**3GPP TSG-SA5 Meeting #130e *S5-202167rev***

**e-meeting, 20 April– 24 April 2020** Revision of S S5-202167

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| *CR-Form-v11.4* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **32.256** | **CR** | **0002** | **rev** | **1** | **Current version:** | **16.0.0** |  |
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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:*** | Correct the Event offline charging scenarios | | | | | | | | | |
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| ***Source to WG:*** | Huawei | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5GS\_Ph1\_AMFCH | | | | |  | ***Date:*** | | | 2020-04-23 |
|  |  | | | |  | |  | | |  |
| ***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-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:*** | | As per the definition in TS 32.290, the PEC is used for event offline charging. | | | | | | | | |
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| ***Summary of change:*** | | Correct the Event offline charging scenarios to PEC. | | | | | | | | |
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| ***Consequences if not approved:*** | | Can not be aligned with other specifications. | | | | | | | | |
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| ***Clauses affected:*** | | 5.2.1.1, 5.2.2.2.1, 5.2.2.2.2, 5.2.2.2.5, 5.2.2.2.8, 5.2.2.2.9, 5.2.2.2.12, 5.2.2.2.15. | | | | | | | | |
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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 ... | | |
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| ***Other comments:*** | |  | | | | | | | | |

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| **First change** |

#### 5.2.1.1 General

5G connection and mobility converged charging, when activated, may be performed by the AMF interacting with CHF using Nchf specified in TS 32.290 [57] and TS 32.291 [58]. In order to provide the data required for the management activities outlined in TS 32.240 [1] (Credit-Control, accounting, billing, statistics, etc.), the AMF shall be able to perform converged charging for each of the following:

- Charging data related to registration.

- Charging data related to N2 connection between the AN and the AMF.

- Charging data related to user location.

The AMF shall use the AMF charging profile defined in clause 5.2.1.2 to determine whether charging (converged) is activated or not. The default AMF charging profile is provided by Charging Characteristics applicable to AMF are described in Annex A.

The AMF shall be able to perform converged charging by interacting with CHF, for charging data related to registration, connection and location management. The Charging Data Request and Charging Data Response are exchanged between the AMF and the CHF, based on IEC, or PEC scenarios as specified in TS 32.290 [57]. The Charging Data Request is issued by the AMF towards the CHF when certain conditions (chargeable events) are met.

The contents and purpose of each charging event that triggers interaction with CHF, as well as the chargeable events that trigger them, are described in the following clauses.

A detailed formal description of the converged charging parameters defined in the present document is to be found in TS 32.291 [58].

A detailed formal description of the CDR parameters defined in the present document is to be found in TS 32.298 [51].

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| **Next change** |

##### 5.2.2.2.1 General

The subclause below describes registration management charging.

For registration procedures, the following scenarios specified in TS 32.290 [57] are supported:

- PEC;

- IEC;

- ECUR.

For deregistration procedures, only PEC scenario is supported.

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| **Next change** |

##### 5.2.2.2.2 General Registration – PEC charging

The following figure 5.2.2.2.2.1 describes a Registration charging message flow in PEC charging, based on figure 4.2.2.2.2-1 of TS 23.502 [202] description and, applicable to:

- Initial Registration in 5GS;

- Mobility Registration Update; or

- Periodic Registration Update; or

- Emergency Registration.



Figure 5.2.2.2.2.1: Registration – PEC charging

1-14c. Registration procedure initiated by UE.

10: The new AMF notifies the old AMF that the registration of the UE in the new AMF is completed.

14d: If necessary, the old AMF is requested by UDM to delete Registration Management contexts and PDU Sessions.

14dCh: The old AMF interacts with the CHF as per deregistration procedure described in figure 5.2.2.2.8.1.

21. Upon successful procedure, Registration Accept sent to the UE.

21ch-a. The AMF sends Charging Data Request [Event] to CHF for the UE successful registration.

21ch-b. The CHF creates the CDR for this registration.

21ch-c. The CHF acknowledges by sending Charging Data Response [Event] to the AMF.

