**3GPP TSG-SA5 Meeting #145-e *S5-225211***

**e-meeting, 15 - 24 August 2022**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **32.255** | **CR** | **0404** | **rev** | **-** | **Current version:** | **17.6.0** |  |
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| *For* ***[HE](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_blank)******[LP](http://www.3gpp.org/3G_Specs/CRs.htm" \l "_blank)*** *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:*** | Correction on Home Provided Charging Id and Roaming Charging Profile | | | | | | | | | |
| ***、*** |  | | | | | | | | | |
| ***Source to WG:*** | China Mobile Com. Corporation | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | ETSUN | | | | |  | ***Date:*** | | | 2022-08-04 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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:*** | | According to C4-222427, during the mobility from HPLMN with I-SMF to VPLMN, the V-SMF retrieves the homeProvidedChargingId from H-SMF during update response, and negotiate the roaming charging profile during update request and response.  The corresponding charging scenario is missing in TS 32.255. | | | | | | | | |
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| ***Summary of change:*** | | Add descriptions of Home Provided Charging Id transfer and Roaming Charging Profile negotiation during the mobility from HPLMN with I-SMF to VPLMN. | | | | | | | | |
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| ***Consequences if not approved:*** | | The charging id and roaming charging profile are incorrect during the mobility from HPLMN to VPLMN. | | | | | | | | |
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| *Clauses affected:* | | 5.1.4, 5.1.9.1, 6.2.1.2 | | | | | | | | |
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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:*** | | S5-XXXXXX Rel-17 DraftCR 32.298 Correction on Home Provided Charging Id and Roaming Charging Profile | | | | | | | | |
|  | |  | | | | | | | | |
| ***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 (that means that the charging identifier is unique within the SMF set if SMF set is used) 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.

For mobility from HPLMN with I-SMF to VPLMN in Home routed scenario, the Charging Identifier for the PDU session will be generated by 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.

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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 may include 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 (optional) are transferred from the old V-SMF to the new V-SMF.

NOTE: how the new V-SMF selects the CHF is operator specific.

- 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.

In roaming Home routed PDU session, when an UE moves from HPLMN with I-SMF insertion to a VPLMN:

- The Home Provided Charging Id which includes the Charging Id assigned by the H-SMF to the original PDU session 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.

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| **Next change** |

#### 6.2.1.2 Definition of PDU session charging information

PDU session specific charging information used for 5G data connectivity charging is provided within the PDU session charging Information.

The detailed structure of the PDU Session Charging Information can be found in table 6.2.1.2.1.

