**3GPP TSG-SA5 Meeting #136e S5-212167**

**E-Meeting, 1st – 9th March 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **32.255** | **CR** | **0286** | **rev** | **1** | **Current version:** | **16.7.0** |  |
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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:*** | Charging id clarification | | | | | | | | | |
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| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | SA5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI16 | | | | |  | ***Date:*** | | | 2021-03-05 |
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| ***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 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:*** | | During EPS to 5GS handover for roaming in Home routed scenario, it’s not clear  1) how the charging ID Information Element and the Home provided charging ID Information Element are used, and  2) when the charging id generated in V-SMF is replaced by Home provided charging ID.  Additionaly, in step4, the required parameters are already provided. So the editor’s notes in subclause 5.2.2.11.7 needs to be removed. | | | | | | | | |
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| ***Summary of change:*** | | Clarify that  1) for V-SMF, the charging ID Information Element and the Home provided charging ID are both used firstly, after that the Home provided charging ID value is placed in charging ID Information Element.  2) For H-SMF, only charging ID generated in PGW-C+SMF is used.  3) Remove the editor’s nodes. | | | | | | | | |
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| ***Consequences if not approved:*** | | Unclear statements lead to incorrect implementation. | | | | | | | | |
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| ***Clauses affected:*** | | 5.1.4, 5.1.9.1, 5.2.2.11.7 | | | | | | | | |
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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:*** | |  | | | | | | | | |

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| **First change** |

### 5.1.4 Charging Identifier

Charging identifier is created to allow correlation of charging information.

For the SMF the charging identifier is assigned per PDU session including the case of I-SMF insertion. At each PDU session establishment, i.e. assignment of a new PDU session id, a new PDU session specific SMF Charging Identifier is generated at the first SMF that processes the PDU session initiating request. The SMF Charging Identifier shall be unique within the SMF which assigned it and is then used in all subsequent messages for that PDU session. The Charging Identifier shall be used throughout the PDU session’s lifetime once assigned. In case of inter-system changes or handovers of PDU session, the Charging Identifier is preserved as long as the PDU session Identifier is preserved.

For EPS handover 5GS in Home routed scenario, the Charging Identifier for the PDU session will be generated by PGW-C+SMF in HPLMN and transferred to the SMF in VPLMN, if the V-SMF has already generated the Charging Identifier, the value shall be replaced by Home Provided Charging Id generated by H-SMF.

For 5GS interworking with EPS, an "EPS bearer Charging Id" is assigned by the PGW-C+SMF to each dedicated EPS bearer QoS Flow(s). For the default bearer QoS Flow(s), the "EPS bearer Charging Id" is the "Charging Id" assigned to the PDU session.

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| **Next change** |

#### 5.1.9.1 General

Based on roaming agreements between the V-PLMN and the H-PLMN, in Home Routed scenario, for each UE roaming in VPLMN:

- The SMF in VPLMN (V-SMF) shall be able to collect charging information per QoS Flow within a PDU session when UE is determined as an in-bound roamer, for CDR generation in VPLMN.

- The SMF in HPLMN (H-SMF) shall be able to collect charging information per QoS Flow within a PDU session when UE is determined as an out-bound roamer, for CDR generation in HPLMN.

This charging information collection mechanism is achieved under Roaming QoS flow Based Charging (QBC) performed by each PLMN, based on a set of charging parameters exchanged between the V-SMF and the H-SMF on a per PDU session basis.

The main parameters exchanged at PDU session establishment are:

- The Charging Id which also includes the VPLMN PLMN ID, assigned by the V-SMF and transferred to the H-SMF in the HPLMN.

- Optionally, the "Roaming Charging Profile" negotiated between the VPLMN and the HPLMN.

The parameters exchanged during the PDU session handover from EPS to 5GS in Home routed roaming scenario:

- The Home Provided Charging Id which includes the Charging Id assigned by the H-SMF to the original PDU session over EPS and transferred by the H-SMF to the V-SMF. This Home Provided Charging Id shall be used by the V-SMF to replace the existing Charging Id previously generated by V-SMF.

- Optionally, the "Roaming Charging Profile" negotiated between the VPLMN and the HPLMN on 5GS side.

In roaming Home routed PDU session, upon V-SMF change:

- intra-PLMN V-SMF change: Charging Id, "Roaming Charging Profile" and CHF address are transferred from the old V-SMF to the new V-SMF.

- inter-PLMN V-SMF change: The Charging Id is transferred from the old V-SMF to the new V-SMF.

- The "Roaming Charging Profile" is optionally exchanged between the new V-SMF and the H-SMF as for a PDU session establishment.

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| **Next change** |

##### 5.2.2.11.7 EPS to 5GS handover for roaming in Home routed scenario

The following figure 5.2.2.11.7.1 describes a PDU session charging handover from EPS to 5GS for roaming in Home routed scenario, focusing on the charging id generation mechanism.



Figure 5.2.2.11.7.1: EPS to 5GS mobility without N26 in Home-Routed Roaming

1. The UE is attached in EPC and initiates a new IP-CAN session.

1ch-a. A Charging Data Request [Initial] is sent to CHF via PGW-C+SMF in HPLMN. The charging ID included is generated by PGW-C +SMF in HPLMN.

1ch-b. The H-CHF opens a CDR 1ch-c. The H-CHF acknowledges by sending Charging Data Response [Initial] to the PGW-C+SMF.

2. UE initiates registration procedure to the 5GS and indicates that it is moving from EPC. UE requests PDU Session Establishment.

2ch-a. SMF in VPLMN creates a charging ID (Visited created Charging Id) for the PDU session and sends the Charging Data Request [Initial] to CHF in VPLMN

2ch-b. The CHF in VPLMN opens a CDR.

2ch-c. The CHF in VPLMN acknowledges by sending Charging Data Response [Initial] to the SMF and optionally supplies a “Roaming Charging Profile” to the V-SMF which override the default one.

3. UPF selection and V-SMF sends the PDU session establishement request to H-SMF.

3ch-a. A Charging Data Request [Update] is sent to CHF in HPLMN, indicating the "Roaming Charging Profile" received from the VPLMN. The same charging ID in step 1ch-a will be the only one charging ID used for any subsequent charging data request sent from H-SMF to CHF i.e. the charging id generated in PGW-C +SMF in HPLMN.

3ch-b. The CHF in HPLMN updates the CDR.

3ch-c. The CHF in HPLMN acknowledges by sending Charging Data Response [Update] to the PGW-C+SMF and supplies the HPLMN selected "Roaming Charging Profile" to the PGW-C+SMF.

4. H-SMF sends the PDU session establishment response with charging Id (Home provided Charging ID).

4ch-a. A Charging Data Request [Update] is sent to CHF in VPLMN, with the "Roaming Charging Profile", charging ID (Visited created Charging Id) and Home provided Charging ID which is received in step4.

4ch-b. The CHF updates the CDR.

4ch-c. The CHF acknowledges by sending Charging Data Response [Update].

In subsequent charging data request sent from V-SMF to V-CHF, the charging ID Information element has the value of Home provided charging ID, and the Home provided charging ID Information element is not provided.

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| **End of change** |