**3GPP TSG-CT WG1 Meeting #130-eC1-213649**

**Electronic meeting, 20-28 May 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **23.122** | **CR** | **0727** | **rev** | **1** | **Current version:** | **17.2.0** |  |
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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 | **X** | ME | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:*** | Storage of user controlled list of services exempted from release due to SOR | | | | | | | | | |
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| ***Source to WG:*** | NTT DOCOMO | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eCPSOR\_CON | | | | |  | ***Date:*** | | | 2021-05-26 |
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| ***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 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:*** | | As discussed during CT1#129-e, where the “user controlled list of services exempted from release due to SOR” is stored needs to be specified. | | | | | | | | |
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| ***Summary of change:*** | | Where the user controlled list is stored is specified | | | | | | | | |
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| ***Consequences if not approved:*** | | Unexpected UE behavior. | | | | | | | | |
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| ***Clauses affected:*** | | C.1 | | | | | | | | |
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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:*** | |  | | | | | | | | |

# C.1 General

The purpose of the control plane solution for steering of roaming in 5GS procedure is to allow the HPLMN to update the "Operator Controlled PLMN Selector with Access Technology" list in the UE by providing the HPLMN protected list of preferred PLMN/access technology combinations via NAS signalling. If the selected PLMN is a VPLMN, the HPLMN can provide the steering of roaming information to the UE using the control plane mechanism during and after registration. If the selected PLMN is the HPLMN, the HPLMN can provide the steering of roaming information to the UE using the control plane mechanism after registration only. The HPLMN updates the "Operator Controlled PLMN Selector with Access Technology" based on the operator policies, which can be based on the registered VPLMN, the location of the UE, etc.

The HPLMN can configure their subscribed UE's USIM to indicate that the UE is expected to receive the steering of roaming information due to initial registration in a VPLMN. At the same time the HPLMN will mark the UE is expected to receive the steering of roaming information due to initial registration in a VPLMN, in the subscription information in the UDM. In this case, it is mandatory for the HPLMN to provide the steering of roaming information to the UE during initial registration in a VPLMN. Otherwise if such configuration is not provided in the USIM, it is optional for the HPLMN to provide the steering of roaming information to the UE during initial registration (based on operator policy). The HPLMN can provide the steering of roaming information to the UE during the registration procedure for mobility registration update and initial registration procedure for emergency services. In addition, the HPLMN can request the UE to provide an acknowledgement of successful reception of the steering of roaming information.

NOTE 1: In annex C of this specification, the User Data Repository (UDR) is considered as part of the UDM.

As the HPLMN needs to consider certain criteria including the number of customers distributed through multiple VPLMNs in the same country or region, the list of the preferred PLMN/access technology combinations is not necessarily the same at all times and for all users. The list of the preferred PLMN/access technology combinations needs to be dynamically generated, e.g. generated on demand, by a dedicated steering of roaming application function (SOR-AF) providing operator specific data analytics solutions.

NOTE 2: The functional description of this dedicated application function (SOR-AF) is out of scope of 3GPP.

In order to support various deployment scenarios, the UDM may support:

- using a list of preferred PLMN/access technology combinations or a secured packet which is or becomes available in the UDM (i.e. retrieved from the UDR);

NOTE 3: A secured packet can be made available at the UDR via implementation specific means. In this case the implementation specific means are required to ensure that the secured packet satisfies the "Replay detection and Sequence Integrity counter" (see ETSI TS 102 225 [73]) every time it is sent out from the HPLMN to the UE.

- obtaining a list of preferred PLMN/access technology combinations or a secured packet from the SOR-AF; or

- both of the above.

The HPLMN policy for the SOR-AF invocation can be present in the UDM only if the UDM supports obtaining a list of preferred PLMN/access technology combinations or a secured packet from the SOR-AF.

The UDM discards any list of preferred PLMN/access technology combinations or any secured packet obtained from the SOR-AF or which is or becomes available in the UDM (i.e. retrieved from the UDR), either during registration (as specified in annex C.2) or after registration (as specified in annex C.3), when the UDM cannot successfully forward the SOR information to the AMF (e.g. in case the UDM receives the response from the SOR-AF with the list of preferred PLMN/access technology combinations or the secured packet after the expiration of the operator specific timer, or if there is no AMF registered for the UE).

