20Ericsson%20AB%5CMisdocumentos%5CSA2_2020%5CSA2%23137E%5CDocs%5CS2-2002289.zip)**,** **S2-2002133)**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **23.503** | **CR** | **0394** | **rev** | **4** | **Current version:** | **16.3.0** |  |
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| *For* ***HE******LP*** *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 |  | Core Network | **X** |

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|  |
| ***Title:***  | QoS flow binding for TSN streams with same periodicity |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | Vertical\_LAN |  | ***Date:*** | 2020-02-17 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | *Rel-16* |
|  | *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. | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | TS 23.501 clause 5.27.2 states: “The TSN AF may aggregate multiple TSN Streams if they have the same periodicity and traffic class.” How those aggregated TSN streams (that have the same periodicity) are mapped to a QoS flow is unclear. The TSN AF may also provide other TSC parameters such as “periodicity” that has no mapping to one of the QoS characteristics listed in 23.501, as such the periodicity will be not be used to generate a 5QI but included in the PCC Rule to the SMF.The SMF binds PCC Rules to QoS flows using QoS parameters, mainly 5QI and ARP, if provided the MDBV or the periodicity or both. This allows mapping of the TSN streams to the QoS flows that has the right QoS profile and periodicity. |
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| ***Summary of change:*** | Describe that the TSN AF provides some TSC parameters that are not used to generate a 5QI, and included in the PCC Rule then used by the SMF for binding PCC Rules into QoS flows.  |
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| ***Consequences if not approved:*** | Incorrect implementation of the TSN feature, not aligned with 23.501. |
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| ***Clauses affected:*** | 6.1.3.2.4, 6.1.3.23 |
|  |  |
|  | **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:*** |  |

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

#### 6.1.3.23 Support of integration with Time Sensitive Networking

Time Sensitive Networking (TSN) support is defined in TS 23.501 [2], where the 5GS represents virtual TSN bridge(s) based on the defined granularity model. The TSN AF and PCF interact to perform QoS mapping as described in clause 5.28.4 of TS 23.501 [2].

The PCF provides the following parameters to the TSN AF: Port Management Container, port numbers associated with the NW-TT and DS-TT, and a UE MAC address (i.e. MAC address of the DS-TT port). The TSN AF may use this information to construct IEEE managed objects, to interwork with IEEE TSN networks.

The TSN AF decides the TSN QoS information (i.e. priority, delay and maximum TSC burst size) based on the received the configuration information of 5GS Bridge from the CNC as defined in clause 5.28.2 of TS 23.501 [2] and the bridge delay information at the TSN AF.

The PCF receives a request from the TSN AF that includes UE MAC address (i.e. MAC address of the DS-TT port) for the PDU session, the Flow Description(s) for each of the TSN streams that are assigned, the TSN QoS parameters and the TSN AF QoS containter including the periodicity, the burst arrival time and the flow direction. The PCF performs Session binding using the UE MAC address, and then the PCF derives the TSN QoS parameters into a 5QI.

The PCF generates a PCC Rule with service data flow filter containing the Flow Descriptions provided by the TSN AF, the mapped 5QI and the TSN AF QoS container. The SMF binds the PCC Rule to a QoS Flow as defined in clause 6.1.3.2.4.

\* \* \* \* Second change \* \* \* \*

##### 6.1.3.2.4 QoS Flow binding

QoS Flow binding is the association of a PCC rule to a QoS Flow within a PDU Session. The binding is performed using the following binding parameters:

- 5QI;

- ARP;

- QNC (if available in the PCC rule);

- Priority Level (if available in the PCC rule);

- Averaging Window (if available in the PCC rule);

- Maximum Data Burst Volume (if available in the PCC rule)

When the PCF provisions a PCC Rule, the SMF shall evaluate whether a QoS Flow with QoS parameters identical to the binding parameters exists unless the PCF requests to bind the PCC rule to the QoS Flow associated with the default QoS rule. If no such QoS Flow exists, the SMF derives the QoS parameters, using the parameters in the PCC Rule, for a new QoS Flow, binds the PCC Rule to the QoS Flow and then proceeds as described TS 23.501 [2] clause 5.7. If a QoS Flow with QoS parameters identical to the binding parameters exists, the SMF updates the QoS Flow, so that the new PCC Rule is bound to this QoS Flow.

NOTE 1: For PCC rules containing a delay critical GBR 5QI value, the SMF can bind PCC Rules with the same binding parameters to different QoS Flows to ensure that the GFBR of the QoS Flow can be achieved with the Maximum Data Burst Volume of the QoS Flow.

The SMF shall identify the QoS Flow associated with the default QoS rule based on the fact that the PCC rule(s) bound to this QoS Flow contain:

- 5QI and ARP values that are identical to the PDU Session related information Authorized default 5QI/ARP; or

- a Bind to QoS Flow associated with the default QoS rule and apply PCC rule parameters Indication.

NOTE 2: The Bind to QoS Flow associated with the default QoS rule and apply PCC rule parameters Indication has to be used whenever the PDU Session related information Authorized default 5QI/ARP (as described in clause 6.3.1) cannot be directly used as the QoS parameters of the QoS Flow associated with the default QoS rule, for example when a GBR 5QI is used or the 5QI priority level has to be changed.

When a QoS Flow associated with the default QoS rule exists, the PCF can request that a PCC rule is bound to this QoS Flow by including the Bind to QoS Flow associated with the default QoS rule Indication in a dynamic PCC rule. In this case, the SMF shall bind the dynamic PCC rule to the QoS Flow associated with the default QoS rule (i.e. ignoring the binding parameters) and keep the binding as long as this indication remains set. When the PCF removes the association of a PCC rule to the QoS Flow associated with the default QoS rule, a new binding may need to be created between this PCC rule and the QoS Flow as described above.

The binding created between a PCC Rule and a QoS Flow causes the downlink part of the service data flow to be directed to the associated QoS Flow at the UPF (as described in TS 23.501 [2] clause 5.7.1). In the UE, the QoS rule associated with the QoS Flow (which is generated by the SMF and explicitly signalled to the UE as described in TS 23.501 [2] clause 5.7.1) instructs the UE to direct the uplink part of the service data flow to the QoS Flow in the binding.

Whenever the authorized QoS of a PCC rule changes, the existing bindings shall be re-evaluated. The re-evaluation may, for a service data flow, require a new binding with another QoS Flow.

NOTE 2: A QoS change of the PDU Session related information Authorized default 5QI/ARP values doesn't cause the QoS Flow rebinding for PCC rules with the Bind to QoS Flow associated with the default QoS rule Indication set.

When the PCF removes a PCC Rule, the SMF shall remove the association of the PCC Rule to the QoS Flow.

The SMF shall report to the PCF that the PCC Rules bound to a QoS Flow are removed when the corresponding QoS Flow is removed.

The QoS Flow binding shall also ensure that:

- if a PCC rule contains the TSN AF QoS Container, the PCC rule is bound to a new QoS Flow and no other PCC rule is bound to this QoS Flow.

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