**3GPP TSG-CT WG4 Meeting #110-eC4-223xyz**

**E-Meeting, 12th – 20th May 2022 (was C4-223270)**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **23.632** | **CR** | **0038** | **rev** | **1** | **Current version:** | **17.1.0** |  |
|  | | | | | | | | |
| *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:*** | Send-Routing-Info-for-SM for retrieval of SMSF Registrations | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | CT4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI17, UDICOM | | | | |  | ***Date:*** | | | 2022-05-04 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | In the context of the R17 WID on "SBA support for SMS in 5GC", CT4 decided to make use of a new service operation to retrieve the SMSF addresses (if any) from UDM; i.e. Nudm\_UECM\_SendRoutingInfoForSM.  This operation can be fully reused in the context of UDICOM from R17 onwards. Furthermore, the use of the new service operation will be much more appropriate than the reuse of the Nudm\_UECM\_Get for this purpose. | | | | | | | | |
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| ***Summary of change:*** | | The new Nudm\_UECM\_SendRoutingInfoForSM service operation is used instead of the Nudm\_UECM\_Get service operation. | | | | | | | | |
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| ***Consequences if not approved:*** | | The usage of Nudm\_UECM Get on individual resources in UDM is suboptimal, from an API design perspective, since it makes the consumer to issue distinct requests per SMS node type and access type. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.5.2, 5.5.3, 5.5.4, 5.5.5 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 \* \* \* \*

### 5.5.2 MT-SMS Routing Information Retrieval

Figure 5.5.2-1 shows the interaction when the SMS-GMSC retrieves routing information from the HSS for MT-SMS delivery.



Figure 5.5.2-1: SMS Routing Info Retrieval

1. The HSS receives a request for routing information from the SMS-GMSC via MAP or S6c.

2. The HSS queries the EPS-UDR via Ud to read the registered MME/MSC, the registered SGSN, and the UE-not-reachable flags for SMS in MME/MSC, SGSN and UDM.

3. If the UE-not-reachable flag for SMS in UDM is not set and unless the user is known not to be registered in 5GC, the HSS retrieves the registered SMSF addresses for 3GPP and non-3GPP accesses (if any) from the UDM.

NOTE: This interaction is achieved in the current release by means of the Nudm\_UECM\_SendRoutingInfoForSM service operation; however, for backwards-compatibility reasons, HSS can also use the Nudm\_UECM\_Get service operation, as defined in pre-Rel17 versions of this specification.

4-5. The UDM retrieves the requested information from the 5GS-UDR.

6. The UDM forwards the retrieved addresses to the HSS if any. If the UE is not reachable for MT-SMS in 5GS for any access type (e.g. there is no SMSF registered for the UE or SMSF registration exists but UE is known not to be reachable in 5GS based on URRP flag), the UDM provides a negative response (Absent Subscriber SM) to the HSS.

If SMS over NAS is not allowed for the user in 5GS based on subscription data, e.g. SMS teleservice is not provisioned or SMS is barred, the UDM indicates in the response to the HSS the corresponding error condition.

7. The HSS returns the relevant MT-SMS target node addresses registered in HSS and/or UDM to the SMS-GMSC and the procedure is terminated.

Otherwise, if there is no MT-SMS target node address registered in HSS nor in UDM, a negative response (Absent Subscriber SM) is sent to the SMS-GMSC and the procedure continues with steps 8 to 11.

8. The HSS includes the SMSC address to the Message Waiting Data (MWD) stored in the EPS-UDR and informs the SMSC as defined in TS 23.040 [12]. The relevant UE-not-reachable flags are set in the EPS-UDR.

If SMS is not allowed for the user in 5GS according to subscription data as indicated in step 6, steps 9 to 11 are not executed so that the HSS does not subscribe to notifications about reachability for SMS in the UDM, and the procedure is terminated.

9. The HSS subscribes in UDM to be notified when the UE becomes reachable for SMS (i.e. when the UE gets in radio contact with the AMF while an SMSF actually is registered, or when an SMSF gets registered) by using the Nudm\_EE\_Subscribe service operation (SUPI, UE Reachability for SMS event) as defined in 3GPP TS 23.502 [5].