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| **Next change** |

##### 5.2.2.2.5 Registration with AMF re-allocation – PEC charging

The following figure 5.2.2.2.5.1 describes a registration with AMF re-allocation PEC charging, based on figure 4.2.2.2.3-1 TS 23.502 [202] description:



Figure 5.2.2.2.5.1: Registration with AMF re-allocation– PEC charging

1-7b. Registration with AMF re-allocation procedure.

21ch-a to 21ch-c: same steps as per Figure 5.2.2.2.2.1.

4-24b. Registration procedure in PEC charging in clause 5.2.2.2.2.

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| **Next change** |

##### 5.2.2.2.8 Deregistration – PEC charging

The Deregistration message flows are applicable to:

- UE-initiated deregistration

- Network-initiated Deregistration.

The following figure 5.2.2.2.8.1 describes a UE-initiated deregistration in PEC charging, based on figure 4.2.2.3.2-1 of TS 23.502 [202] description:



Figure 5.2.2.2.8.1: UE-initiated Deregistration – PEC charging

1. Deregistration procedure initiated by UE.

1ch-a. The AMF sends Charging Data Request [Event] to CHF for the UE deregistration.

1ch-b. The CHF creates the CDR for this deregistration.

1ch-c. The CHF acknowledges by sending Charging Data Response [Event] to the AMF.

7: The AMF sends NAS message Deregistration Accept to UE. In case of Deregistration type is switch-off, the Deregistration Accept message is not sent.

The following figure 5.2.2.2.8.2 describes a Network-initiated Deregistration in PEC charging, based on figure 4.2.2.3.3-1 of TS 23.502 [202] description:



Figure 5.2.2.2.8.2: Network-initiated Deregistration – PEC charging

1. AMF receives Nudm\_UECM\_DeregistrationNotification from UDM.

2. Deregistration Request sent towards the UE. In case of Implicit Deregistration, the Deregistration Request message is not sent.

2ch-a. The AMF sends Charging Data Request [Event] to CHF for the UE successful deregistration.

2ch-b. The CHF creates the CDR for this deregistration.

2ch-c. The CHF acknowledges by sending Charging Data Response [Event] to the AMF.

[3-8]. Deregistration procedure steps.

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| **Next change** |

##### 5.2.2.2.9 Registration – Untrusted non-3GPP access - PEC charging

The following figure 5.2.2.2.9.1 describes UE Registration via Untrusted non-3GPP Access, in PEC charging, based on figure 4.12.2.2-1 of TS 23.502 [202] description.



Figure 5.2.2.2.9.1: Registration via Untrusted non-3GPP Access – PEC

1-11b. UE registration procedure via N3IWF.

12. Upon successful procedure, NAS Registration Accept sent to N3IWF by AMF.

12ch-a. The AMF sends Charging Data Request [Event] to CHF for the UE successful registration.

12ch-b. The CHF creates the CDR for this registration.

12ch-c. The CHF acknowledges by sending Charging Data Response [Event] to the AMF.

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| **Next change** |

##### 5.2.2.2.12 Registration for SMS over NAS – PEC charging

The following figure 5.2.2.2.12.1 describes a registration in 5GS for SMS over NAS in PEC charging, based on figure 4.13.3.1-1 TS 23.502 [202], where the "SMS supported" indication is included in Registration Request from the UE.



Figure 5.2.2.2.12.1: Registration for SMS over NAS – PEC charging

Steps 1-7: SMS service activation in the SMSF

Step 8: SMSF answers to the AMF with Nsmsf\_SMService\_Activate service

9ch-a to 9ch-c: Same steps as 21ch-a to 21ch-c of Figure 5.2.2.2.2.1. The "SMS allowed" indication is included in addition.

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| **Next change** |

##### 5.2.2.2.15 Deregistration for SMS over NAS – PEC charging

Deregistration procedures for SMS over NAS are specified in TS 23.502 [202] clause 4.13.3.2:

- When based on subsequent Registration Request message from the UE, the registration charging scenario in clause 5.2.2.2.2 or 5.2.2.2.3 applies.

- When based on procedures in which UE is determined as deregistered by the AMF, the Network-initiated deregistration charging scenario in clause 5.2.2.2.8 applies.

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| **End of change** |