**3GPP TSG-WG SA2 Meeting #141E e-meeting S2-2006841r02**

**Elbonia, Oct 12 – 23, 2020 (revision of S2-200xxxx)**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **23.502** | **CR** | **2402** | **rev** | **-** | **Current version:** | **15.11.0** |  |
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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 |  | ME |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:***  | Removal of SMSF registration notification flag |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon, Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | 5GS\_Ph1 |  | ***Date:*** | 2020-10-02 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-15 |
|  | *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)* |
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| ***Reason for change:*** | According to the LS from CT4(C4-204437), the Stage 3 came to the conclusion that SMSF Registration Notification Flag to subscription data on UDM is not required, as when UDM can check mwdList within Message Waiting Data and alerts service centres stored once UDM detects that an SMSF has registered, which can serve the purpose.This CR proposes to remove the SMSF registration notification flag. |
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| ***Summary of change:*** | Removal of SMSF registration notification flag |
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| ***Consequences if not approved:*** | Stateless UDM implementation cannot handle re-delivery of MT-SMS due to inappropriate specification on UDM internal behaviour using semaphores**.**Mislaignment with stage 3 conclusion. |
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| ***Clauses affected:*** | 4.2.5.2, 4.2.5.3, 4.13.3.9 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 23.502 CR 2403  |
| ***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 \* \* \* \*

#### 4.2.5.2 UE Reachability Notification Request procedure

The UE Reachability Notification Request procedure is illustrated in figure 4.2.5.2-1.



Figure 4.2.5.2-1: UE Reachability Notification Request Procedure

1a. [Conditional] When a service-related entity requests the UDM to provide an indication regarding UE reachability, the UDM checks whether that service-related entity is authorized to perform this request on this subscriber.

NOTE 1: This request for UE Reachability Notification is received in UDM using different interfaces/services depending on the service-related entity. For example, an SBI capable service-related entity can use the Nudm\_EventExposure\_Subscribe service while an SMS-GMSC uses the procedure as described in TS 23.040 [7].

 The UDM may retrieve from the UDR the list of NF IDs for Network Functions authorized by the HPLMN to request notifications on this UE's reachability.

 If the entity is not authorized, the UDM may reject the request (e.g. if the requesting entity is recognized as being a valid entity, but not authorized for that subscriber) or discard it silently (e.g. if the requesting entity is not recognized). Appropriate O&M reports are generated.

1b. [Conditional] The UDM stores locally the identity of the service-related entity and sets the URRP-AMF flag parameter to indicate that such request is received from an authorised NF (see clause 4.13.3.9).

NOTE 2: In case that the service-related entity is an SMS-GMSC, the UDM stores the SC address within the MWD list. Otherwise, if the service-related entity is an SBI capable service-related entity, the UDM stores the address of the SBI capable service-related entity in the form of a subscription to the Nudm\_EventExposure service.

1c. [Conditional] An NF (e.g. SMF) may subscribe event of UE reachability status change by using the Namf\_EventExposure\_Subscribe service operation. Steps 2 to 4 are skipped.

 The AMF invokes the Namf\_EventExposure\_Notify service operation to report the current reachability state of a UE to the NF if requested by the consumer NF.

2. [Conditional] If the value of URRP-AMF flag parameter changes from "not set" to "set" and an AMF is registered in the UDM for the target UE, the UDM initiates Namf\_EventExposure\_Subscribe service operation for UE reachability for UE reachable for DL traffic towards the AMF. The UDM may indicate if direct notification to NF shall be used by the AMF. When direct notification to NF is indicated to the AMF, the URRP-AMF is not set in the UDM in step 1a for NF initiated requests.

NOTE 3: 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. Also, for interworking with EPC, the UDM/HSS can trigger UE Reachability Notification Request procedure with MME as described in TS 23.401 [13].

3. The AMF checks that the requesting entity is authorized to perform this request on this subscriber.

 If the AMF has an MM Context for that user, the AMF stores the NF ID in the URRP-AMF information, associated with URRP-AMF information flag to indicate the need to report to the UDM or directly to the NF with a UE Activity Notification (see clause 4.2.5.3).

4. [Conditional] For UE reachability for UE reachable for DL traffic, if the UE state in AMF is in CM-CONNECTED state and the Access Type is 3GPP access, the AMF initiates N2 Notification procedure (see clause 4.8.3) with reporting type set to Single RRC-Connected state notification.

\* \* \* \* Second change \* \* \* \*

#### 4.2.5.3 UE Activity Notification procedure

The UE Activity Notification procedure is illustrated in figure 4.2.5.3-1.