Table 6.2.1.2.1: Structure of PDU Session Charging Information

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| Information Element | Category | Description |
| Charging Id | OM | This field holds the Charging Id for PDU session. The value of Charging Id is the same as that of Home Provided Charging Id in V-SMF only in the home routed roaming scenario for EPS to 5GS interworking and inter-PLMN mobility from HPLMN with I-SMF to VPLMN. |
| Home Provided Charging Id | OC | This field holds the Charging Id generated by H-SMF.This field is only applicable in V-SMF in the home routed roaming scenario for EPS to 5GS interworking and inter-PLMN mobility from HPLMN with I-SMF to VPLMN. |
| User Information | OM | Group of user information. |
| User Identifier | OC | This field contains the identification of the user (i.e. GPSI). |
| User Equipment Info | OC | This field holds the identification of the terminal (i.e. PEI, MAC Address)  It is used for identifying the user in case SUPI is not present during emergency service. The detail identification of the wireline access is specified in clause 4.7.7 of TS 23.316 [203]. |
| unauthenticatedFlag | OC | This field indicates the served SUPI is not authenticated. |
| Roamer In Out | OC | This field holds an indication if the roamer is in-bound or out-bound. This field is present only if UE is identified as a roamer. |
| User Location Info | OC | This field indicates details of where the UE is currently located (access-specific user location information).  For MA PDU session, this field holds the user location associated to the 3GPP access |
| MA PDU Non 3GPP User Location info | OC | This field holds the user location associated to the non 3GPP access for MA PDU session. |
| User Location Time | OC | This field holds the UTC time at which the UE was last known to be in the location.  For MA PDU session, this field holds the user location time associated to the 3GPP access. |
| MA PDU Non 3GPP User Location Time | OC | This field holds the user location time associated to the non 3GPP access for MA PDU session. |
| UE Time Zone | OC | This field holds the Time Zone of where the UE is located, if available where the UE currently resides. |
| Presence Reporting Area Information | OC | This field contains part of the Presence Reporting Area Information of UE as defined in TS 23.501[200], comprising the Presence Reporting Area identifier(s) and an indication on whether the UE is inside or outside the Presence Reporting Area, if available. |
| PDU Session Information | OC | Group of PDU session information. |
| PDU Session ID | M | This field holds identifier of PDU session. |
| Network Slice Instance Identifier | OM | This field holds network slice information the PDU session belongs to. |
| PDU Type | OM | This field holds the type of PDU session. |
| PDU Address | OC | Group of UE IP address. |
| PDU Ipv4 Address | OC | This field holds the IP Address of the served SUPI allocated for PDU session, i.e. IPv4 address. |
| PDU IPv6 Address with Prefix | OC | This field holds the IP Address of the served SUPI allocated for PDU session, i.e. IPv6 prefix. |
| PDU Address prefix length | OC | PDP/PDN Address prefix length of an IPv6 typed Served PDU Address. The field needs not available for prefix length of 64 bits. |
| IPv4 Dynamic Address Flag | OC | This field indicates whether served PDP/PDN address for IPv4 is dynamically allocated. This field is missing if address is static. |
| IPv6 Dynamic Address Flag | OC | This field indicates whether served PDP/PDN address for IPv6 is dynamically allocated. This field is missing if address is static. |
| Additional PDU IPv6 prefixes | OC | This field holds a list of additional IPv6 prefix allocated for the PDU session, when applicable. |
| SSC Mode | OC | This field holds SSC mode of PDU session. |
| MA PDU session information | OC | This field holds information associated to the MA PDU session. |
| MA PDU session indicator | OC | This field indicates the PDU session is a MA PDU session requested by the UE or requested by Network modification based ATSSS capabilities provided by the UE and the Network. |
| ATSSS capability | OC | This field holds the ATSSS capability supported by the MA PDU session |
| SUPI PLMN ID | OC | This field holds PLMN ID of the SUPI. |
| CP CIoT Optimisation indicator | OC | This field holds the indicator whether control plane optimization CIoT for 5GS is used during the PDU session, if this feature is enabled. |
| 5GS Control Plane Only indicator | OC | This field holds the indicator whether the control plane only is used, i.e., the PDU data only transfers to control plane in case of control plane CIoT optimization. |
| Small data rate control indicator | OC | This field holds the indicator whether the small data rate control for 5GS CIoT is used during the PDU session. |
