**3GPP TSG-CT WG1 Meeting #133-e *rev of* C1-216869**

**E-meeting, 11-19 November 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **24.301** | **CR** | **3639** | **rev** | **1** | **Current version:** | 17.4.1 |  |
|  |
| *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:***  | Re-activate N1 mode capability upon re-attach procedure - EPS |
|  |  |
| ***Source to WG:*** | NTT DOCOMO |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5GProtoc17 |  | ***Date:*** | 2021-11-11 |
|  |  |  |  |  |
| ***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)* |
|  |  |
| ***Reason for change:*** | As discussed during CT1#131-e (see C1-214662), if the UE receives registration reject message with 5GMM cause #27, then there is a concern that the UE cannot camp on a 5GS cell for long time even after the user has changed his/her subscription and thereby allowed to access to the cell.It is proposed that the UE re-enables its N1 mode when it receives perticular signalling in EPS, i.e. if the subscription status to 5G changes, the NW triggers re-attach procedure. Therefore, it is proposed that the UE re-enables its N1 mode capability when it receives DETACH REQUEST message with “re-attach required”.During CT1#131-e, we have proposed a solution, i.e. the UE re-enables its N1 mode capability when the UE performs re-attach procedure (which can be trigerred by the NW). However, some companies raised concern regarding backward compatibility, e.g. the Rel-17 UE may re-enable its N1 mode capability which was not the intention of Rel-16 NW operators.To prevent this issue, it is proposed that the UE re-enables its N1 mode capability only when it has received an indication from the EPC to re-enable its N1 mode capability. |
|  |  |
| ***Summary of change:*** | The UE enables its disabled N1 mode capability when performs re-attach procedure in **EPS**, if the UE has disabled its N1 mode capability and the UE has received an indication to re-enable its N1 mode capability. |
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| ***Consequences if not approved:*** | The UE cannot access to 5GCN for long time even though it is allowed by its subscription. |
|  |  |
| ***Clauses affected:*** | 5.5.2.3.2, 9.9.3.7 |
|  |  |
|  | **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:*** |  |

##### 5.5.2.3.2 Network initiated detach procedure completion by the UE

When receiving the DETACH REQUEST message and the detach type indicates "re-attach required", the UE shall deactivate the EPS bearer context(s), if any, including the default EPS bearer context locally without peer-to-peer signalling between the UE and the MME. The UE shall stop the timer T3346, if it is running. The UE shall also stop timer(s) T3396 and ESM back-off timer(s) not related to congestion control (see clause 6.3.6), if running. The UE shall send a DETACH ACCEPT message to the network and enter the state EMM-DEREGISTERED. Furthermore, the UE shall, after the completion of the detach procedure, and the release of the existing NAS signalling connection, initiate an attach or combined attach procedure. The UE shall enable N1 mode capability for 3GPP access if it was disabled and the UE received "re-enable N1 mode required" indicatotion within the Detach type IE.The UE should also re-establish any previously established PDN connection(s).

NOTE 1: When the detach type indicates "re-attach required", user interaction is necessary in some cases when the UE cannot re-activate the EPS bearer(s), if any, automatically.

A UE which receives a DETACH REQUEST message with detach type indicating "re-attach required" or "re-attach not required" and no EMM cause IE, is detached only for EPS services.

When receiving the DETACH REQUEST message and the detach type indicates "IMSI detach", the UE shall not deactivate the EPS bearer context(s) including the default EPS bearer context. The UE shall set the MM update status to U2 NOT UPDATED. A UE may send a DETACH ACCEPT message to the network, and shall re-attach to non-EPS services by performing the combined tracking area updating procedure according to clause 5.5.3.3, sending a TRACKING AREA UPDATE REQUEST message with EPS update type IE indicating "combined TA/LA updating with IMSI attach".

If the UE is attached for EPS and non-EPS services, then the UE shall set the update status to U2 NOT UPDATED if:

- the Detach type IE indicates "re-attach required"; or

- the Detach type IE indicates "re-attach not required" and no EMM cause IE is included.

