**3GPP TSG SA WG5 Meeting #156 *S5-244540***

**Maastricht, The Netherlands 19 - 23 August 2024**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **32.255** | **CR** | **0545** | **rev** | **1** | **Current version:** | **18.4.0** |  |
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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:*** | Rel-18 CR 32.255 Correction on 5G VN group communication | | | | | | | | | |
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| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
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| ***Work item code:*** | 5GLAN\_CH, TEI17 | | | | |  | ***Date:*** | | | 2024-08-22 |
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| ***Category:*** | **A** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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. | | | | | | | | *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:*** | | The terms used to indicate 5G VN group communication is not consistent across this specification.  The charging principles for 5G VN group communication is ambiguous, e.g. “associate charging information” may be misinterpreted that it requires online association of the charging information, which is not true for this scenario. | | | | | | | | |
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| ***Summary of change:*** | | 1. Synchronize the term used as “5G VN group communication”.  2. Clarify the ambiguity in the charging principle. | | | | | | | | |
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| ***Consequences if not approved:*** | | The support for 5G VN group communication charging remains ambiguous, making it hard to apply to production environment. | | | | | | | | |
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| ***Clauses affected:*** | | 5.1.2, 5.1.15.1, 5.1.15.2, 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:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Revision of S5-244006 | | | | | | | | |

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| **First change** |

### 5.1.2 Requirements

The following are high-level charging requirements specific to the packet domain, derived from the requirements in TS 22.115 [101], TS 22.261 [102], TS 23.501 [200], TS 23.502 [201], TS 23.503 [202] and TS 23.247 [204].

- The SMF shall support converged online and offline charging.

- The SMF may support offline only charging.

- The SMF shall support PDU session charging using service based interface.

- The SMF shall support network slice instance charging.

- The SMF shall collect charging information per PDU session for UEs served under 3GPP access and non-3GPP access (untrusted non-3GPP access, trusted non-3GPP access and wireline).

- Every PDU session shall be assigned a unique identity number for billing purposes per PLMN. (i.e. the Charging Id).

- Data volumes on both the uplink and downlink directions shall be counted separately. The data volumes shall reflect the data as delivered to and forwarded from the user.

- The charging mechanisms shall provide the date and time information when the PDU session starts.

- The SMF shall be capable of handling the Charging Characteristics. Charging Characteristics can be specific to a subscription or subscribed DNN.

- The SMF may be capable of identifying data volumes, elapsed time or events for individual service data flows (flow based charging). One PCC rule identifies one service data flow.

- SMF shall allow reporting of the service or the detected application usage per rating group or per combination of the rating group and service id. This reporting level can be activated per PCC rule.

- The quota management shall be per rating group per PDU session.

- If there are multiple UPFs for one PDU session, the quota management may be one for all UPFs or separate per UPF and the usage and charging information reporting per UPF.

- The SMF shall support charging for PDU Session types of IP, Ethernet and Unstructured.

- In Home Routed scenario, the SMF shall collect charging information per PDU session and, based on Home Operator policy and agreement between Home and Visit Operators, shall be able to collect charging information per Qos Flow for in-bound and out-bound roamers in Home Routed scenario.

- In Local breakout scenarios, the SMF in VPLMN shall collect charging information per QoS flow and, based on Visited Operator policy and agreement between Home and Visit Operator, may be able to collect charging information per service data flow for roamers in the LBO scenario.

- For interworking between 5GS and EPC, the dedicated PGW-C + SMF shall collect charging information using the same mechanisms as the SMF.

- The SMF shall support PDU session charging when the PDU session is served by both I-SMF and SMF.

- The SMF shall support charging for MA PDU Connectivity Service over 3GPP access and non-3GPP access.

- The SMF in VPLMN and in HPLMN shall support charging for MA PDU Connectivity Service in roaming Home Routed scenario with UE registered to the same VPLMN for 3GPP access and non-3GPP access.

- The SMF in HPLMN shall support charging for MA PDU Connectivity Service in roaming Home Routed scenario with UE registered in different PLMNs.

- The SMF shall support the charging of redundant transmission for high reliability communication.

- The SMF shall support the charging of 5G VN group communication.

- The SMF shall support the charging of 5GS CIoT.

- The SMF may support the charging of time sensitive communication traffic.

- The SMF may support the IMS data channel volume-based charging.

- The SMF may support PDU session charging of 5G multicast services.

- The SMF may support the charging of 5GS satellite backhaul.

- The SMF may support the converged charging for NPN.

- The SMF may support the charging of 5GS satellite access.

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| **Next change** |

#### 5.1.15.1 General

The SMF may support PDU Sessions for a 5G VN group which offers a virtual data network capable of supporting 5G LAN-type service over the 5G system, which specified in the TS 23.501[200].

The SMF embedding the CTF generates 5G VN group communication charging information towards the CHF based on the user plane architecture with the additional following options described in the clause 4.4.6 of TS 23.501[200] to support 5G LAN-type service.

