**3GPP TSG-CT WG1 Meeting #131-eC1-21XXX**

**Electronic meeting, 19 – 27 Aug 2021 *was C1-214645***

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **24.501** | **CR** | **3544** | **rev** | **1** | **Current version:** | **17.3.1** |  |
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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 | **x** | Radio Access Network |  | Core Network | **x** |

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| ***Title:***  | Not start T3540 if 5GMM cause IE is considered as abnormal cases |
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| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5GProtoc17 |  | ***Date:*** | 2021-08-12 |
|  |  |  |  |  |
| ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | * As the following text quoted from sub-clause 5.5.2.3.4 of TS 24.501 specified, when the UE receives a de-registration request message with cause values #11, #15, #22, #72, #74, #75, #76 and#77, sometimes the UE will consider it as abnormal case and processing according to subclause 5.5.2.3.4.

*b) DEREGISTRATION REQUEST, other 5GMM cause values than those treated in subclause 5.5.2.3.2, cases of 5GMM cause value #11, #15, #22, #72, #74, #75, #76 and#77 that are considered as abnormal cases according to subclause 5.5.2.3.2 or no 5GMM cause IE is included, and the De-registration type IE indicates "re-registration not required".** In the associated descisption of subclause 5.5.2.3.4 of TS 24.501, T3540 is not required to start but let ther UE enter the state 5GMM-DEREGISTERED and attempt other PLMN ASAP, see below.

*b) DEREGISTRATION REQUEST, other 5GMM cause values than those treated in subclause 5.5.2.3.2, cases of 5GMM cause value#11, #15, #22, #72, #74, #75, #76 and#77 that are considered as abnormal cases according to subclause 5.5.2.3.2 or no 5GMM cause IE is included, and the De-registration type IE indicates "re-registration not required".* *The UE shall delete 5G-GUTI, TAI list, last visited registered TAI, list of equivalent PLMNs (if any), ngKSI, shall set the 5GS update status to 5U2 NOT UPDATED and shall start timer T3502.* *A UE not supporting S1 mode may enter the state 5GMM-DEREGISTERED.PLMN-SEARCH in order to perform a PLMN selection or SNPN selection according to 3GPP TS 23.122 [5]; otherwise the UE shall enter the state 5GMM-DEREGISTERED.ATTEMPTING-REGISTRATION.* *If the message was received via 3GPP access and the UE is operating in the single-registration mode, the UE shall:**- enter the state 5GMM-DEREGISTERED and attempt to select E-UTRAN radio access technology and proceed with the appropriate EMM specific procedures. In this case, the UE may disable the N1 mode capability (see subclause 4.9); or**- enter the state 5GMM-DEREGISTERED.PLMN-SEARCH in order to perform a PLMN selection according to 3GPP TS 23.122 [5].* *If the message was received via 3GPP access and the UE is operating in the single-registration mode, the UE shall set the EPS update status to EU2 NOT UPDATED, enter the state EMM-DEREGISTERED and shall delete the EMM parameters 4G-GUTI, last visited registered TAI, TAI list and eKSI.** However, in the description about T3540 in subclause in sub-clause 5.3.1.3 of TS24.501, T3540 seems shall be started for these causes values.

*a) shall start the timer T3540 if the UE receives any of the 5GMM cause values #7, #11, #12, #13, #15, #27, #31, #62, #72, #73, #74, #75, #76*It is proposed to clarify that the UE starts T3540 only when the received cause is not considered as abnormal cases.Table 10.2 shows that the 5GMM cause value #31 also can be incuded in the DEREGISTRATION REQUEST message. |
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| ***Summary of change:*** | UE starts T3540 only when the received cause is not considered as abnormal cases |
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| ***Consequences if not approved:*** | UE that has process the 5GMM cause as abnormal cases still need to start the T3540 |
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| ***Clauses affected:*** | 5.3.1.3, 5.5.2.3.5 |
|  |  |
|  | **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:*** |  |

\*\*\*\*\* start of 1st change \*\*\*\*\*

#### 5.3.1.3 Release of the N1 NAS signalling connection

The signalling procedure for the release of the N1 NAS signalling connection is initiated by the network.

In N1 mode, upon indication from lower layers that the access stratum connection has been released, the UE shall enter 5GMM-IDLE mode and consider the N1 NAS signalling connection released.