When receiving the DETACH REQUEST message and the detach type indicates "re-attach not required" and no EMM cause IE, or "re-attach not required" and the EMM cause value is not #2 "IMSI unknown in HSS", the UE shall deactivate the EPS bearer context(s), if any, including the default EPS bearer context locally without peer-to-peer signalling between the UE and the MME. The UE shall then send a DETACH ACCEPT message to the network and enter state EMM-DEREGISTERED.

If the detach type indicates "IMSI detach" or "re-attach required", then the UE shall ignore the EMM cause IE if received.

If the detach type indicates "re-attach not required", the UE shall take the following actions depending on the received EMM cause value:

#2 (IMSI unknown in HSS);

 The UE shall handle the MM parameters update status, TMSI, LAI and ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when a DETACH REQUEST is received with the GMM cause with the same value and with detach type set to "re-attach not required". The USIM shall be considered as invalid for non-EPS services until switching off or the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.7a. If the UE maintains a counter for "SIM/USIM considered invalid for non-GPRS services", then the UE shall set this counter to UE implementation-specific maximum value.

 The UE is still attached for EPS services in the network.

#3 (Illegal UE);

#6 (Illegal ME); or

#8 (EPS services and non-EPS services not allowed);

 The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to clause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall consider the USIM as invalid for EPS services until switching off or the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.7a. The UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED.NO-IMSI. If the UE maintains a counter for "SIM/USIM considered invalid for GPRS services", then the UE shall set this counter to UE implementation-specific maximum value. If the UE maintains a counter for "SIM/USIM considered invalid for non-GPRS services", then the UE shall set this counter to UE implementation-specific maximum value.

 If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the MM parameters update status, TMSI, LAI and ciphering key sequence number and the GMM parameters GMM state, RAI, P-TMSI, P-TMSI signature, GPRS ciphering key sequence number and GPRS update status as specified in 3GPP TS 24.008 [13] for the case when a DETACH REQUEST is received with the GMM cause with the same value and with detach type set to "re-attach not required". The USIM shall also be considered as invalid for non-EPS services until switching off or the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.7a.

 For the EMM cause value #3 or #6, if the UE is operating in single-registration mode, the UE shall handle the 5GMM parameters 5GMM state, 5GS update status, 5G-GUTI, last visited registered TAI, TAI list and ngKSI as specified in 3GPP TS 24.501 [54] for the case when a DEREGISTRATION REQUEST is received over 3GPP access with the 5GMM cause with the same value, with de-registration type set to "re-registration not required" and with access type set to "3GPP access".

 For the EMM cause value #8, if the UE is operating in single-registration mode, the UE shall in addition set the 5GMM state to 5GMM-DEREGISTERED, 5GS update status to 5U3 ROAMING NOT ALLOWED, and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI.

NOTE 2: The possibility to configure a UE so that the radio transceiver for a specific radio access technology is not active, although it is implemented in the UE, is out of scope of the present specification.

#7 (EPS services not allowed);

 The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to clause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall consider the USIM as invalid for EPS services until switching off or the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.7a. The UE shall enter the state EMM-DEREGISTERED. If the UE maintains a counter for "SIM/USIM considered invalid for GPRS services", then the UE shall set this counter to UE implementation-specific maximum value.

 If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, RAI, P‑TMSI, P-TMSI signature, GPRS ciphering key sequence number and GPRS update status as specified in 3GPP TS 24.008 [13] for the case when a DETACH REQUEST is received with the GMM cause with the same value and with detach type set to "re-attach not required".

 A UE operating in CS/PS mode 1 or CS/PS mode 2 of operation which is IMSI attached for non-EPS services is still IMSI attached for non-EPS services in the network. The UE operating in CS/PS mode 1 or CS/PS mode 2 of operation shall set the update status to U2 NOT UPDATED, shall attempt to select GERAN or UTRAN access technology and shall proceed with the appropriate MM specific procedure according to the MM service state. The UE shall not reselect E-UTRAN radio access technology until switching off or the UICC containing the USIM is removed.