The UE maintains a list of "PLMNs where registration was aborted due to SOR". If the UE receives steering of roaming information in the REGISTRATION ACCEPT or DL NAS TRANSPORT message and the security check to verify that the steering of roaming information is provided by HPLMN is successful, the UE shall remove the current selected PLMN from the list of "PLMNs where registration was aborted due to SOR". The UE shall delete the list of "PLMNs where registration was aborted due to SOR" when the MS is switched off or the USIM is removed.

If:

- the UE's USIM is configured to indicate that the UE shall expect to receive the steering of roaming information during initial registration procedure but did not receive it or security check on the steering of roaming information fails;

- the current chosen VPLMN is not contained in the list of "PLMNs where registration was aborted due to SOR";

- the current chosen VPLMN is not part of "User Controlled PLMN Selector with Access Technology" list; and

- the UE is not in manual mode of operation;

then the UE will perform PLMN selection with the current VPLMN considered as lowest priority.

It is mandatory for the VPLMN to transparently forward to the UE the steering of roaming information received from HPLMN and to transparently forward to the HPLMN the acknowledgement of successful reception of the steering of roaming information received from UE, both while the UE is trying to register onto the VPLMN as described in subclause C.2, and after the UE has registered onto the VPLMN as described in subclause C.3.

If the last received steering of roaming information contains the list of preferred PLMN/access technology combinations then the ME shall not delete the "Operator Controlled PLMN Selector with Access Technology" list stored in the ME when the UE is switched off.

The ME shall delete the "Operator Controlled PLMN Selector with Access Technology" list stored in the ME when a new USIM is inserted.

The procedure in this annex for steering of UE in VPLMN can be initiated by the network while the UE is trying to register onto the VPLMN as described in subclause C.2, or after the UE has registered onto the HPLMN or the VPLMN as described in subclause C.3.

The steering of roaming connected mode control information (SOR-CMCI) enables the HPLMN to control the timing of a UE in connected mode to move to idle mode to perform the steering of roaming. The UE shall support the SOR-CMCI. The support and use of SOR-CMCI by the HPLMN is based on the HPLMN's operator policy.

The UDM may support providing the UE with the SOR-CMCI:

- which becomes available in the UDM (i.e. retrieved from the UDR);

- received from the SOR-AF; or

- both of the above.

The following requirements are applicable for the SOR-CMCI:

- The HPLMN may configure SOR-CMCI in the UE and may also send SOR-CMCI over N1 NAS signalling. The SOR-CMCI received over N1 NAS signalling has precedence over the SOR-CMCI configured in the UE.

- The user may configure the UE with a "user controlled list of services exempted from release due to SOR". The "user controlled list of services exempted from release due to SOR" shall be stored on the USIM if the corresponding file is present. If the corresponding file is not present on the USIM, the "user controlled list of services exempted from release due to SOR" shall be stored in a non-volatile memory in the ME together with the SUPI from the USIM;

- The UE shall indicate to the HPLMN its support for SOR-CMCI.

NOTE 4: The HPLMN has the knowledge of the USIM's capabilities in supporting SOR-CMCI.

- While performing SOR, the UE shall consider the list of preferred PLMN/access technology combinations or secured packet received in the SOR information together with the available SOR-CMCI.

- The HPLMN may provision the SOR-CMCI in the UE over N1 NAS signalling. The UE shall store the configured SOR-CMCI in the non-volatile memory of the ME or in the USIM as described in subclause C.4.

- The UDM discards any SOR-CMCI obtained from the SOR-AF or which is or becomes available in the UDM (i.e. retrieved from the UDR), either during registration (as specified in annex C.2) or after registration (as specified in annex C.3), when the UDM cannot successfully forward the SOR-CMCI to the AMF (e.g. in case the UDM receives the response from the SOR-AF with the SOR-CMCI after the expiration of the operator specific timer, or if there is no AMF registered for the UE).

Editor's note: Exact structure of the SOR-CMCI is FFS.

Editor's note: If the UE has an established emergency PDU session, it is FFS whether the UE shall attempt to perform the PLMN selection immediately after the emergency PDU session is released or after some time to enable PSAP callback.