**3GPP TSG-CT WG1 Meeting #124-eC1-203800**

**Electronic meeting, 2-10 June 2020**

|  |
| --- |
| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **24.301** | **CR** | **3406** | **rev** | **1** | **Current version:** | **16.4.0** |  |
|  |
| *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)*.* |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network |  | Core Network | **x** |

|  |
| --- |
|  |
| ***Title:***  | Redirection of UE from S1 mode to N1 mode |
|  |  |
| ***Source to WG:*** | Samsung |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5G\_CIoT |  | ***Date:*** | 2020-05-26 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-16 |
|  | *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)* |
|  |  |
| ***Reason for change:*** | Currently, the redirection of the UE from EPC to 5GC e.g. based on load conditions (as specified in TS 23.501) is restricted to the registration procedure i.e. to redirect the UE, the MME sends the Attach Reject message or TAU Reject message with EMM cause #31.“*In networks that support CIoT features in both EPC and 5GC, the operator may steer UEs from a specific CN type due to operator policy, e.g., due to roaming agreements, Preferred and Supported Network Behaviour, load redistribution, etc.*” (from 23.501)The current method is very limited and cannot be used for:a) UEs in connected mode, orb) UEs that transition to connected mode with the service request procedure and therefore may not actually perform a TAU procedure for a long time.To have full flexibility in the network for UE redirection, e.g. based on load conditions or other local policies, which can be used in all cases including cases a) and b) above, the network should be able to either:1) perform a network initiated detach procedure, or2) send Service Reject to the UE.The two options above are introduced in this CR. |
|  |  |
| ***Summary of change:*** | Based on network policy to redirect the UE to 5GC, the network can:1) perform a network initiated detach procedure, or2) reject the service request procedure.In both cases, the EMM cause #31 is included in the NAS message to the UE. |
|  |  |
| ***Consequences if not approved:*** | The network can require a long time to redirect the UE to 5GC which may not be inline with network policies when such policies require immediate relocation of UEs in connected mode, or of UEs that don’t transition to connected mode with the TAU procedure. |
|  |  |
| ***Clauses affected:*** | 4.5, 5.3.19.2, 5.6.1.5, 5.6.1.6 |
|  |  |
|  | **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:*** |  |

\*\*\*\*\*\* NEXT CHANGE \*\*\*\*\*\*

## 4.5 Disabling and re-enabling of UE's E-UTRA capability

The UE shall only disable the E-UTRA capability when in EMM-IDLE mode.

When the UE supports both N1 mode and S1 mode then the UE's capability to access the 5GCN via E-UTRA shall not be affected, if the UE's E-UTRA capability is disabled or enabled.

When the UE is disabling the E-UTRA capability not due to redirection to 5GCN required, it should proceed as follows:

a) select another RAT (GERAN, UTRAN, or NG-RAN if the UE has not disabled its N1 mode capability for 3GPP access as specified in 3GPP TS 24.501 [54]) of the registered PLMN or a PLMN from the list of equivalent PLMNs;

b) if another RAT of the registered PLMN or a PLMN from the list of equivalent PLMNs cannot be found, or the UE does not have a registered PLMN, then perform PLMN selection as specified in 3GPP TS 23.122 [6]. As an implementation option, instead of performing PLMN selection, the UE may select another RAT of the chosen PLMN. If disabling of E-UTRA capability was not due to UE initiated detach procedure for EPS services only, the UE may re-enable the E-UTRA capability for this PLMN selection; or

c) if no other allowed PLMN and RAT combinations are available, then the UE may re-enable the E-UTRA capability and remain registered for EPS services in E-UTRAN of the registered PLMN. If the UE chooses this option, then it may periodically attempt to select another PLMN and RAT combination that can provide non-EPS services. How this periodic scanning is done, is UE implementation dependent.

When the UE is disabling the E-UTRA capability upon receiving reject cause #31 "Redirection to 5GCN required" as specified in subclauses 5.5.1.2.5, 5.5.1.3.5, 5.5.3.2.5, 5.5.3.3.5, and 5.6.1.5, it should proceed as follows:

i) If the UE is in NB-S1 mode:

1) if lower layers do not provide an indication that the current E-UTRA cell is connected to 5GCN or lower layers do not provide an indication that the current E-UTRA cell supports CIoT 5GS optimizations that are supported by the UE, search for a suitable NB-IoT cell connected to 5GCN according to 3GPP TS 36.304 [21];

2) if lower layers provide an indication that the current E-UTRA cell is connected to 5GCN and the current E-UTRA cell supports CIoT 5GS optimizations that are supported by the UE then perform a core network selection to select 5GCN as specified in 3GPP TS 24.501 [54] subclause 4.8.4A.1; or

3) if lower layers cannot find a suitable NB-IoT cell connected to 5GCN or there is no suitable NB-IoT cell connected to 5GCN which supports CIoT 5GS optimizations that are supported by the UE, the UE may re-enable the E-UTRA capability, and indicate to lower layers to remain camped in E-UTRA connected to EPC of the previously registered PLMN and proceed with the appropriate EMM procedure.