 If the UE is operating in single-registration mode, the UE shall handle the 5GMM parameters 5GMM state, 5GS update status, 5G-GUTI, last visited registered TAI, TAI list and ngKSI as specified in 3GPP TS 24.501 [54] for the case when a DEREGISTRATION REQUEST is received over 3GPP access with the 5GMM cause with the same value, with de-registration type set to "re-registration not required" and with access type set to "3GPP access".

#11 (PLMN not allowed);

 The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to clause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall delete the list of equivalent PLMNs, shall reset the attach attempt counter and enter the state EMM-DEREGISTERED.PLMN-SEARCH.

 The UE shall store the PLMN identity in the "forbidden PLMN list" and if the UE is configured to use timer T3245 (see 3GPP TS 24.368 [15A] or 3GPP TS 31.102 [17]) then the UE shall start timer T3245 and proceed as described in clause 5.3.7a. If the message has been successfully integrity checked by the NAS and the UE maintains a PLMN-specific attempt counter for that PLMN, then the UE shall set this counter to the UE implementation-specific maximum value.

 The UE shall perform a PLMN selection according to 3GPP TS 23.122 [6].

 If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the MM parameters update status, TMSI, LAI and ciphering key sequence number and the GMM parameters GMM state, RAI, P-TMSI, P-TMSI signature, GPRS ciphering key sequence number, GPRS update status and GPRS attach attempt counter as specified in 3GPP TS 24.008 [13] for the case when a DETACH REQUEST is received with the GMM cause with the same value and with detach type set to "re-attach not required".

 If the UE is operating in single-registration mode, the UE shall handle the 5GMM parameters 5GMM state, 5GS update status, 5G-GUTI, last visited registered TAI, TAI list, ngKSI and registration attempt counter as specified in 3GPP TS 24.501 [54] for the case when a DEREGISTRATION REQUEST is received over 3GPP access with the 5GMM cause with the same value, with de-registration type set to "re-registration not required" and with access type set to "3GPP access".

#12 (Tracking area not allowed);

 The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to clause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall reset the attach attempt counter and shall enter the state EMM-DEREGISTERED.LIMITED-SERVICE.

 The UE shall store the current TAI in the list of "forbidden tracking areas for regional provision of service".

 If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, RAI, P‑TMSI, P-TMSI signature, GPRS ciphering key sequence number, GPRS update status and GPRS attach attempt counter as specified in 3GPP TS 24.008 [13] for the case when a DETACH REQUEST is received with the GMM cause with the same value and with detach type set to "re-attach not required". If the UE is IMSI attached for non-EPS services, the UE shall in addition handle the MM parameters update status, TMSI, LAI, ciphering key sequence number and location update attempt counter as specified in 3GPP TS 24.008 [13] for the case when a DETACH REQUEST is received with the GMM cause with the same value and with detach type set to "re-attach not required".

 If the UE is operating in single-registration mode, the UE shall handle the 5GMM parameters 5GMM state, 5GS update status, 5G-GUTI, last visited registered TAI, TAI list and ngKSI as specified in 3GPP TS 24.501 [54] for the case when a DEREGISTRATION REQUEST is received over 3GPP access with the 5GMM cause with the same value, with de-registration type set to "re-registration not required" and with access type set to "3GPP access".

#13 (Roaming not allowed in this tracking area);

 The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to clause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall delete the list of equivalent PLMNs, reset the attach attempt counter and shall change to state EMM-DEREGISTERED.PLMN-SEARCH.

 The UE shall store the current TAI in the list of "forbidden tracking areas for roaming".

