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| **3GPP TSG-SA5 Meeting #141-e *S5-221396rev1*****e-meeting, 17 - 26 January 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **32.277** | **CR** |  | **rev** | **-** | **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** |
|  |
| ***Title:***  | Update general charging principles for 5G ProSe |
|  |  |
| ***Source to WG:*** | CATT |
| ***Source to TSG:*** | SA5 |
|  |  |
| ***Work item code:*** | 5G\_ProSe |  | ***Date:*** | 2022-1-5 |
|  |  |  |  |  |
| ***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:*** | The requirement and charging information for 5G converged charging is missing |
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| ***Summary of change:*** | Updating general charging principles for 5G ProSe |
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| ***Consequences if not approved:*** | Charging of 5G ProSe will not be supported for the converged charging |
|  |  |
| ***Clauses affected:*** | 5.1.1, 5.1.2.1, 5.1.2.3, 5.1.2.4 |
|  |  |
|  | **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:*** |  |

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| **1st modified section** |

## 5.1 ProSe charging principles

### 5.1.1 Requirements

There are three types of ProSe services defined in TS 23.303 [238]:

- ProSe Direct Discovery, including ProSe open Direct Discovery and restricted Direct Discovery, and

- ProSe EPC-level Discovery, and

- ProSe one-to-many Direct Communication for Public Safety Use, and

- ProSe one-to-one Direct Communication, including UE-to-Network Relay for Public Safety Use.

In 5GS, Proximity based Services (ProSe) are services that can be provided by the 5GS based on UEs being in proximity to each other. The 5GS enablers for ProSe include the following functions:

- 5G ProSe Direct Discovery, including 5G ProSe open Direct Discovery and restricted Direct Discovery, and

- UE-to-Network Relay Discovery, and

- 5G ProSe Direct Communication, including Unicast Direct Communication, Broadcast and Groupcast Direct Communication and

- UE-to-Network Relay Communication.

The following are high-level charging requirements for ProSe services, derived from the requirements in TS 22.115 [101], and TS 23.303 [238].

5G ProSe charging information can be collected by ProSe related functions, with the following modification:

- the 5G DDNMF takes the role of "ProSe Function" in the 5G Direct Discovery;

- EPC-level Discovery is not supported in 5GS;

- the E-UTRAN is replaced by NG-RAN and E-UTRA is replaced with NR;.

- corresponding 5GS identifiers replace the EPS identifiers, e.g. use SUPI instead of IMSI, and use GPSI instead of MSISDN;

- PC5\_tech parameter is omitted and the intended PC5 radio technology is NR.ProSe Function shall be able to collect charging information for UEs in HPLMN, in online, offline and converged charging for:

- ProSe open Direct Discovery Model A;

- ProSe restricted Direct Discovery Model A and Model B;

- ProSe EPC-level Discovery.

ProSe Function shall be able to collect charging information for UEs in VPLMN in offline and converged charging for:

- ProSe open Direct Discovery for Announce;

- ProSe restricted Direct Discovery for Announce.

ProSe Function shall be able to collect charging information for UEs in VPLMN and Local PLMNs where applicable in offline and converged charging for:

- ProSe open Direct Discovery for Monitor and Match;

- ProSe restricted Direct Discovery for Monitor and Match.

NOTE 1: the notion of "Local PLMN" does not apply to WLAN-based ProSe Direct Discovery, so the requirements related to charging for Local PLMN do not apply to WLAN-based ProSe Direct Discovery.ProSe Function shall be able to indicate the PC5 radio technology (e.g., E-UTRA, WLAN) used for ProSe Direct Discovery in the charging information. 5G DDNMF shall be able to indicate the NR PC5 radio technology used for 5G ProSe Direct Discovery in the charging information.

ProSe Function shall be able to collect charging information from UEs in HPLMN and VPLMN in offline and converged charging for:

 - ProSe one-to-many Direct Communication for Public Safety Use;

- ProSe one-to-one Direct Communication for Public Safety Use, including UE-to-Network Relay;

For ProSe one-to-many Direct Communication for Public Safety Use, the following requirements apply to the UE delivery of usage information to the ProSe Function:

- When the UE is in E-UTRAN coverage, if the usage information recorded for the current collection period is not empty, it shall report the usage information as configured when the earlier one of the following criteria are met:

- a configured collection period has elapsed; the end of an associated configured reporting window has not been reached; and the UE temporarily switches to RRC CONNECTED mode; or

- a configured collection period has elapsed and the end of an associated configured reporting window has been reached.

- When the UE is out of E-UTRAN coverage, the UE shall generate reports from the recorded usage information every collection period and store the non-empty reports in a non-volatile memory, and send the reports once the UE returns to coverage.

- The storage of the usage information and the execution of the reporting procedure shall be in a secure environment in the UE that is trusted by the operator.

NOTE 2: The secured storage and execution of the reporting procedure do not guarantee that the recording of the usage information is trusted.

NOTE 3: When the UE operates out of coverage for a long time, the stored reports may reach the limit of the memory. The handling of such situation is determined by UE implementation.