- Figure 4.4.6.1-1 depicts the non-roaming user plane architecture to support 5G LAN-type service using local switch.

- Figure 4.4.6.1-2 depicts the non-roaming user plane architecture to support 5G LAN-type service using N19 tunnel.

- Figure 4.1.1 depicts the non-roaming user plane architecture to support 5G LAN-type service using N6 tunnel.

#### 5.1.15.2 Support 5G VN group communication

In order to support the 5G VN group communication charging, the following principles are used:

- The internal group identifier of 5G VN group is reported, which is used to indicate the 5G VN group and associate charging information in PDU session charging CHF CDR for 5G VN group communication.

- The uplink and downlink data volumes of PDU session for 5G VN group communication are reported separately.

- The usage of the N19 tunnel for 5G VN group communication is measured based on the PDU session charging.

- SMF may report the traffic forwarding way information corresponding to the 5G VN group communication.

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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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Information Element | | Category | | Description | |
| Charging Id | | OM | | This field holds the Charging Identifier 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 Identifier 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. | |
| SMF Charging Id | | OM | | This field holds a string that, be provided from the SMF instead of Charging Id, if supported. | |
| SMF Home Provided Charging Id | | OC | | This field holds a string that, be provided from the H-SMF instead of Home Provided Charging Id, if supported. | |
| 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]. | |
| unauthenticated Flag | | 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 | |
| IMS Session Information | | OC | | This field holds the IMS session related information. | |
| Caller Information | | OC | | This field holds the address(es) of calling party. | |
| Callee Information | | OC | | This field holds callee information. | |
| 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. | |
| S-NSSAI | | M | | This field holds network slice S-NSSAI the PDU session belongs to in the serving PLMN. | |
| HPLMN S-NSSAI | | OM | | This field holds the HPLMN S-NSSAI the VPLMN S-NSSAI is mapped to, for the PDU session. This field is only applicable in V-SMF for roaming. | |
| Alternative S-NSSAI | | OC | | This field holds the Alternative S-NSSAI replacing the S-NSSAI associated to the PDU session.  This field is present when Alternative S-NSSAI is serving the UE. | |
| 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. | |
| Serving Network Function Information | | M | | This field holds the Information of the serving network function:  - AMF for the PDU sessions served by SMF  - in non-roaming  - in VPLMN for local breakout and home routed roaming  - V-SMF for the PDU session served by H-SMF and V-SMF in HPLMN for home routed roaming  - I-SMF for the PDU session served by SMF and I-SMF  - ePDG for untrusted non-3GPP access  - SGW for EPC/E-UTRAN access.  - SGSN for GERAN/UTRAN access | |
| 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 identify PDU Session that is redundant with this PDU session.  This field is only applicable for dual connectivity based end to end redundant user plane paths case. | |
| 5G LAN Type Service | | OC | | This field holds the 5G LAN Type service information, if present, the PDU session is for 5G VN group communication. | |
| Internal Group Identifier | | M | | This field holds the internal group identifier of the 5G VN group. | |
| SNPN Information | | OC | | This field holds information associated to SNPN. | |
| SNPN ID | | M | | This field holds PLMN ID and the NID which identifies the SNPN.  The PLMN ID is the same as PLMN ID of the SUPI. | |
| Access Type | | OC | | This field identifies the type of access network for SNPN. It indicates whether the access is via 3GPP or via non-3GPP. | |
| N3IWF FQDN | | OC | | This field holds FQDN which can indicate the domain of the SNPN. | |
| 5G Satellite Access Indicator | | OC | | This field holds the use of 5G Satellite Access. | |
| Satellite backhaul Information | | OC | | This field contains parameters that can be used to determine that a Satellite Backhaul has been used for the data traffic | |
| Satellite Backhaul Category | | OC | | This field contains the type of the satellite used in the backhaul. For the Edge Computing and SCC-to-SCC communications via satellite backhaul, the type of the satellite is GEO. | |
| GEO Satellite ID | | OC | | For the Edge Computing and SCC-to-SCC communications via satellite backhaul cases, this field contains the ID of the GEO satellite | |
| 5GS Bridge Information | | OC | | This field holds the bridge information of the 5GS TSN, including bridge ID and port numbers. | |
| Bridge ID | | M | | This field holds the unique identifier of a 5GS TSN bridge instance for a given PDU session. | |
| NW-TT port number | | OM | | This field holds the port number allocated by the network-side TSN translator (NW-TT) for a given PDU session. | |
| DS-TT port number | | OM | | This field holds the port number allocated by device-side TSN translator (DS-TT) for a given PDU session. | |
| 5G Multicast Service | | OC | | This field holds the 5G MBS service information, if present, the UE has joined the multicast service. It may have multiple occurrences. | |
| MBS Session ID | | M | | This field holds the MBS session identifier referring to clause 6.5.1 of TS 23.247 [204]. | |
| 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 | | OM | | This field holds the value of Secondary RAT Type, as provided by the NG-RAN. | |
| Qos Flows Usage Reports | | OM | | 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** |