**3GPP TSG-SA5 Meeting #141-eS5-221668d4**

**e-meeting, 17 - 26 January 2022** Revision of S5-221129

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **32.255** | **CR** | **0365** | **rev** | **1** | **Current version:** | **17.4.0** |  |
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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:***  | Add charging requirements of 5GS CIoT |
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| ***Source to WG:*** | Huawei |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | 5G\_CIoT\_CH |  | ***Date:*** | 2022-01-27 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***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 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | This tdoc is to add charging requirements of 5GS CIoT. |
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| ***Summary of change:*** | Charging requirement is added in clause 5.1.2.The conceptural description is added. |
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| ***Consequences if not approved:*** | The charging requirements of 5GS CIoT is not covered in TS 32.255. |
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| ***Clauses affected:*** | 3.3, 5.1.2, 5.1.x (new) |
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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:*** |  |
|  |  |
| ***This CR's revision history:*** | This tdoc is revison of S5-221129. |

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| **Start of changes** |

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [100] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [100].

5GC 5G Core Network

5GS 5G System

ABMF Account Balance Management Function

AF Application Function

AMF Access and Mobility Management Function

ATSSS Access Traffic Steering, Switching, Splitting

AUSF Authentication Server Function

BD Billing Domain

CCS Converged Charging System

CDF Charging Data Function

CGF Charging Gateway Function

CHF Charging Function

CIoT Cellular Internet of Things

CP Control Plane

CTF Charging Trigger Function

DNN Data Network Name

FBC Flow Based Charging

IoT Internet of Things

GPSI Generic Public Subscription Identifier

GUAMI Globally Unique AMF Identifier

MA Multi-Access

MPTCP Multi-Path TCP Protocol

MTC Machine-Type Communications

N3IWF Non-3GPP InterWorking Function

NE Network Element

NEF Network Exposure Function

NF Network Function

NRF Network Repository Function

NSSF Network Slice Selection Function

OCF Online Charging Function

OCS Online Charging System

PCC Policy and Charging Control

PCF Policy Control Function

PEI Permanent Equipment Identifier

QBC QoS flow Based Charging

QFI QoS Flow Identifier

SCP Service Communication Proxy

SDF Service Data Flow

SMF Session Management Function

SSC Session and Service Continuity

SUPI Subscription Permanent Identifier

TNAN Trusted Non-3GPP Access Network

TNAP Trusted Non-3GPP Access Point

UDM Unified Data Management

UDR Unified Data Repository

UPF User Plane Function

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| **Next 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] and TS 23.503 [202].

- 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.

- 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 5GS CIoT.

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| **Next change** |

### 5.1.x Support of Cellular IoT

The 5GS support for Cellular IoT (CIoT) is specified in TS 23.501 [200], this includes EPC interworking and home-routed roaming. In legacy networks Cellular IoT may be referred to as Machine Type Communications (MTC).

During the PDU session establishment (initial charging request) the SMF may provide the following charging information related to 5GS CIoT:

- The indication of Control Plane 5GS CIoT optimization

- Small data rate control indication

- The RAT types (NB-IoT or LTE-M)

- The control plane only indication

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| **End of changes** |