10. The UDM stores the EE-subscription (Reachability for SMS) in the 5G-UDR.

11. The UDM acknowledges the subscription to the HSS.

\* \* \* Next Change \* \* \* \*

### 5.5.3 MT-SMS Delivery Failure

Figure 5.5.3-1 shows the interaction when the SMS-GMSC sends Report-SM-Delivery-Status to the HSS.



Figure 5.5.3-1: MT-SMS Delivery Failure

1. The HSS receives a Report-SM-Delivery-Status from the SMS-GMSC indicating the MT-SMS target nodes at which MT-SMS delivery was unsuccessful.

2-3. The HSS reads and updates the Message Waiting Data stored in the EPS-UDR.

4. The HSS acknowledges the receipt of the delivery status to the SMS-GMSC.

5. If during step 3 the UE-not-reachable flag for UDM was modified from false to true, the HSS subscribes to notification on UE-Reachability for SMS at the UDM, using the Nudm\_EE\_Subscribe service operation as defined in 3GPP TS 23.502 [5].

6-7. The UDM checks that the UE is registered in an AMF and SMSF for 3GPP and non-3GPP accesses. The UDM then queries the 5GS-UDR to see whether the UE-Reachability event has already been subscribed at the registered AMF(s) (i.e. whether URRP-AMF flag is set).

8-9. If not already subscribed, the UDM subscribes to UE-Reachability notification at the AMF(s) using the Namf\_EE service.

NOTE: As defined in 3GPP TS 23.502 [5], the UDM can trigger UE Reachability Notification Request procedure with two different AMFs for a UE which is connected to 5G Core Network over 3GPP access and non-3GPP access simultaneously.

10-11. The UDM stores the received EE-Subscription in the 5GS-UDR and if steps 8-9 were performed, the UDM sets the relevant URRP-AMF flags in the 5GS-UDR.

12. The UDM acknowledges the subscription to the HSS.

\* \* \* Next Change \* \* \* \*

### 5.5.4 SMS Alerting

Figure 5.5.4-1 shows the interaction when the UE becomes available.



Figure 5.5.4-1: SMS Alerting

1. The UDM receives a Notification from the AMF or an SMSF Registration.

2-3. The UDM queries the 5GS-UDR to see whether any NF (e.g. the HSS) has subscribed to notifications on UE-reachability for SMS events.

4. The UDM acknowledges the message received in step 1.

5. If the HSS has subscribed to UE reachability for SMS notification, the UDM notifies the HSS as described in 3GPP TS 23.502 [5].

6-7. The UDM updates (clears) the relevant reachability flag. And, if the HSS has been notified in step 5, the UDM also deletes the (one-time) EE-subscriptions of UE reachability for SMS in the 5GS-UDR.

Steps 8 to 11 are skipped if the HSS has not been notified in step 5.

8. The HSS reads Message Waiting Data from the EPS-UDR.

9-10. The HSS sends Alert-SC to all SMS-GMSCs stored in the MWD.

11. The HSS removes the SMS-GMSCs from the MWD stored in the EPS-UDR and clears the relevant UE-not-reachable flags from the EPS-UDR.

12. The HSS acknowledges receipt of the Notification to the UDM.

\* \* \* Next Change \* \* \* \*

### 5.5.5 MT-SMS Routing Information Retrieval Over Nudr

Figure 5.5.5-1 shows the interaction when the SMS-GMSC retrieves routing information from the HSS for MT-SMS delivery when the HSS uses the Nudr SBI.



Figure 5.5.5-1: SMS Routing Info Retrieval over Nudr

1. The HSS receives a request for routing information from the SMS-GMSC via MAP or S6c.

2. The HSS queries the EPS-UDR via Ud to read the registered MME/MSC, the registered SGSN and the UE-not-reachable flags for MME/MSC, SGSN and UDM.

3-4. If the UE-not-reachable flag for UDM is not set and unless the user is known not to be registered in 5GC, the HSS retrieves the registered SMSF addresses for 3GPP and non-3GPP accesses (if any) from the 5GS-UDR.

5. The HSS returns the relevant MT-SMS target node addresses registered in HSS and/or UDM to the SMS-GMSC and the procedure is terminated.

Otherwise, if there is no MT-SMS target node address registered in HSS nor in UDM, a negative response (Absent Subscriber SM) is sent to the SMS-GMSC and the procedure continues with steps 8 to 11 in figure 5.5.2-1.

\* \* \* End of Changes \* \* \* \*