**3GPP TSG-CT WG1 Meeting #127bis-eC1-210xxx**

**Electronic meeting, 25-29 January 2021 (was C1-210114)**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **23.122** | **CR** | **0652** | **rev** | **1** | **Current version:** | **17.1.1** |  |
|  | | | | | | | | |
| *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 | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:*** | Configuration of services exempted from release due to SOR at the UE | | | | | | | | | |
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| ***Source to WG:*** | Qualcomm Incorporated | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eCPSOR\_CON | | | | |  | ***Date:*** | | | 2021-01-26 |
|  |  | | | |  | |  | | |  |
| ***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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | At SA1#92-e, SA1 sent LS S1-204376 / C1-210040 to CT1 informing CT1 that SA1 agreed CR 0488 to TS 22.261 (S1-204377) regarding the services exempted from release due to SOR. The CR was subsequently approved at SA#90-e.  According to the CR:  *The UE shall be able to delay conforming to steering of roaming control information from the HPLMN while it is engaged in priority service (e.g. emergency call, MPS session), or a service defined by HPLMN policy or the user not to be interrupted (e.g. MMTEL voice/video call).*  The CT1 specification in TS 23.122 needs to be aligned with this SA1 agreement. | | | | | | | | |
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| ***Summary of change:*** | | Subclauses C.1 and C.4.1 were updated such that the UE can be configured by the user with a list of services that are exempted from a release due to SOR. | | | | | | | | |
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| ***Consequences if not approved:*** | | The stage 1 requirement that the user can define a list of services which are exempted from release due to SOR will not be met. | | | | | | | | |
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| ***Clauses affected:*** | | C.1, C.4.1 | | | | | | | | |
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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:*** | |  | | | | | | | | |

\*\*\* First change \*\*\*

# 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 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 using the Nudm\_ParameterProvision\_Update service operation; 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 UE shall indicate to the HPLMN its support for SOR-CMCI; and

- 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.

Editor's note: Whether to store the SOR-CMCI in the UE's ME or USIM is FFS.

Editor's note: it is FFS whether the SOR-CMCI is (a) configured in the UE using the UE parameters update via UDM control plane procedure, (b) included in a SOR transparent container, (c) transported in a new transparent container, or (d) other means.

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.

Editor's note: it is FFS whether the UE performs local NAS signalling connection release or de-registration procedure when the SOR-CMCI requires that the UE shall move to the idle mode.

\*\*\* Next change \*\*\*

## C.4.1 General

The HPLMN, based on operator policy, may provide the UE with SOR-CMCI to control the timing when the UE enters idle mode and perform higher priority PLMN /access technology selection. This is achieved by the HPLMN indicating to the UE the criteria for releasing specific PDU session(s) or services to enter idle mode.

NOTE 1: The released PDU sessions may be re-established by the application once the UE successfully registers on a higher priority PLMN. User interaction is required for some applications.

The HPLMN may configure the SOR-CMCI in the UE, and may also provide the SOR-CMCI to the UE over N1 NAS signalling. The SOR-CMCI received over N1 NAS signalling takes precedence over the SOR-CMCI configured in the UE.

SOR-CMCI consists of the following parameters:

i) criteria consisting of zero, one or more PDU session attribute criterion types and zero, one or more service criteria types:

1) PDU session attribute type criterion:

a) DNN of the PDU session; and

b) S-NSSAI of the PDU session;

Editor's Note: It is FFS whether 5QI is considered as part of the PDU session attribute type criteria.

2) service type criterion:

a) IMS registration related signalling;

b) MMTEL voice call;

c) MMTEL video call;

d) MO SMS over NAS or MO SMSoIP; and

3) match all type criterion; and

Editor's Note: It is FFS whether other service criterion types or parameters are to be added.

ii) a value for Tsor-cm timer associated with each criterion presented in i) indicating the time the UE shall wait before releasing the PDU sessions and entering idle mode.

If there are more than one criterion applicable for a PDU session (ex. a criterion for the PDU session and another one for the service) then the timer Tsor-cm with the highest value shall apply.

Editor's Note: It is FFS on how to handle the case where there are more than one criterion applicable for multiple PDU sessions and services, resulting in multiple values applicable to timer Tsor-cm.

If the value for Tsor-cm timer equals "infinity" then the UE shall wait until the PDU session(s) is released or the service is stopped.

The timer Tsor-cm is applicable only if the UE is in automatic network selection mode.

The UE shall consider the following services as exempted from being forced to release the related established PDU session, if any, enter idle mode and perform high priority PLMN/Access technology selection. These services are known to the UE by default and the UE shall not follow the SOR-CMCI criteria even if configured to interrupt such services:

i) emergency services.

The UE configured with high priority access in the selected PLMN shall consider all services to be exempted from being forced to release the related established PDU session, if any, enter idle mode and perform high priority PLMN/Access technology selection.

The user may configure the UE with a "user controlled list of services exempted from release due to SOR", consisting of one or more of the following:

i) MMTEL voice call;

ii) MMTEL video call; and

ii) SMS over NAS or SMSoIP.

The UE shall set the value for Tsor-cm timer for all services included in the "user controlled list of services exempted from release due to SOR" to infinity.

Editor's Note: It is FFS how to ensure that the HPLMN is aware that the UE has a configured "user controlled list of services exempted from release due to SOR", and/or the user is having a service that matches one of the services included in the "user controlled list of services exempted from release due to SOR" during SOR.

\*\*\* End of changes \*\*\*