**3GPP TSG-CT WG1 Meeting #126-e****C1-207XXX**

**Electronic meeting, 15-23 October 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **24.501** | **CR** | **2763** | **rev** | **3** | **Current version:** | **17.0.0** |  |
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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 | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Title:***  | Network slice specific authentication and authorization failure |
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| ***Source to WG:*** | Lenovo, Motorola Mobility |
| ***Source to TSG:*** | C1 |
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| ***Work item code:*** | 5GProtoc17, eNS |  | ***Date:*** | 2020-11-06 |
|  |  |  |  |  |
| ***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 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:*** | Communication failure in the access stratum (AS) layer can happen at different stages of NSSAA, see C1-207201. This results in abnormal cases on the network side and on the UE side. |
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| ***Summary of change:*** | According to the analysis in document C1-207201, a persistent lower layer failure caused by loss of coverage or being in a forbidden coverage so that the access stratum (AS) layer deletes the AS context and UE is transferred to Idle in limited service state, can result in the abnormal cases when a) the NSSAA procedure has not been completed (i.e. the AAA-S has not been able to complete the EAP excahnge with the UE); orb) the NSSAA procedure has been completed from the AAA-S side, however:b.1) the AMF has not transmitted the outcome of the NSSAA procedure towards the UE in prior to the lower layer failure; orb.2) the AMF has transmitted the outcome of the NSSAA procedure towards the UE in prior to the lower layer failure, but the UE configuration update procedure has not been performed yet.The behavior of the network is slightly different in the above cases, however they are common in the sense that the network in all cases needs to delete the pending NSSAI. The UE needs also to delete the pending NSSAI. This is due to the fact if the UE regains coverage in the same network, the UE cannot request to register with the S-NSSAIs in the pending NSSAI. One point to consider is that the RLF may take some time, and it is up to the user or UE implementation to determine which network slices are required after the RLF. This means that the UE demand to register to S-NSSAI(s) after the RLF may have changed, and thus, the UE may want to request a new set of S-NSSAIs. However, if the pending NSSAI is kept stored in the UE, the UE does not have the freedom to request the needed slices. In the cases b.1) and b.2), the AMF may store the NSSAA result received from the AAA-S. |
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| ***Consequences if not approved:*** | After regaining coverage in the same network, if the UE has not deleted the pending NSSAI, the UE cannot request the S-NSSAIs from the pending NSSAI, which limits the UE freedom to use network slices according to the demand after the RLF. |
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| ***Clauses affected:*** | 5.4.4.5, 5.4.4.6, 5.4.7.2.3, 5.4.7.2.4 |
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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 ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

------------------------------------------ Next Change --------------------------------------

#### 5.4.4.5 Abnormal cases in the UE

The following abnormal cases can be identified:

a) Transmission failure of the CONFIGURATION UPDATE COMPLETE message with TAI change from lower layers

 If the current TAI is not in the TAI list, the generic UE configuration update procedure shall be aborted and a registration procedure for mobility and periodic registration update shall be initiated.

 If the current TAI is still part of the TAI list, it is up to the UE implementation how to re-run the ongoing procedure that triggered the generic UE configuration update procedure.

b) Transmission failure of CONFIGURATION UPDATE COMPLETE message indication without TAI change from lower layers

 It is up to the UE implementation how to re-run the ongoing procedure that triggered the generic UE configuration update procedure.

c) Generic UE configuration update and de-registration procedure collision

 If the UE receives CONFIGURATION UPDATE COMMAND message after sending a DEREGISTRATION REQUEST message and the access type included in the DEREGISTRATION REQEUST message is same as the access in which the CONFIGURATION UPDATE COMMAND message is received, then the UE shall ignore the CONFIGURATION UPDATE COMMAND message and proceed with the de-registration procedure. Otherwise, the UE shall proceed with both the procedures.

d) Void

e) Generic UE configuration update and service request procedure collision

 If the UE receives a CONFIGURATION UPDATE COMMAND message before the ongoing service request procedure has been completed, the UE shall proceed with both the procedures.

f) "CAG information list" is received and the UE is operating in SNPN access mode

 If the UE receives the CAG information list IE in the CONFIGURATION UPDATE COMMAND message and the UE is operating in SNPN access mode, the UE shall ignore the content of CAG information list IE.

g) Lower layer failure

 If the UE receives a CONFIGURATION UPDATE COMMAND message before a lower layer failure but due to lower layer failure, the UE is not able to transmit the CONFIGURATION UPDATE COMPLETE message, the UE shall delete the pending NSSAI.