 The UE shall perform a PLMN selection according to 3GPP TS 23.122 [6]

 If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, RAI, P‑TMSI, P-TMSI signature, GPRS ciphering key sequence number, GPRS update status and GPRS attach attempt counter as specified in 3GPP TS 24.008 [13] for the case when a DETACH REQUEST is received with the GMM cause with the same value and with detach type set to "re-attach not required". If the UE is IMSI attached for non-EPS services, the UE shall in addition handle the MM parameters update status, TMSI, LAI, ciphering key sequence number and location update attempt counter and as specified in 3GPP TS 24.008 [13] for the case when a DETACH REQUEST is received with the GMM cause with the same value and with detach type set to "re-attach not required".

 If the UE is operating in single-registration mode, the UE shall handle the 5GMM parameters 5GMM state, 5GS update status, 5G-GUTI, last visited registered TAI, TAI list, ngKSI and registration attempt counter as specified in 3GPP TS 24.501 [54] for the case when a DEREGISTRATION REQUEST is received over 3GPP access with the 5GMM cause with the same value, with de-registration type set to "re-registration not required" and with access type set to "3GPP access".

#14 (EPS services not allowed in this PLMN);

 The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to clause 5.1.3.3). Furthermore, the UE shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall reset the attach attempt counter and shall enter the state EMM-DEREGISTERED.PLMN-SEARCH.

 The UE shall store the PLMN identity in the "forbidden PLMNs for GPRS service" list and if the UE is configured to use timer T3245 (see 3GPP TS 24.368 [15A] or 3GPP TS 31.102 [17]) then the UE shall start timer T3245 and proceed as described in clause 5.3.7a. If the message has been successfully integrity checked by the NAS and the UE maintains a PLMN-specific PS-attempt counter for that PLMN, then the UE shall set this counter to the UE implementation-specific maximum value.

 A UE in PS mode 1 or PS mode 2 of operation shall delete the list of equivalent PLMNs and perform a PLMN selection according to 3GPP TS 23.122 [6].

 A UE operating in CS/PS mode 1 or CS/PS mode 2 of operation which is IMSI attached for non-EPS services is still IMSI attached for non-EPS services and shall set the update status to U2 NOT UPDATED.

 A UE operating in CS/PS mode 1 of operation and supporting A/Gb mode or Iu mode may select GERAN or UTRAN radio access technology and proceed with the appropriate MM specific procedure according to the MM service state. In this case, the UE shall disable the E-UTRA capability (see clause 4.5).

 A UE operating in CS/PS mode 1 of operation and supporting A/Gb mode or Iu mode may perform a PLMN selection according to 3GPP TS 23.122 [6].

 A UE operating in CS/PS mode 1 of operation and supporting S1 mode only or operating in CS/PS mode 2 of operation shall delete the list of equivalent PLMNs and shall perform a PLMN selection according to 3GPP TS 23.122 [6].

 If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status, RAI, P-TMSI, P-TMSI signature, GPRS ciphering key sequence number and GPRS attach attempt counter as specified in 3GPP TS 24.008 [13] for the case when a DETACH REQUEST is received with the GMM cause with the same value and with detach type set to "re-attach not required".

 If the UE is operating in single-registration mode, the UE shall in addition set the 5GMM state to 5GMM-DEREGISTERED, 5GS update status to 5U3 ROAMING NOT ALLOWED, and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. Additionally, the UE shall reset the registration attempt counter.

#15 (No suitable cells in tracking area);

 The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to clause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and KSI. The UE shall reset the attach attempt counter and shall enter the state EMM-DEREGISTERED.LIMITED-SERVICE.

 The UE shall store the current TAI in the list of "forbidden tracking areas for roaming".

 The UE shall search for a suitable cell in another tracking area or in another location area according to 3GPP TS 36.304 [21].

 If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, RAI, P‑TMSI, P-TMSI signature, GPRS ciphering key sequence number, GPRS update status and GPRS attach attempt counter as specified in 3GPP TS 24.008 [13] for the case when a DETACH REQUEST is received with the GMM cause with the same value and with detach type set to "re-attach not required". If the UE is IMSI attached for non-EPS services, the UE shall in addition handle the MM parameters update status, TMSI, LAI, ciphering key sequence number and location update attempt counter as specified in 3GPP TS 24.008 [13] for the case when a DETACH REQUEST is received with the GMM cause with the same value and with detach type set to "re-attach not required".

