**3GPP TSG-SA5 Meeting #143-e *S5-223104***

e-meeting, 9 - 17 May 2022

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **32.255** | **CR** | **0394** | **rev** | **1** | **Current version:** | **17.5.0** |  |
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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:*** | QBC triggering for LBO | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson LM, MATRIXX Software | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | CHROAM | | | | |  | ***Date:*** | | | 2022-04-20 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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)* | |
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| ***Reason for change:*** | | Adding description for local breakout for the triggers | | | | | | | | |
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| ***Summary of change:*** | | Adding section for local breakout as well as stating that the existing is for home routed. | | | | | | | | |
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| ***Consequences if not approved:*** | | Charging for local breakout cannot be supported. | | | | | | | | |
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| ***Clauses affected:*** | | 5.2.1.6, 5.2.1.7 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

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| **First change** |

#### 5.2.1.6 QoS flow Based Charging

QoS flow Based Charging allows the SMF to collect charging information related to data volumes per PDU session, categorized per QoS Flow. QBC doesn't support quota management.

For home routed roaming scenario the user can be identified by SUPI.

For home routed roaming scenario and a given PDU session, QBC shall be performed by the SMF within the same charging session used for Flow Based Charging if any, toward the selected CHF(s). For the case where QBC is performed from SMF in VPLMN, Flow Based Charging is not applicable and there is no possibility to have quota management for the PDU Session. For the case where QBC is performed from SMF in HPLMN, FBC can be performed or not performed at the same time according to operator's policy.

For local breakout roaming scenario and a given PDU session, the SMF in VPLMN may perform QBC towards the VPLMN and may also perform FBC and/or QBC towards the HPLMN. If both QBC and FBC is performed, then it shall be within the same charging session.

The SMF categorizes the volume within PDU session by QoS Flow identified by QoS Flow Identifier (QFI).

The amount of data counted for the QoS Flow shall be the user plane payload at the UPF.

For local breakout roaming scenario, the unit usage reporting for QBC may be reported (resulting in a close of the counts and start of new counts for all active QoS flows) at the same time as FBC i.e., triggered by the reporting for FBC.

Table 5.2.1.6.1 summarizes the set of default trigger conditions and their category which shall be supported by the SMF in QBC. For "immediate report" category, the table also provides the corresponding Charging Data Request [Initial, Update, Termination] message sent from SMF towards the CHF.

Table 5.2.1.6.1: Default Chargeable events in SMF for QBC

| Chargeable event | Trigger level | Default category | CHF allowed to change category | CHF allowed to enable and disable | Message when "immediate reporting" category |
| --- | --- | --- | --- | --- | --- |
| Start of PDU session | PDU session | Immediate | Not Applicable | Not Applicable | Charging Data Request [Initial] |
| Start of a QoS Flow | QoS Flow | Deferred | Not Applicable | Not Applicable | Charging Data Request [Update] |
| **Change of Charging conditions** | | | | |
| QoS change | QoS Flow | Deferred | Yes | Yes |
| GFBR guaranteed status change | QoS Flow | Deferred | Yes | Yes |
| User Location change | PDU session | Deferred | Yes | Yes |
| Serving Node change | PDU session | Deferred | Yes | Yes |
| Change of UE presence in Presence Reporting Area(s) | PDU session | Deferred | Yes | Yes |
| Change of 3GPP PS Data off Status | PDU session | Deferred | Yes | Yes |
| Tariff time change | PDU session | Deferred | No | No |
| UE time zone change | PDU session | Immediate | Yes | Yes |
| PLMN change | PDU session | Immediate | Yes | Yes |
| RAT type change | PDU session | Immediate | Yes | Yes |
| Session-AMBR change | PDU session | Immediate | Yes | Yes |
| Addition of UPF | PDU session | Immediate | Yes | Yes |
| Removal of UPF | PDU session | Immediate | Yes | Yes |
| Handover cancel | PDU session | Immediate | Yes | Yes |
| Handover start | PDU session | Immediate | Yes | Yes |
| Handover complete | PDU session | Immediate | Yes | Yes |
| Redundant transmission change | QoS Flow | Immediate | Yes | Yes |
| **Limit per PDU session** | | | | |
| Expiry of data time limit per PDU session | PDU session | Immediate | No | Yes |
| Expiry of data volume limit per PDU session | PDU session | Immediate | No | Yes |
| Expiry of data event limit per PDU session | PDU session | Immediate | No | Yes |
| Expiry of limit of number of charging condition changes | PDU session | Immediate | No | Yes |
| **Limit per QoS Flow** | | | | |
| Expiry of data time limit per QoS Flow | QoS Flow | Deferred | Yes | Yes |
| Expiry of data volume limit per QoS Flow | QoS Flow | Deferred | Yes | Yes |
| **Others** | | | | |
| End of QoS Flow | QoS Flow | Deferred | Yes | Yes |
| Management intervention | PDU session | Immediate | No | No |
| End of PDU session | PDU session | Immediate | No | No | Charging Data Request [Termination] |
| Abort request is received from the CHF | PDU session | Immediate | No | No |
| NOTE 1: If GFBR guaranteed status change is enabled, SMF needs to ensure the request for the notification from the access network (i.e. 3GPP RAN) when the GFBR can no longer (or can again) be guaranteed for a QoS Flow during the lifetime of the QoS Flow. | | | | | |

