**3GPP TSG-CT WG1 Meeting #125-eC1-205xxx**

**Electronic meeting, 20-28 August 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **23.122** | **CR** | **0585** | **rev** | **1** | **Current version:** | **16.6.1** |  |
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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:***  | Editor's Note resolution for SOR |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon, NTT DOCOMO |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5GProtoc16 |  | ***Date:*** | 2020-07-30 |
|  |  |  |  |  |
| ***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 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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)* |
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| ***Reason for change:*** | For steering of UE in HPLMN or VPLMN after registration, there is a below EN remained which depends on CT4 work."*NOTE: Before notifying the HPLMN UDM, the SOR-AF, based on operator policies or criteria, can obtain the user location information by triggering the unified location service exposure procedure as defined in 3GPP TS 23.273 [70] subclause 6.5, or additionally based on implementation specific criteria, by requesting the UE location information from other application function using implementation specific method. This user location information can then be used in the SOR-AF algorithms.**Editor's Note: If the SOR-AF requests the user location information by triggering the unified location service exposure procedure as defined in 3GPP TS 23.273 [70], the impact on CT4 specification is FFS.*"SOR-AF logic, is related to the Operator business logic, that is out of scope to 3GPP. Hence including the obtaining of user location information depends on operator policy and the operator business logic. The above NOTE has referred stage 2 LCS specification which provides clear and enough guidance for the use of LCS by the SOR-AF logic, if the operator wishes to do so. Hence no further stage 3 APIs need to be standardized and there is no impact on CT4 specification. |
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| ***Summary of change:*** | It proposes to resolve a remained EN for SOR. |
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| ***Consequences if not approved:*** | EN for SOR remains. |
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| ***Clauses affected:*** | C.3 |
|  |  |
|  | **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.3 Stage-2 flow for steering of UE in HPLMN or VPLMN after registration

The stage-2 flow for the steering of UE in HPLMN or VPLMN after registration is indicated in figure C.3.1. The selected PLMN can be the HPLMN or a VPLMN. The AMF is located in the selected PLMN. The flow is triggered:

- If the HPLMN UDM supports obtaining a list of preferred PLMN/access technology combinations or a secured packet from the SOR-AF, the HPLMN policy for the SOR-AF invocation is present in the HPLMN UDM and the SOR-AF provides the HPLMN UDM with a new list of preferred PLMN/access technology combinations or a secured packet for a UE identified by SUPI; or

- When a new list of preferred PLMN/access technology combinations or a secured packet becomes available in the HPLMN UDM.

NOTE: Before notifying the HPLMN UDM, the SOR-AF, based on operator policies or criteria, can obtain the user location information by triggering the unified location service exposure procedure as defined in 3GPP TS 23.273 [70] subclause 6.5, or additionally based on implementation specific criteria, by requesting the UE location information from other application function using implementation specific method. This user location information can then be used in the SOR-AF algorithms.

Figure C.3.1: Procedure for providing list of preferred PLMN/access technology combinations after registration

For the steps below, security protection is described in 3GPP TS 33.501 [24].

0) The SOR-AF to the HPLMN UDM: Update request is sent to the HPLMN UDM to trigger the update of the UE with the new list of preferred PLMN/access technology combinations or a secured packet for a UE identified by SUPI.

1) The HPLMN UDM to the AMF: The UDM notifies the changes of the user profile to the affected AMF by the means of invoking Nudm\_SDM\_Notification service operation. The Nudm\_SDM\_Notification service operation contains the steering of roaming information that needs to be delivered transparently to the UE over NAS within the Access and Mobility Subscription data. If the HPLMN decided that the UE is to acknowledge successful security check of the received steering of roaming information, the Nudm\_SDM\_Notification service operation also contains an indication that the UDM requests an acknowledgement from the UE as part of the steering of roaming information;

2) The AMF to the UE: the AMF sends a DL NAS TRANSPORT message to the served UE. The AMF includes in the DL NAS TRANSPORT message the steering of roaming information received from the UDM.

3) Upon receiving the steering of roaming information, the UE shall perform a security check on the list of preferred PLMN/access technology combinations included in the DL NAS TRANSPORT message to verify that the list of preferred PLMN/access technology combinations is provided by HPLMN, and:

a) if the security check is successful and:

- if the steering of roaming information contains a secured packet (see 3GPP TS 31.115 [67]), the ME shall upload the secured packet to the USIM using procedures in 3GPP TS 31.111 [41];

NOTE 1: How the ME handles UICC responses and failures in communication between the ME and UICC is implementation specific and out of scope of this release of the specification.

