**3GPP TSG-SA5 Meeting #129e *S5-201106rev1***

**e-meeting, 24 February – 4 March 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **32.255** | **CR** |  | **rev** | **1** | **Current version:** |  |  |
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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:***  | Introduction of V-SMF change in Roaming HR - principles |
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| ***Source to WG:*** |  |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | ETSUN |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** |  |
|  | *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-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:*** | Based on TS 23.502 clause 4.23.1, in deployments topologies with specific SMF Service Areas, if a UE moves out of V-SMF serving area in the serving PLMN, the V-SMF can be changed for a Roaming Home Routed PDU session. Based on below Note in TS 23.502 clause 4.2.2.2.2, the V-SMF change can be inter-PLMN (session continuity can be supported when V-SMF change is inter-PLMN).NOTE 8: If the UE moves into a different PLMN, the AMF in the serving PLMN can insert or change the V-SMF(s) in the serving PLMN for Home Routed PDU session(s). In this case, the same procedures described in clause 4.23.3 are applied for the V-SMF change as for the I-SMF change (i.e. by replacing the I-SMF with V-SMF). During inter-PLMN change, if the same SMF is used, session continuity can be supported depending on operator policies.The V-SMF change intra-PLMN and inter-PLMN scenarios are not addressed. |
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| ***Summary of change:*** | Introduce V-SMF change scenarios principles for a PDU session in Roaming Home Routed with:* Charging Id preservation in both intra-PLMN and inter-PLMN V-SMF changes
* CHF Address preservation for intra-PLMN V-SMF change
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| ***Consequences if not approved:*** | V-SMF change in deployments topologies with specific SMF Service Areas cannot be supported. |
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| ***Clauses affected:*** | 5.1.9.1, 5.1.9.2, 5.2.1.7 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |  |
| ***affected:*** |  | **X** |  Test specifications |  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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| **First 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:

- 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 replacing the existing Charging Id.

- 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: Home Provided 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 Home Provided 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** |

#### 5.1.9.2 CHF selection

In roaming Home routed scenario, at PDU session establishment, the CHF selection mechanism specified in clause 5.1.8 applies to:

- The V-SMF for CHF selection in VPLMN, with the following differences:

- CHF address(es) selection mechanisms based on PCF and UDM are not applicable.

- when charging characteristics is used it will be based on local configuration;

- when NRF is used, the V-CHF can be selected based on UE identified as in-bound roamer and the PLMN Id of the H-PLMN;

- The H-SMF for CHF selection in HPLMN, with the following difference: when NRF is used, the H-CHF can be selected based on UE identified as out-bound roamer and the PLMN Id of the V-PLMN.

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

- intra-PLMN V-SMF change: CHF address supplied by the old V-SMF shall be used.

- inter-PLMN V-SMF change: CHF selection mechanism as per V-SMF CHF selection in VPLMN at PDU session establishment.

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| **Next 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 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").

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.

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.

At each V-SMF change in Home routed scenario, 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** |