- The UE shall upload the usage information to a location configured by the ProSe Function securely over PC3ch using the mechanism defined in TS 33.303 [240].

- If a replacement of USIM occurs when UE is out of coverage, the usage information for a given IMSI shall remain stored on the UICC or ME as long as the UE does not use the USIM associated with that IMSI.

- The results of the collection and delivery of usage information reports should not affect the UE's use of the ProSe Direct Communication service.

NOTE 4: For Public Safety use the UE is able to use ProSe Direct Communication service even if there are errors in usage information collection or reporting.

NOTE 5: In 5GS, both public safety use and commercial services are applicable for ProSe Direct Discovery and Direct Communication, including UE-to-Network Relay, as defined in TS 23.304 [241].

ProSe Function shall be capable of handling the Charging Characteristics. Charging Characteristics can be specific for a subscription or for subscribed services. ProSe Function shall use the Charging Characteristics profile to decide if online or offline charging is used for a user. The Charging Characteristics is provided by the HSS to the ProSe Function as part of the subscription information. Requirements of the use of Charging Characteristics are provided in annex A.

CHF selection by 5G DDNMF is performed via NRF based discovery.

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| **next modified section** |

### 5.1.2 Charging information

#### 5.1.2.1 Charging information for ProSe Direct Discovery

For ProSe Direct Discovery, the ProSe Function shall collect the following charging information:

- identity of the mobile subscriber using the ProSe functionality, e.g. IMSI;

- identity of the PLMN where the ProSe functionality is used;

- specific ProSe functionality used, e.g. Announcing, Monitoring, or Match Report;

- role of the UE in the ProSe, e.g. Announcing UE, Monitoring UE, Discoveree UE, Discoverer UE;

- modelof the Direct Discovery used by the UE, e.g. Model A, or Model B;

- the validity period associated with ProSe Application Code allocated to an Announcing UE;

- the PLMN ID extracted from the set of Filters provided for a Monitoring UE in a Monitor Request and the maximum validity period associated with the set of Filters;

- the PLMN ID extracted from the ProSe Application Code and the monitored PLMN ID with the timestamp reported by a Monitoring UE in the Match Report message, which is triggered by the Monitoring UE when the ProSe Application Code that matches the Discovery Filters does not have ProSe Application ID already locally stored that correspond to this ProSe Application Code;

- ProSe Application ID used in the ProSe Direct Discovery;

- Application ID related to the ProSe Direct Discovery.

- PC5 radio technology (e.g., E-UTRA or WLAN) used for ProSe Direct Discovery. When this information is not present, it means the PC5 radio technology is E-UTRA.

For 5G ProSe Direct Discovery, the 5G DDNMF shall collect the charging information, with following modification:

- the E-UTRAN is replaced by NG-RAN and E-UTRA is replaced with NR;

- the ECGI is replaced by NCGI;

- corresponding 5GS identifiers replace the EPS identifiers, e.g. use SUPI instead of IMSI, and use GPSI instead of MSISDN;

- PC5\_tech parameter is omitted and the intended PC5 radio technology is NR.

The charging information shall be collected when a UE performs ProSe Direct Discovery, including Announcing Request, Monitoring Request, and Match Report.

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#### 5.1.2.3 Charging information for ProSe one-to-many Direction Communication

For the ProSe one-to-many Direct Communication for Public Safety Use, the UE shall collect the following information, and be included in the usage information report to the ProSe Function for charging purposes, if configured by the network:

- UE identity, e.g. IMSI;

- For every collection period:

- Sequence number of the report;

- List of the locations of the UE when in coverage, e.g. ECGIs, and the corresponding timestamps;

- Configured Radio Parameters used for the ProSe Direct Communication, as defined in TS 24.333 [241];

- List of timestamps of when the UE goes in/out of E-UTRAN coverage;

- For every ProSe Direct Communication Group (identified by ProSe L2 Group ID):

- Group Parameters used for the ProSe Direct Communication, as defined in TS 24.333 [241], e.g. ProSe L2 Group ID, IP Multicast Address, Source IP address, etc.;

- Timestamp of the first one-to-many communication transmission/reception;

- Identities of the transmitters in the one-to-many communication session, e.g. Source L2 ID and IP address;

- List of non-zero amount of data transmitted by UE;

- List of amount of data transmitted by UE when in E-UTRAN coverage at each location, with ECGI and the corresponding timestamps, and indicator of which radio resources used (i.e., operator-provided in coverage or configured) and the radio frequency used;

- List of amount of data transmitted by UE for each out of E-UTRAN coverage period and the corresponding timestamps and the radio frequency used ;

- List of non-zero amount of data received by UE;

- List of amount of data received by UE when in E-UTRAN coverage at each location, with ECGI and the corresponding timestamps, and indicator of which radio resources used (i.e., operator-provided in coverage or configured) and the radio frequency used;

- List of amount of data received by UE for each out of E-UTRAN coverage period and the corresponding timestamps and the radio frequency used;

- Application specific data, e.g. application specific session floor control information, Application layer User ID of group members in the communication.