------------------------------------------ Next Change --------------------------------------

#### 5.4.4.6 Abnormal cases on the network side

The following abnormal cases can be identified:

a) Expiry of timer T3555.

 The network shall, on the first expiry of the timer T3555, retransmit the CONFIGURATION UPDATE COMMAND message and shall reset and start timer T3555. This retransmission is repeated four times, i.e. on the fifth expiry of timer T3555, the procedure shall be aborted. In addition, if the CONFIGURATION UPDATE COMMAND message includes the 5G-GUTI IE, the network shall behave as described in case b)-1) below.

b) Lower layer failure.

 If a lower layer failure is detected before the CONFIGURATION UPDATE COMPLETE message is received and:

1) if the CONFIGURATION UPDATE COMMAND message includes the 5G-GUTI IE, the old and the new 5G-GUTI shall be considered as valid until the old 5G-GUTI can be considered as invalid by the AMF. If a new TAI list was provided in the CONFIGURATION UPDATE COMMAND message, the old and new TAI list shall also be considered as valid until the old TAI list can be considered as invalid by the AMF.

 During this period the AMF:

i) may first use the old 5G-S-TMSI from the old 5G-GUTI for paging within the area defined by the old TAI list for an implementation dependent number of paging attempts for network originated transactions. If a new TAI list was provided in the CONFIGURATION UPDATE COMMAND message, the new TAI list should also be used for paging. Upon response from the UE, the AMF may re-initiate the CONFIGURATION UPDATE COMMAND. If the response is received from a tracking area within the old and new TAI list, the network shall re-initiate the CONFIGURATION UPDATE COMMAND message. If no response is received to the paging attempts, the network may use the new 5G-S-TMSI from the new 5G-GUTI for paging for an implementation dependent number of paging attempts. In this case, if a new TAI list was provided with new 5G-GUTI in the CONFIGURATION UPDATE COMMAND message, the new TAI list shall be used instead of the old TAI list. Upon response from the UE the AMF shall consider the new 5G-GUTI as valid and the old 5G-GUTI as invalid.

ii) shall consider the new 5G-GUTI as valid if it is used by the UE and, additionally, the new TAI list as valid if it was provided with this 5G-GUTI in the CONFIGURATION UPDATE COMMAND message; and

iii) may use the identification procedure followed by a new generic UE configuration update procedure if the UE uses the old 5G-GUTI;

2) if the CONFIGURATION UPDATE COMMAND message does not include the 5G-GUTI IE, the network shall abort the procedure; or

3) if the N1 NAS signalling connection is lost due to the UE's loss of coverage, the AMF shall delete the pending S-NSSAI and the AMF:

- shall not update the allowed NSSAI and the rejected NSSAI; and

- may store the EAP result associated with the corresponding S-NSSAI.

NOTE: The network can re-initiate the generic UE configuration update procedure if the UE returns back to the connected mode.

c) Generic UE configuration update and UE initiated de-registration procedure collision.

 If the network receives a DEREGISTRATION REQUEST message before the ongoing generic UE configuration update procedure has been completed, the network shall abort the generic UE configuration update procedure and shall progress the de-registration procedure.

d) Generic UE configuration update and registration procedure for mobility and periodic registration update collision

 If the network receives a REGISTRATION REQUEST message before the ongoing generic UE configuration update procedure has been completed, the network shall abort the generic UE configuration update procedure and shall progress the registration procedure for mobility and periodic registration update procedure.

e) Generic UE configuration update and service request procedure collision

 If the network receives a SERVICE REQUEST message before the ongoing generic UE configuration update procedure has been completed, both the procedures shall be progressed.