 When the ME receives a USAT REFRESH command qualifier (see 3GPP TS 31.111 [41]) of type "Steering of Roaming" it performs the procedure for steering of roaming in subclause 4.4.6 with an exception that if the UE is in automatic network selection mode, then the UE shall wait until it moves to idle mode or 5GMM-CONNECTED mode with RRC inactive indication (see 3GPP TS 24.501 [64]) before attempting to obtain service on a higher priority PLMN (specified in subclause 4.4.6 bullet d);

- otherwise, the ME shall replace the highest priority entries in the "Operator Controlled PLMN Selector with Access Technology" list stored in the ME with the received list of preferred PLMN/access technology combinations. If the UE is in automatic network selection mode and the selected PLMN is a VPLMN, then the UE shall wait until it moves to idle mode or 5GMM-CONNECTED mode with RRC inactive indication (see 3GPP TS 24.501 [64]) before attempting to obtain service on a higher priority PLMN as specified in subclause 4.4.3.3 by acting as if timer T that controls periodic attempts has expired.

 If the selected PLMN is a VPLMN and the UE has an established emergency PDU session then the UE shall attempt to perform the PLMN selection subsequently after the emergency PDU session is released.

NOTE 2: The receipt of the steering of roaming information by itself does not trigger the release of the emergency PDU session.

 If the UDM has not requested an acknowledgement from the UE then steps 4 and 5 are skipped; and

b) if the selected PLMN is a VPLMN, the security check is not successful and the UE is in automatic network selection mode, then the UE shall wait until it moves to idle mode or 5GMM-CONNECTED mode with RRC inactive indication (see 3GPP TS 24.501 [64]) before attempting to obtain service on a higher priority PLMN as specified in subclause 4.4.3.3 by acting as if timer T that controls periodic attempts has expired, with an exception that the current PLMN is considered as lowest priority. If the selected PLMN is a VPLMN and the UE has an established emergency PDU session then the UE shall attempt to perform the PLMN selection after the emergency PDU session is released.

NOTE 3: The receipt of the steering of roaming information by itself does not trigger the release of the emergency PDU session.

 If the UDM has not requested an acknowledgement from the UE then steps 4 and 5 are skipped;

NOTE 4: When the UE is in the manual mode of operation or the current chosen VPLMN is part of the "User Controlled PLMN Selector with Access Technology" list, the UE stays on the VPLMN.

4) The UE to the AMF: if the UDM has requested an acknowledgement from the UE in the DL NAS TRANSPORT message and the security check in step 2 was successful, the UE sends an UL NAS TRANSPORT message to the serving AMF with an SOR transparent container including the UE acknowledgement; and

5) The AMF to the HPLMN UDM: If the UL NAS TRANSPORT message with an SOR transparent container is received, the AMF uses the Nudm\_SDM\_Info service operation to provide the received SOR transparent container to the UDM. If the HPLMN decided that the UE is to acknowledge successful security check of the received list of preferred PLMN/access technology combinations in step 1, the UDM verifies that the acknowledgement is provided by the UE.

 If the present flow was invoked by the HPLMN UDM being notified by the SOR-AF about a change in the list of preferred PLMN/access technology combinations or a secured packet for a UE identified by SUPI using an Nsoraf\_SoR\_Notify service operation, and the HPLMN UDM verification of the UE acknowledgement is successful, then the HPLMN UDM informs the SOR-AF about successful delivery of the list of preferred PLMN/access technology combinations, or of the secured packet to the UE, using Nsoraf\_SoR\_Info (SUPI of the UE, successful delivery).

6) The HPLMN UDM to the SOR-AF: Nsoraf\_SoR\_Info (SUPI of the UE, successful delivery). If the HPLMN policy for the SOR-AF invocation is present and the HPLMN UDM received and verified the UE acknowledgement in step 5, then the HPLMN UDM informs the SOR-AF about successful delivery of the list of preferred PLMN/access technology combinations, or of the secured packet to the UE.

If the selected PLMN is a VPLMN and:

- the UE in manual mode of operation encounters security check failure of SOR information in DL NAS TRANSPORT message; and

- upon switching to automatic network selection mode the UE remembers that it is still registered on the PLMN where the security check failure of SOR information was encountered;

the UE shall wait until it moves to idle mode or 5GMM-CONNECTED mode with RRC inactive indication (see 3GPP TS 24.501 [64]) before attempting to obtain service on a higher priority PLMN as specified in subclause 4.4.3.3, by acting as if timer T that controls periodic attempts has expired, with an exception that the current registered PLMN is considered as lowest priority. If the selected PLMN is a VPLMN and the UE has an established emergency PDU session then the UE shall attempt to perform the PLMN selection after the emergency PDU session is released.

NOTE 5: The receipt of the steering of roaming information by itself does not trigger the release of the emergency PDU session.

NOTE 6: If the selected PLMN is the HPLMN, regardless whether the UE is in automatic network selection mode or manual network selection mode, regardless whether the UE has an established emergency PDU session or not, and regardless whether the security check is successful or not successful, the UE is not required to perform the PLMN selection.

\* \* \* End of Change \* \* \* \*