Figure 4.2.5.3-1: UE Activity Procedure

0. Event has been subscribed in the AMF for UE reachability for DL traffic or for UE reachability status change.

1a. For a UE in CM-IDLE, the AMF receives (N1) NAS signalling implying UE is reachable for DL traffic, e.g. a Registration Request or Service Request message from the UE;

1b. For a UE in CM-CONNECTED, if the AMF has initiated the N2 Notification procedure in Step 4 of clause 4.2.5.2 and the AMF receives a (N2) UE Notification (see clause 4.8.3) or a (N2) Path Switch Request (see clause 4.9.1.2) implying UE is reachable for DL traffic from the NG-RAN. Otherwise (i.e. UE is in CM-CONNECTED and AMF has not initiated N2 Notification procedure), AMF performs step 2; or

1c. The UE's reachability state changes from reachable to unreachable, then AMF performs step 2.

2a. For event subscription of "UE reachable for DL traffic" if the AMF has an MM context for the UE and the URRP-AMF information flag associated with the subscribing NF is set to report once that the UE is reachable for DL traffic, the AMF initiates the Namf\_EventExposure\_Notify service operation (SUPI, UE-Reachable) message (or Nudm\_UECM\_Registration service operation when applicable) to the UDM following step 1a or 1b. The AMF clears the corresponding URRP-AMF information if applicable for the UE.

2a1. When the UDM receives the Namf\_EventExposure\_Notify service operation (SUPI, UE-Reachable) message or Nudm\_UECM\_Registration service for a UE that has URRP-AMF information flag set in the UDM, it triggers appropriate notifications to the service-related entities associated with the URRP-AMF information flag (e.g. SMSF or SMS-GMSC) that have subscribed to the UDM for this notification. UDM clears the local URRP-AMF information for the UE (see clause 4.13.3.9).

NOTE: The UE Reachability Notification is sent by the UDM using different interfaces/services depending on the service-related entity. For example, an SBI capable service-related entity can receive the notification using the Nudm\_EventExposure\_Notify service operation (if previously subscribed) while an SMS-SC gets the notification as described in TS 23.040 [7] based on the SC address stored in the MWD list.

2b. If in step 0 the AMF received Namf\_EventExposure\_Subscribe\_service operation directly from an NF authorised to receive direct notifications in the case of UE reachability status change, or the UDM indicated that the notification needs to be sent directly to the NF in the case of UE reachability for DL traffic, the AMF initiates the Namf\_EventExposure\_Notify service operation (SUPI, UE reachability state) message directly to the NF.

\* \* \* \* Third change \* \* \* \*

#### 4.13.3.9 Unsuccessful Mobile terminating SMS delivery attempt

The procedure of Unsuccessful Mobile terminating SMS delivery is defined as follows:

- If the UE is registered over both 3GPP access and non-3GPP access in the same AMF (i.e. the UE is registered in the same PLMN for both access types):

- if the MT-SMS delivery over one Access Type has failed, the AMF, based on operator local policy, may re-attempt the MT-SMS delivery over the other Access Type before indicating failure to SMSF;

- if the MT-SMS delivery on both Access Types has failed, the AMF shall inform the SMSF immediately.

- If the AMF informs the SMSF that it cannot deliver the MT-SMS to the UE, the SMSF sends a failure report to the first SMS-GMSC (which can be co-located with IP-SM-GW or SMS Router) as defined in TS 23.040 [7]. If the SMS-GMSC has more than one entity for SMS transport towards the UE, then upon receiving MT-SMS failure report, the SMS-GMSC, based on operator local policy, may re-attempt the MT-SMS delivery via the other entity.

- After the first SMS-GMSC informs the UDM/HSS that the UE is not able to receive MT-SMS, the UDM shall setthe URRP-AMF flag and store the SC address in the MWD list as defined in TS 23.040 [7].

- If the UE is registered in an AMF and the UDM has not subscribed to UE Reachability Notification in the AMF yet, the UDM immediately initiates a subscription procedure as specified in clause 4.2.5.2.

- When the AMF detects UE activities, it notifies UDM with UE Activity Notification as described in clause 4.2.5.3. The UDM clears its URRP-AMF flag, and the UDM/HSS clears the MWD list and alerts related SMSCs to retry MT-SMS delivery.

- When the SMS-GMSC requests routing information from UDM/HSS for a UE not registered in 5GC, or for a registered UE which has not been yet registered for SMS service, the UDM/HSS reponds to the SMS-GMSC that the UE is absent, stores the SC address in the MWD list (if not yet stored) and indicates that to the SC as defined in TS 23.040 [7].

 When the UDM receives an Nudm\_UECM\_Registration Request from an SMSF for a UE for which the MWD list is stored and no URRP-AMF flag is set, the UDM/HSS alerts the related SCs to retry the MT-SMS delivery and clears the MWD list.

NOTE: This scenario assumes that the UE is not in 2G/3G/4G coverage.

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