| Serving Network Function ID | OC | This field holds the identity of the serving network function  - AMF identity for the PDU sessions being served by SMF in non-roaming  - V-SMF identity for the home routed roaming  - I-SMF identity for PDU session being served by SMF + I-SMF  - ePDG identity for handover between EPC/ePDG and 5GS  - SGW identity for the EPC/E-UTRAN interworking  In all other cases the identity is implementation specific. |
| Serving Network Function Functionality | M | This field holds the functionality of the serving network function:  - AMF for the PDU sessions being served by SMF in non-roaming  - SMF for the home routed roaming  - I-SMF for the PDU session being served by SMF + I-SMF  - ePDG for handover between EPC/ePDG and 5GS  - SGW for EPC/E-UTRAN interworking. |
| Serving Network Function Name | OC | This field holds the unique identifier of the serving network function instance. |
| Serving Network Function Addresses | OC | This field holds the IP addresses of the serving network function. |
| Serving Network Function FQDN | OC | This field holds the FQDN the serving network function.  When the serving network function is an AMF, this FQDN is the AMF name as defined in clause 5.9.5 of 3GPP TS 23.501 [200]. |
| Serving Network Function PLMN ID | OC | This field holds the PLMN ID of the network the Serving Network Function belongs to. |
| AMF Identifier | OC | This field holds the AMF identifier. |
| Serving CN PLMN ID | OC | This field holds the serving Core Network Operator PLMN ID selected by the UE if different from SMF PLMN ID. |
| RAT Type | OC | This field holds the Radio Access Technology (RAT) currently serving the UE.  For MA PDU session, this field holds the Radio Access Technology (RAT) associated to the 3GPP access |
| MA PDU Non 3GPP RAT Type | OC | This field holds the Radio Access Technology (RAT) serving the UE in non 3GPP access for MA PDU session. |
| Data Network Name Identifier | M | This field contains the identifier of the DNN the user is connected to. |
| DNN Selection Mode | OC | This field indicates whether the requested DNN corresponds to an explicitly subscribed DNN or to the usage of a wildcard subscription. |
| Authorized QoS Information | OC | This field holds the authorized QoS applied to PDU session. |
| Subscribed QoS Information | OC | This field holds the subscribed default QoS for the PDU session. |
| Authorized Session-AMBR | OC | This field holds the authorized Session-AMBR for the PDU session. |
| Subscribed Session-AMBR | OC | This field holds the subscribed Session-AMBR for the PDU session. |
| PDU session start Time | OC | This field holds the timestamp when PDU session starts. |
| PDU session stop Time | OC | This field holds the timestamp when PDU session terminates. |
| Diagnostics | OC | This field holds a detailed reason for the release of the PDU session and complements the "Change Condition" information. |
| Enhanced Diagnostics | OC | This field holds a more detailed reason for the release of the PDU session, when a set of causes are applicable. |
| Charging Characteristics | OC | This field holds the Charging Characteristics for this PDU session. |
| Charging Characteristics  Selection Mode | OC | This field holds information about how the "Charging Characteristics" was selected. |
| 3GPP PS Data Off Status | OC | This field holds the 3GPP Data off Status when UE's 3GPP Data Off status is Activated or Deactivated. |
| Session Stop Indicator | OC | This field indicates to the CHF that the PDU session has been terminated. |
| Redundant Transmission  Type | OC | This field holds the redundant transmission Type. |
| PDU Session Pair ID | OC | This field holds an identifier that may be used to link two redundant PDU Sessions for dual connectivity based end to end redundant user plane paths type. |
| 5G LAN Type Service | OC | This field holds the 5G LAN Type service information, if present, the 5G LAN Type service is used. |
| Internal Group Identifier | M | This field holds the identifier of the 5G LAN VN group. |
| Unit Count Inactivity Timer | OC | This field holds the threshold for the time period when no units has been counted by the SMF. It holds either the value configured in SMF, if it is supported, or the value to be used as received from the CHF. A value of zero indicates that this mechanism shall not be used.  This field is not applicable to QBC. |
| RAN Secondary RAT Usage Report | OC | This field holds the secondary RAT usage reported from NG-RAN. |
| NG RAN Secondary RAT Type | OC | This field holds the value of Secondary RAT Type, as provided by the NG-RAN. |
| Qos Flows Usage Reports | OC | This field holds a list of containers per QFI with volumes reported, each container is time stamped. |
| QoS Flow Id | OM | This field holds the QoS flow Identifier (QFI) |
| Start Timestamp | OC | This field holds the start timestamp of the collected usage. |
| End Timestamp | OC | This field holds the end timestamp of the collected usage. |
| Downlink Volume | OC | This field holds the amount of used volume in downlink direction. |
| Uplink Volume | OC | This field holds the amount of used volume in uplink direction. |

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| **End of change** |