If the UE in 3GPP access is configured for eCall only mode as specified in 3GPP TS 31.102 [22] then:

- if the N1 NAS signalling connection that was released had been established for eCall over IMS, the UE shall start timer T3444; and

- if the N1 NAS signalling connection that was released had been established for a call to an HPLMN designated non-emergency MSISDN or URI for test or terminal reconfiguration service, the UE shall start timer T3445.

The UE shall start the timer T3447 if not already running when the N1 NAS signalling connection is released as specified in subclause 5.3.17.

To allow the network to release the N1 NAS signalling connection, the UE:

a) shall start the timer T3540 if the UE receives any of the 5GMM cause values #7, #11, #12, #13, #15, #27, #31, #62, #72, #73, #74, #75, #76 and the UE does not consider the received 5GMM cause value as abnormal case as specified in subclause 5.5.2.3.4;

b) shall start the timer T3540 for a UE in 3GPP access if:

1) the UE receives a REGISTRATION ACCEPT message which does not include a Pending NSSAI IE or UE radio capability ID deletion indication IE;

2) the UE has set the Follow-on request indicator to "No follow-on request pending" in the REGISTRATION REQUEST message;

3) the UE has not included the Uplink data status IE in the REGISTRATION REQUEST message, or the UE has included the Uplink data status IE in the REGISTRATION REQUEST message but the REGISTRATION ACCEPT message indicates that no user-plane resources of any PDU sessions are to be re-established;

4) the UE has not included the Allowed PDU session status IE or has included the Allowed PDU session status IE indicating there is no PDU session(s) for which the UE allowed the user-plane resource to be re-established over 3GPP access in the REGISTRATION REQUEST message, or the UE has included the Allowed PDU session status IE in the REGISTRATION REQUEST message but the REGISTRATION ACCEPT message does not indicate that any user-plane resources of any PDU sessions are to be re-established;

5) the registration procedure has been initiated in 5GMM-IDLE mode;

6) the user-plane resources for PDU sessions have not been set up;

7) the UE need not request resources for V2X communication over PC5 reference point (see 3GPP TS 23.287 [6C]); and

8) the UE need not request resources for ProSe direct discovery over PC5 or ProSe direct communication over PC5 (see 3GPP TS 23.304 [6E]);

NOTE 1: The lower layers indicate when the user-plane resources for PDU sessions are successfully established or released.

c) shall start the timer T3540 if the UE receives a REGISTRATION REJECT message indicating:

 the 5GMM cause value #9 or #10;

d) shall start the timer T3540 if the UE receives a SERVICE REJECT message indicating:

 the 5GMM cause value #9, #10 or #28;

e) shall start the timer T3540 if:

1) the UE receives a CONFIGURATION UPDATE COMMAND message containing the Configuration update indication IE with the Registration bit set to "registration requested" and with:

i) either new allowed NSSAI information or new configured NSSAI information or both included;

ii) the network slicing subscription change indication; or

iii) no other parameters;

2) the user-plane resources for PDU sessions have not been set up; and

3) no emergency PDU session has been established;

f) shall start the timer T3540 for a UE in 3GPP access if:

1) the UE receives a SERVICE ACCEPT message;

2) the UE did not set the Service type IE to "signalling" or "high priority access", the UE has not included the Uplink data status IE in the SERVICE REQUEST message, or the UE has included the Uplink data status IE in the SERVICE REQUEST message but the SERVICE ACCEPT message indicates that no user-plane resources of any PDU sessions are to be re-established;

3) the UE has not included the Allowed PDU session status IE or has included the Allowed PDU session status IE indicating there is no PDU session(s) for which the UE allowed the user-plane resource to be re-established over 3GPP access in the SERVICE REQUEST message, or the UE has included the Allowed PDU session status IE in the SERVICE REQUEST message but the SERVICE ACCEPT message does not indicate that any user-plane resources of any PDU sessions are to be re-established;

4) the service request procedure has been initiated in 5GMM-IDLE mode;

5) the user-plane resources for PDU sessions have not been set up;

6) the UE need not request resources for V2X communication over PC5 reference point (see 3GPP TS 23.287 [6C]); and

7) the UE need not request resources for ProSe direct discovery over PC5 or ProSe direct communication over PC5 (see 3GPP TS 23.304 [6E]);

NOTE 2: The lower layers indicate when the user-plane resources for PDU sessions are successfully established or released.

g) may start the timer T3540 if the UE receives any of the 5GMM cause values #3 or #6 or if it receives an AUTHENTICATION REJECT message; or

h) shall start the timer T3540 upon completion of the configuration update procedure or the registration procedure if the UE does not have an emergency PDU session and:

1) the UE received a CONFIGURATION UPDATE COMMAND message or a REGISTRATION ACCEPT message while camping on a CAG cell and the entry for the current PLMN in the received "CAG information list" does not include any of the CAG-ID(s) supported by the current CAG cell;

2) the UE received a CONFIGURATION UPDATE COMMAND message or a REGISTRATION ACCEPT message while camping on a non-CAG cell and the entry for the current PLMN in the received "CAG information list" includes an "indication that the UE is only allowed to access 5GS via CAG cells"; or

3) the UE received a CONFIGURATION UPDATE COMMAND message while camping on a CAG cell and the entry for the current PLMN in not included in the received "CAG information list".

Upon expiry of T3540,

- in cases a), b), f), g) and h) the UE shall locally release the established N1 NAS signalling connection;

- in cases c) and d) the UE shall locally release the established N1 NAS signalling connection and the UE shall initiate the registration procedure as described in subclause 5.5.1.3 or  5.6.1.5; or

- in case e), the UE shall locally release the established N1 NAS signalling connection and perform a new registration procedure as specified in subclause 5.5.1.3.2.

In case a),

- upon receiving a request from the upper layers to perform emergency services fallback only for a UE in 3GPP access or establishing an emergency PDU session, the UE shall stop timer T3540 and shall locally release the N1 NAS signalling connection, before proceeding as specified in subclause 5.5.1.

In case b) and f),

- upon an indication from the lower layers that the user-plane resources for PDU sessions are set up, the UE shall stop timer T3540 and may send uplink signalling via the existing N1 NAS signalling connection or user data via user plane. If the uplink signalling is associated with emergency services fallback only for a UE in 3GPP access or establishing an emergency PDU session, the UE shall stop timer T3540 and send the uplink signalling via the existing N1 NAS signalling connection;

- upon receipt of a DEREGISTRATION REQUEST message, the UE shall stop timer T3540 and respond to the network-initiated de-registration request via the existing N1 NAS signalling connection as specified in subclause 5.5.2.3;

- upon receipt of a message of a network-initiated 5GMM common procedure, the UE shall stop timer T3540 and respond to the network-initiated 5GMM common procedure via the existing N1 NAS signalling connection as specified in subclause 5.4;

- if there is no user-plane resources established for PDU sessions, upon receiving a request from the upper layers to perform emergency services fallback only for a UE in 3GPP access or establishing an emergency PDU session, the UE shall stop timer T3540 and shall locally release the N1 NAS signalling connection, before proceeding as specified in subclause 5.6.1;

- if there is no user-plane resources established for PDU sessions, upon receiving a request from the upper layers to perform services other than emergency services fallback only for a UE in 3GPP access or establishing an emergency PDU session, the UE shall wait for the local release of the established N1 NAS signalling connection upon expiry of timer T3540 or wait for timer T3540 being stopped, before initiating NAS signalling;

- upon receipt of a DL NAS TRANSPORT message, the UE shall stop timer T3540 and may send uplink signalling via the existing N1 NAS signalling connection; or

- upon initiation of registration procedure for mobility and periodic registration update as specified in subclause 5.5.1.2.7 for cases h), i), j), subclause 5.5.1.3.7 for cases j), k) or subclause 5.5.1.3.2 for case a), the UE shall stop timer T3540.

In case c) and d),

- upon an indication from the lower layers that the access stratum connection has been released, the UE shall stop timer T3540 and perform a new registration procedure as specified in subclause 5.5.1.3.5 or 5.6.1.5.

- upon receiving a request from the upper layers to perform emergency services fallback only for a UE in 3GPP access or establishing an emergency PDU session, the UE shall stop timer T3540 and shall locally release the N1 NAS signalling connection, before proceeding as specified in subclause 5.5.1.

In case e),

- upon an indication from the lower layers that the access stratum connection has been released, the UE shall stop timer T3540 and perform a new registration procedure as specified in subclause 5.5.1.3.2.

- upon an indication from the lower layers that the user-plane resources for PDU sessions are set up, the UE shall stop timer T3540 and may send user data via user plane.

NOTE 3: In this case, the new registration procedure is performed when the UE moves to the 5GMM-IDLE mode.

- upon receiving a request from the upper layers to perform emergency services fallback only for a UE in 3GPP access or establishing an emergency PDU session, the UE shall stop timer T3540 and shall locally release the N1 NAS signalling connection, before proceeding as specified in subclause 5.5.1.