ii) If the UE is in WB-S1 mode:

1) if lower layers do not provide an indication that the current E-UTRA cell is connected to 5GCN or lower layers do not provide an indication that the current E-UTRA cell supports CIoT 5GS optimizations that are supported by the UE, search for a suitable E-UTRA cell connected to 5GCN according to 3GPP TS 36.304 [21];

2) if lower layers provide an indication that the current E-UTRA cell is connected to 5GCN and the current E-UTRA cell supports CIoT 5GS optimizations that are supported by the UE, then perform a core network selection to select 5GCN as specified in 3GPP TS 24.501 [54] subclause 4.8.4A.1; or

3) if lower layers cannot find a suitable E-UTRA cell connected to 5GCN or there is no suitable E-UTRA cell connected to 5GCN which supports CIoT 5GS optimizations that are supported by the UE, the UE may re-enable the E-UTRA capability, and indicate to lower layers to remain camped in E-UTRA connected to EPC of the previously registered PLMN and proceed with the appropriate EMM procedure.

The UE shall re-enable the E-UTRA capability when performing a PLMN selection unless:

- the disabling of E-UTRA capability was due to UE initiated detach procedure for EPS services only; or

- the UE has already re-enabled the E-UTRA capability when performing bullets b) or c) above.

If due to handover, the UE moves to a new PLMN in A/Gb, Iu, or N1 mode which is not in the list of equivalent PLMNs and not a PLMN memorized by the UE for which E-UTRA capability was disabled, and the disabling of E-UTRA capability was not due to UE initiated detach procedure for EPS services only, the UE shall re-enable the E-UTRA capability after the RR/RRC connection is released.

If UE that has disabled its E-UTRA capability due to IMS voice not available and CS fallback not available re-enables it when PLMN selection is performed, then it should memorize the identity of the PLMNs where E-UTRA capability was disabled and use that stored information in subsequent PLMN selections as specified in 3GPP TS 23.122 [6].

The UE may support "E-UTRA Disabling for EMM cause #15" and implement the following behaviour:

- if the "E-UTRA Disabling Allowed for EMM cause #15" parameter as specified in 3GPP TS 24.368 [15A] or 3GPP TS 31.102 [17] is present and set to enabled; and

- if the UE receives an ATTACH REJECT or TRACKING AREA UPDATE REJECT message including both EMM cause #15 "no suitable cells in tracking area" and an Extended EMM cause IE with value "E-UTRAN not allowed";

then the UE shall disable the E-UTRA capability, memorize the identity of the PLMN where the E-UTRA capability was disabled and use that stored information in subsequent PLMN selections as specified in 3GPP TS 23.122 [6].

When the UE supporting the A/Gb and/or Iu mode together with the S1 mode needs to stay in A/Gb or Iu mode, in order to prevent unwanted handover or cell reselection from UTRAN/GERAN to E-UTRAN, the UE shall disable the E-UTRA capability and:

- The UE shall not set the E-UTRA support bits of the MS Radio Access capability IE (see 3GPP TS 24.008 [13], subclause 10.5.5.12a), the E-UTRA support bits of Mobile Station Classmark 3 IE (see 3GPP TS 24.008 [13], subclause 10.5.1.7), the PS inter-RAT HO from GERAN to E-UTRAN S1 mode capability bit and the ISR support bit of the MS network capability IE (see 3GPP TS 24.008 [13], subclause 10.5.5.12) in the ATTACH REQUEST message and the ROUTING AREA UPDATE REQUEST message after it selects GERAN or UTRAN;

- the UE shall use the same value of the EPC capability bit of the MS network capability IE (see 3GPP TS 24.008 [13], subclause 10.5.5.12) in the ATTACH REQUEST message and the ROUTING AREA UPDATE REQUEST message; and

- the UE NAS layer shall indicate the access stratum layer(s) of disabling of the E-UTRA capability.

When the UE supporting N1 mode together with S1 mode needs to stay in N1 mode, in order to prevent unwanted handover or cell reselection from NG-RAN to E-UTRAN, the UE shall disable the E-UTRA capability and:

- the UE shall set the S1 mode bit to "S1 mode not supported" in the 5GMM Capability IE of the REGISTRATION REQUEST message (see 3GPP TS 24.501 [54]);

- the UE shall not include the S1 UE network capability IE in the REGISTRATION REQUEST message (see 3GPP TS 24.501 [54]); and

- the UE NAS layer shall indicate the access stratum layer(s) of disabling of the E-UTRA capability.

If the UE is disabling its E-UTRA capability before selecting to GERAN, UTRAN or NG-RAN radio access technology, the UE shall not perform the detach procedure of subclause 5.5.2.1.

If the UE is required to disable the E-UTRA capability and select GERAN, UTRAN or NG-RAN radio access technology, and the UE is in the EMM-CONNECTED mode, the UE shall locally release the established NAS signalling connection and enter the EMM-IDLE mode before selecting GERAN, UTRAN or NG-RAN radio access technology.