The default "Limit" trigger conditions, are trigger thresholds configured in the Charging Characteristics applied to the PDU session for QBC. It shall be possible for the CHF to override these default triggers when providing Charging Data Response [Initial], either to disable the triggers, or to enable triggers new thresholds value.

For QBC the following details of chargeable events and corresponding actions in the SMF are defined in Table 5.2.1.6.2:

Table 5.2.1.6.2: Chargeable events and their related actions in SMF for QBC

| Chargeable event | Conditions | SMF action |
| --- | --- | --- |
| Start of PDU session |  | Charging Data Request [Initial]. |
| Start of a QoS Flow | Start of the QoS Flow associated with the default QoS rule | Charging Data Request [Update]. |
| Start of a QoS Flow | Start new counts with time stamps. |
| End of a QoS Flow |  | Close the counts with time stamps for the QoS flows |
| End of PDU session |  | Charging Data Request [Termination]  Close the counts with time stamps |
| Change of charging condition in the SMF (e.g. QoS change, Session-AMBR change, user location change, Radio access type change, PLMN change, Serving Node change, UE Time Zone change, change of UE presence in Presence Reporting Area(s), change of 3GPP PS Data Off status, GFBR guaranteed status change) | If the corresponding trigger is enabled | Close the counts and start new counts with time stamps for all active QoS flows. |
| If the corresponding trigger is enabled and the category is set to "immediate reporting" | Charging Data Request [Update] |
| Handover start | If the corresponding trigger is enabled | Close the counts with time stamps and start new counts with time stamps. |
| If the corresponding trigger is enabled and the category is set to "immediate reporting" | Charging Data Request [Update]. |
| Handover cancel | If the corresponding trigger is enabled | Close the counts with time stamps and start new counts with time stamps for active QoS flows. |
| If the corresponding trigger is enabled and the category is set to "immediate reporting" | Charging Data Request [Update]. |
| Handover complete | If the corresponding trigger is enabled | Close the counts and start new counts with time stamps for active QoS flows. |
| If the corresponding trigger is enabled and the category is set to "immediate reporting" | Charging Data Request [Update] |
| Redundant transmission change | If the corresponding trigger is enabled and the category is set to "immediate reporting" | Charging Data Request [Update].  Close the counts and start new counts with time stamps. |
| Addition of UPF | If the corresponding trigger is enabled | Start new counts with time stamps for the added UPF. |
| If the corresponding trigger is enabled and the category is set to "immediate reporting" | Charging Data Request [Update]. |
| Removal of UPF | If the corresponding trigger is enabled | Close the counts with time stamps for the removed UPF |
| If the corresponding trigger is enabled and the category is set to "immediate reporting" | Charging Data Request [Update]. |
| Expiry of time limit per QoS Flow | If the corresponding trigger is enabled | Close the counts with time stamps. |
| If the category is set to "immediate reporting" | Charging Data Request [Update] |
| If the QoS Flow is still active | Start new counts with time stamps |
| Expiry of data volume limit per QoS Flow | If the corresponding trigger is enabled | Close the counts with time stamps |
| If the category is set to "immediate reporting" | Charging Data Request [Update] |
| If the QoS Flow is still active | Start new counts with time stamps |
| Expiry of time limit per PDU session | If the corresponding trigger is enabled | Close the counts with time stamps for all QoS flows. |
| If the category is set to "immediate reporting" | Charging Data Request [Update] |
| If the PDU session is still active | Start new counts with time stamps for all active QoS flows |
| Expiry of data volume limit per PDU session | If the corresponding trigger is enabled | Close the counts with time stamps for all QoS flows. |
| If the category is set to "immediate reporting" | Charging Data Request [Update] |
| If the PDU session is still active | Start new counts with time stamps for all active QoS flows |
| Expiry of a limit of number of charging condition changes per PDU session | If the corresponding trigger is enabled | Close the counts with time stamps for all QoS flows. |
| If the category is set to "immediate reporting" | Charging Data Request [Update] |
| If the PDU session is still active | Start new counts with time stamps for all active QoS flows |
| Management intervention |  | Charging Data Request [Update]  Close the counts with time stamps for all QoS Flows |
| If the PDU session is still active | Start new counts with time stamps |
| Abort |  | Charging Data Request [Termination]  Close the counts with time stamps |