If the UE had set the Follow-on request indicator to "Follow-on request pending" in the REGISTRATION REQUEST message due to pending uplink signalling but cannot send the pending signalling due to new service area restrictions received or due to network not supporting the feature as indicated in the REGISTRATION ACCEPT message (for example UE set the "Follow-on request pending" to send SMS over NAS but AMF notified "SMS over NAS not allowed") and if there is no further pending data or signalling and user plane resources have not been set up, the UE may locally release the established N1 NAS signalling connection upon completion of the registration procedure.

\*\*\*\*\* end of 1st change \*\*\*\*\*

\*\*\*\*\* start of 2nd change \*\*\*\*\*

##### 5.5.2.3.5 Abnormal cases in the network side

The following abnormal cases can be identified:

a) T3522 time-out

 On the first expiry of the timer, the network shall retransmit the DEREGISTRATION REQUEST message and shall start timer T3522. This retransmission is repeated four times, i.e. on the fifth expiry of timer T3522, the de-registration procedure shall be aborted. The network shall change to the state 5GMM-DEREGISTERED for the access type which the de-registration procedure is intended for.

b) Lower layer failure

 The de-registration procedure is aborted. The network shall change to the state 5GMM-DEREGISTERED for the access type which the de-registration procedure is intended for.

c) De-registration procedure collision

 If the network receives a DEREGISTRATION REQUEST message with "switch off" indication, before the network-initiated de-registration procedure has been completed, both procedures shall be considered completed.

 If the network receives a DEREGISTRATION REQUEST message without "switch off" indication, before the network-initiated de-registration procedure has been completed, the network shall send a DEREGISTRATION ACCEPT message to the UE.

d) De-registration and registration procedure for initial registration collision

 If the network receives a REGISTRATION REQUEST message indicating either "initial registration" or "emergency registration" in the 5GS registration type IE before the network-initiated de-registration procedure has been completed, the network shall aborted the de-registration procedure and the registration procedure shall be progressed after the PDU sessions associated with the access type the REGISTRATION REQUEST message is sent over have been deleted.

NOTE 1: The above collision case is valid if the DEREGISTRATION REQUEST message indicates the access type over which the initial registration procedure is attempted otherwise both the procedures are progressed.

e) De-registration and registration procedure for mobility and periodic registration update collision

 If the network sent a DEREGISTRATION REQUEST message without 5GMM cause value #11, #12, #13 or #15 and the network receives a REGISTRATION REQUEST message indicating either "mobility registration updating" or "periodic registration updating" in the 5GS registration type IE before the network-initiated de-registration procedure has been completed, the de-registration procedure shall be progressed, i.e. the REGISTRATION REQUEST message shall be ignored.

 If the network sent a DEREGISTRATION REQUEST message with 5GMM cause value #11, #12, #13 or #15 and the network receives a REGISTRATION REQUEST message indicating either "mobility registration updating" or "periodic registration updating" in the 5GS registration type IE before the network-initiated de-registration procedure has been completed, the de-registration procedure shall be aborted and the registration procedure shall be progressed.

NOTE 2: The above collision case is valid if the DEREGISTRATION REQUEST message indicates the access type over which the mobility and periodic registration procedure is attempted otherwise both the procedures are progressed.

f) De-registration and service request procedure collision

 If the network receives a SERVICE REQUEST message or a CONTROL PLANE SERVICE REQUEST message before the network-initiated de-registration procedure has been completed (e.g. the DEREGISTRATION REQUEST message is pending to be sent to the UE), the network shall progress the de-registration procedure.

NOTE 3: The above collision case is valid if the DEREGISTRATION REQUEST message indicates the access type over which the service request procedure is attempted otherwise both the procedures are progressed.

g) De-registration requested for a UE not supporting CAG due to CAG restrictions

 Based on operator policy, if the network-initiated de-registration procedure is triggered for a UE not supporting CAG due to CAG restrictions, the network shall send the DEREGISTRATION REQUEST message including a 5GMM cause value other than the 5GMM cause #76 (Not authorized for this CAG or authorized for CAG cells only).

NOTE 4: 5GMM cause #7 (5GS services not allowed), 5GMM cause #11 (PLMN not allowed), 5GMM cause #27 (N1 mode not allowed), 5GMM cause #31 (Redirection to EPC required), 5GMM cause #73 (Serving network not authorized) can be used depending on the subscription of the UE and whether the UE roams or not.

\*\*\*\*\* end of 2nd change \*\*\*\*\*