 If the UE is operating in single-registration mode, the UE shall handle the 5GMM parameters 5GMM state, 5GS update status, 5G-GUTI, last visited registered TAI, TAI list, ngKSI and registration attempt counter as specified in 3GPP TS 24.501 [54] for the case when a DEREGISTRATION REQUEST is received over 3GPP access with the 5GMM cause with the same value, with de-registration type set to "re-registration not required" and with access type set to "3GPP access".

#25 (Not authorized for this CSG);

 The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to clause 5.1.3.3). The UE shall reset the attach attempt counter and shall enter the state EMM-DEREGISTERED.LIMITED-SERVICE.

 If the cell where the UE has received the DETACH REQUEST message is a CSG cell and the CSG ID and associated PLMN identity of the cell are contained in the Allowed CSG list, the UE shall remove the entry corresponding to this CSG ID and associated PLMN identity from the Allowed CSG list.

 If the cell where the UE has received the DETACH REQUEST message is a CSG cell and the CSG ID and associated PLMN identity of the cell are contained in the Operator CSG list, the UE shall apply the procedures defined in 3GPP TS 23.122 [6] clause 3.1A.

 The UE shall search for a suitable cell according to 3GPP TS 36.304 [21].

 If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status and GPRS attach attempt counter as specified in 3GPP TS 24.008 [13] for the case when a DETACH REQUEST is received with GMM cause with the same value and with detach type set to "re-attach not required". If the UE is IMSI attached for non-EPS services, the UE shall in addition handle the MM parameters update status and location update attempt counter as specified in 3GPP TS 24.008 [13] for the case when a DETACH REQUEST is received with the GMM cause with the same value and with detach type set to "re-attach not required".

 If the UE is operating in single-registration mode, the UE shall in addition set the 5GMM state to 5GMM-DEREGISTERED and set the 5GS update status to 5U3 ROAMING NOT ALLOWED and reset the registration attempt counter.

Other EMM cause values or if no EMM cause IE is included is considered as abnormal cases. The behaviour of the UE in those cases is described in clause 5.5.2.3.4.

#### 9.9.3.7 Detach type

The purpose of the Detach type information element is to indicate the type of detach.

The Detach type information element is coded as shown in figure 9.9.3.7.1 and table 9.9.3.7.1.

The Detach type is a type 1 information element.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Detach typeIEI | Switchoff | Type of detach | octet 1 |

Figure 9.9.3.7.1: Detach type information element

Table 9.9.3.7.1: Detach type information element

|  |
| --- |
| Type of detach (octet 1) |
|  |
| In the UE to network direction: |
| Bits |
| 3 | 2 | 1 |  |  |
| 0 | 0 | 1 |  | EPS detach |
| 0 | 1 | 0 |  | IMSI detach |
| 0 | 1 | 1 |  | combined EPS/IMSI detach |
| 1 | 1 | 0 |  | reserved |
| 1 | 1 | 1 |  | reserved |
|  |
| All other values are interpreted as "combined EPS/IMSI detach" in this version of the protocol. |
|  |
| In the network to UE direction: |
| Bits |
| 3 | 2 | 1 |  |  |
| 0 | 0 | 1 |  | re-attach required |
| 0 | 1 | 0 |  | re-attach not required |
| 0 | 1 | 1 |  | IMSI detach |
| 1 | 1 | 0 |  | reserved |
| 1 | 1 | 1 |  | reserved |
|  |
| All other values are interpreted as "re-attach not required" in this version of the protocol. |
|  |
| Switch off (octet 1) |
|  |
| In the UE to network direction: |
| Bit |
| 4 |  |  |  |  |
| 0 |  |  |  | normal detach |
| 1 |  |  |  | switch off |
|  |
| In the network to UE direction: |
| Bit |
| 4 |  |  |  |  |
| 0 |  |  |  | normal detach |
| 1 |  |  |  | re-enable N1 mode required |