The CDR generation mechanism processed by the CHF upon receiving Charging Data Request [Initial, Update, Termination] issued by the SMF for these chargeable events in QBC, is specified in clause 5.2.3.

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| **Second change** |

#### 5.2.1.7 Roaming QoS flow Based charging (QBC)

When QoS flow Based Charging specified in 5.2.1.6 is used in a context of roaming, a "Roaming Charging Profile" is defined to allow, when shared, QBC synchronized between both PLMNs and includes:

- The set of chargeable events as per Table 5.2.1.6.1 and associated category.

- The set of thresholds for chargeable events based on trigger thresholds.

- An indication on whether the "Default partial record" or the "Individual partial record" mechanism per clause 5.2.3, is used by CHF.

A default "Roaming Charging Profile" is specified for the SMF and comprises:

- The set of chargeable events and associated category specified as the default per Table 5.2.1.6.1.

- The default set of thresholds configured in the Charging Characteristics for QBC.

- The "Default partial record" mechanism indicated as the one used by CHF.

In home routed scenario, in the VPLMN, at PDU session establishment or PDU session transfer from a different VPLMN, the default "Roaming Charging Profile" in the new V-SMF may optionally be overridden by a new "Roaming Charging Profile" supplied by the CHF in the Charging Data Response [Initial] with:

- updated set of chargeable events and associated category.

- updated thresholds for chargeable events based on trigger thresholds.

- the selected partial record mechanism ("Default partial record" or "Individual partial record").

In home routed scenario, this updated "Roaming Charging Profile" is transferred from the new V-SMF to the H-SMF and may be acknowledged or replaced by the HPLMN selected "Roaming Charging Profile" to be used by the new V-SMF.

in the HPLMN, at PDU session establishment or V-SMF change for a PDU session, the "Roaming Charging Profile", when received by the H-SMF from the new V-SMF, may be updated by the CHF in the HPLMN in the Charging Data Response [Initial] to H-SMF. This HPLMN CHF selected "Roaming Charging Profile" is used by the H-SMF and transferred towards the VPLMN.

In local breakout scenario, in the VPLMN, at PDU session establishment, the "Roaming Charging Profile", when received by the V-SMF, may be updated by the CHF in the HPLMN in the Charging Data Response [Initial] to V-SMF. This HPLMN CHF selected "Roaming Charging Profile" is used by the V-SMF and shall remain unchanged during the PDU session lifetime.

In home routed scenario, the "Roaming Charging Profile" resulting from the exchange between the VPLMN and HPLMN at PDU session establishment shall remain unchanged during the PDU session lifetime, unless there is a V-SMF change.

In home routed scenario, at each V-SMF change, the "Roaming Charging Profile" may be renegotiated between the VPLMN and HPLMN and shall remain unchanged during the PDU session lifetime with the actual V-SMF.

The capability specified in clause 5.2.1.2.1 for the CHF to be able to update the triggers after the PDU session is established for a given VPLMN shall not be applicable for Roaming QBC.

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| **End of changes** |