- QoS flow information, e.g. PC5 QoS Flow Id, QoS information, QoS Characteristics.

NOTE For broadcast mode of 5G ProSe direct communication over PC5 reference point, the UE is configured with the Destination Layer-2 ID(s) to be used for ProSe applications. For groupcast mode of 5G ProSe direct communication over PC5 reference point, the application layer may provide Application Layer Group ID. The UE self-selects a Source Layer-2 ID.

The network shall be able to configure the UE with information to be included in the usage information report as per following:

- Whether the Group Parameters need to be reported;

- Whether timestamps of the first transmission/reception need to be reported;

- Whether the amount of data transmitted by UE needs to be reported, and whether with location information;

- Whether the amount of data received by UE needs to be reported, and whether with location information;

- Whether the list of locations of the UE when in E-UTRAN coverage needs to be reported;

- Whether the list of timestamps of when UE goes in/out of E-UTRAN coverage need to be recorded.

- Whether the indicator of radio resources used and radio frequency are to be reported with the amount of data transmitted and received.

- Whether the QoS flow information need to be reported;For 5G ProSe Broadcast and Groupcast Direct Communication, the UE and network shall collect the charging information with the following modification:

- the E-UTRAN is replaced by NG-RAN and E-UTRA is replaced with NR;

- the ECGI is replaced by NCGI;

- corresponding 5GS identifiers replace the EPS identifiers, e.g. use SUPI instead of IMSI, and use GPSI instead of MSISDN;

- PC5\_tech parameter is omitted and the intended PC5 radio technology is NR;

- both public safety use and commercial services are applicable for Direct Communication.

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#### 5.1.2.4 Charging information for ProSe one-to-one Direction Communication

For the ProSe one-to-one Direct Communication for Public Safety Use, the UE shall collect the following information, and be included in the usage information report to the ProSe Function for charging purposes, if configured by the network:

- UE identity, e.g. IMSI;

- For every collection period:

- Sequence number of the report;

- List of the locations of the UE when in coverage, e.g. ECGIs, and the corresponding timestamps;

- Configured Radio Parameters used for the ProSe Direct Communication, as defined in TS 24.333 [241];

- List of timestamps of when the UE goes in/out of E-UTRAN coverage;

- For every ProSe Direct Communication (identified by ProSe L2 ID):

- Timestamp of the first one-to-one communication transmission/reception;

- Identities of the transmitters in the non-relay one-to-one communication session, e.g. Source L2 ID and IP address and Target L2 ID and IP address;

- Identities of the transmitters in the direct communication via ProSe UE-to-Network relay, e.g. Source L2 ID and IP address, ProSe UE-to-Network Relay UE L2 ID and IP address.

- List of non-zero amount of data transmitted by UE;

- List of amount of data transmitted by UE when in E-UTRAN coverage at each location, with ECGI and the corresponding timestamps, and indicator of which radio resources used (i.e., operator-provided in coverage or configured) and the radio frequency used;

- List of amount of data transmitted by UE for each out of E-UTRAN coverage period and the corresponding timestamps and the radio frequency used;

- List of non-zero amount of data received by UE;

- List of amount of data received by UE when in E-UTRAN coverage at each location, with ECGI and the corresponding timestamps, and indicator of which radio resources used (i.e., operator-provided in coverage or configured) and the radio frequency used;

- List of amount of data received by UE for each out of E-UTRAN coverage period and the corresponding timestamps and the radio frequency used;

- List of non-zero amount of data relayed by UE, only for ProSe direct communication via ProSe UE-to-Network Relay,

- List of amount of data relayed by a ProSe UE-to-Network Relay at each location, with ECGI and the corresponding timestamps, and indicator of radio resources used and the radio frequency used;

- Application specific data, e.g. application specific session floor control information, Application layer User ID in the one-to-one communication.

- QoS flow information, e.g. PC5 QoS Flow Id, QoS information, Qos Characteristics.

The network shall be able to configure the UE with information to be included in the usage information report as per following:

- Whether UE need to be reported;

- Whether timestamps of the first transmission/reception need to be reported;

- Whether the amount of data transmitted by UE needs to be reported, and whether with location information;

- Whether the amount of data received by UE needs to be reported, and whether with location information;

- Whether the list of locations of the UE when in E-UTRAN coverage needs to be reported;

- Whether the list of timestamps of when UE goes in/out of E-UTRAN coverage need to be recorded;

- Whether the indicator of radio resources used and radio frequency are to be reported with the amount of data transmitted and received;

- Whether the QoS flow information need to be reported.

For 5G ProSe Unicast Direct Communication, the UE and network shall collect the charging information with the following modification:

- the E-UTRAN is replaced by NG-RAN and E-UTRA is replaced with NR;

- the ECGI is replaced by NCGI;

- corresponding 5GS identifiers replace the EPS identifiers, e.g. use SUPI instead of IMSI, and use GPSI instead of MSISDN;

- PC5\_tech parameter is omitted and the intended PC5 radio technology is NR;

- both public safety use and commercial services are applicable for Direct Communication.

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| **End of changes** |