------------------------------------------ End of Change --------------------------------------

##### 5.4.7.2.3 Abnormal cases on the network side

The following abnormal cases can be identified:

a) T3575 expiry

 The AMF shall, on the first expiry of the timer T3575, retransmit the NETWORK SLICE-SPECIFIC AUTHENTICATION COMMAND message and shall reset and start timer T3575. This retransmission is repeated four times, i.e. on the fifth expiry of timer T3575, the AMF shall abort the network slice-specific authentication and authorization procedure for the S-NSSAI. The AMF shall consider that the network slice-specific authentication and authorization procedure for the S-NSSAI is completed as a failure.

b) Lower layers indication of non-delivered NAS PDU due to handover

 If the NETWORK SLICE-SPECIFIC AUTHENTICATION COMMAND message could not be delivered due to an intra AMF handover and the target TAI is included in the TAI list, then upon successful completion of the intra AMF handover the AMF shall retransmit the NETWORK SLICE-SPECIFIC AUTHENTICATION COMMAND message. If a failure of handover procedure is reported by the lower layer and the N1 NAS signalling connection exists, the AMF shall retransmit the NETWORK SLICE-SPECIFIC AUTHENTICATION COMMAND message.

c) Network slice-specific authentication and authorization procedure and de-registration procedure collision

 If the network receives a DEREGISTRATION REQUEST message before the ongoing network slice-specific authentication and authorization procedure has been completed and the access type included in the DEREGISTRATION REQUEST message is the same as the one for which the network slice-specific authentication and authorization procedure is ongoing, the network shall abort the network slice-specific authentication and authorization procedure and shall progress the UE-initiated de-registration procedure. The AMF may initiate the network slice-specific authentication and authorization procedure for the S-NSSAI via is completed as a failure, if available.

d) Lower layers failure

 If a lower layer failure is detected while the network slice-specific authentication and authorization procedure is ongoing and before the NETWORK SLICE-SPECIFIC AUTHENTICATION COMPLETE message is received, the network shall abort the procedure and shall delete the pending S-NSSAI and shall not update the allowed NSSAI and the rejected NSSAI. The network shall not re-initiate the network slice-specific authentication and authorization procedure unless the UE returns to the connected mode.

------------------------------------------ Next Change --------------------------------------

##### 5.4.7.2.4 Abnormal cases in the UE

The following abnormal cases can be identified:

a) Transmission failure of the NETWORK SLICE-SPECIFIC AUTHENTICATION COMPLETE message with TAI change from lower layers

 If the current TAI is not in the TAI list, the network slice-specific authentication and authorization procedure shall be aborted and a registration procedure for mobility and periodic registration update indicating "mobility registration updating" in the 5GS registration type IE of the REGISTRATION REQUEST message shall be initiated.

 If the current TAI is still part of the TAI list, it is up to the UE implementation how to re-run the ongoing procedure that triggered the network slice-specific authentication and authorization procedure.

b) Transmission failure of NETWORK SLICE-SPECIFIC AUTHENTICATION COMPLETE message indication without TAI change from lower layers

 It is up to the UE implementation how to re-run the ongoing procedure that triggered the network slice-specific authentication and authorization procedure.

c) Network slice-specific authentication and authorization procedure and de-registration procedure collision

 If the UE receives NETWORK SLICE-SPECIFIC AUTHENTICATION COMMAND message after sending a DEREGISTRATION REQUEST message and the access type included in the DEREGISTRATION REQUEST message is the same as the access in which the NETWORK SLICE-SPECIFIC AUTHENTICATION COMMAND message is received, then the UE shall ignore the NETWORK SLICE-SPECIFIC AUTHENTICATION COMMAND message and proceed with the de-registration procedure. Otherwise, the UE shall proceed with both procedures.

d) Lower layer failure

 If a lower layer failure is detected before the NETWORK SLICE-SPECIFIC AUTHENTICATION COMPLETE message is to be transmitted, the UE shall delete the pending NSSAI.

------------------------------------------ Next Change --------------------------------------

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