If the E-UTRA capability was disabled due to the attempt to select GERAN or UTRAN radio access technology progressing the CS emergency call establishment (see subclause 4.3.1), the criteria to enable the E-UTRA capability again is UE implementation specific.

If the E-UTRA capability was disabled due to the UE initiated detach procedure for EPS services only (see subclause 5.5.2.2.2), upon request of the upper layers to re-attach for EPS services the UE shall enable the E-UTRA capability again. If the E-UTRA capability was disabled due to receipt of EMM cause #14 "EPS services not allowed in this PLMN", then the UE shall enable the E-UTRA capability when the UE powers off and powers on again or the USIM is removed. If E-UTRA capability was disabled for any other reason, the UE shall enable the E-UTRA capability in the following cases:

- the UE mode of operation changes from CS/PS mode 1 of operation to CS/PS mode 2 of operation;

- the UE mode of operation changes from PS mode 1 of operation to PS mode 2 of operation; or

- the UE powers off and powers on again or the USIM is removed;

As an implementation option, the UE may start a timer for enabling E-UTRA when the UE's attach attempt counter or tracking area updating attempt counter reaches 5 and the UE disables E-UTRA capability for cases described in subclauses 5.5.1.2.6, 5.5.1.3.4.3, 5.5.1.3.6, 5.5.3.2.6, 5.5.3.3.4.3 and 5.5.3.3.6. The UE should memorize the identity of the PLMNs where E-UTRA capability were disabled. On expiry of this timer:

- if the UE is in Iu mode or A/Gb mode and is in idle mode as specified in 3GPP TS 24.008 [13] on expiry of the timer, the UE should enable the E-UTRA capability;

- if the UE is in Iu mode or A/Gb mode and an RR connection exists, the UE shall delay enabling E-UTRA capability until the RR connection is released;

- if the UE is in Iu mode and a PS signalling connection exists but no RR connection exists, the UE may abort the PS signalling connection before enabling E-UTRA capability;

- if the UE is in N1 mode and is in 5GMM-IDLE mode as specified in 3GPP TS 24.501 [54], on expiry of the timer, the UE should enable the E-UTRA capability; and

- if the UE is in N1 mode and is in 5GMM-CONNECTED mode as specified in 3GPP TS 24.501 [54], on expiry of the timer, the UE shall delay enabling the E-UTRA capability until the N1 NAS signalling connection is released.

If the UE attempts to establish an emergency bearer service in a PLMN where the E-UTRA capability was disabled due to the UE's attach attempt counter or tracking area updating attempt counter have reached 5, the UE may enable the E-UTRA capability for that PLMN memorized by the UE.

For other cases, it is up to the UE implementation when to enable the E-UTRA capability.

NOTE: If the UE is not operating in CS/PS mode 1 operation, the value of the timer for enabling E-UTRA capability is recommended to be not larger than the default value of T3402.

\*\*\*\*\*\* NEXT CHANGE \*\*\*\*\*\*

#### 5.3.19.2 Redirection of the UE by the core network

The network that supports CIoT optimizations can redirect a UE between EPC and 5GCN as specified in subclause 5.31.3 of 3GPP TS 23.501 [8]. The network can take into account the UE’s N1 mode capability or S1 mode capability, the CIoT network behaviour supported and preferred by the UE or the CIoT network behaviour supported by the network to determine the redirection.

NOTE: It is assumed that the network would avoid redirecting the UE back and forth between EPC and 5GCN.

The network redirects the UE to 5GCN by rejecting the attach request, tracking area update request, or service request with the EMM cause #31 "Redirection to 5GCN required" as specified in subclause 5.5.1.2.5, 5.5.1.3.5, 5.5.3.2.5,  5.5.3.3.5, and 5.6.1.5. Upon receipt of reject message, the UE disables the E-UTRA capability as specified in subclause 4.5 and enables the N1 mode capability if it was disabled in order to move to 5GCN.

The network that supports CIoT optimizations can also redirect a UE from 5GCN to EPC as specified in subclause 4.8.4A.2 of 3GPP TS 24.501 [54].

\*\*\*\*\*\* NEXT CHANGE \*\*\*\*\*\*

#### 5.6.1.5 Service request procedure not accepted by the network

If the service request cannot be accepted, the network shall return a SERVICE REJECT message to the UE including an appropriate EMM cause value.

NOTE 1: A service request can only be rejected before the network has initiated any procedure which will be interpreted by the UE as successful completion of the service request procedure (see subclauses 5.6.1.4.1 and 5.6.1.4.2) and which will trigger a transition from state EMM-SERVICE-REQUEST-INITIATED to EMM-REGISTERED on the UE side.

Based on local policies or configurations in the MME, if the MME determines to change the periodic tracking area update timer (T3412), or if the MME determines to change the PSM usage or the value of timer T3324 in the UE for which PSM is allowed by the MME, the MME may return a SERVICE REJECT with the cause #10 "implicitly detached" to the UE.

Based on operator policy, if the service request procedure is rejected due to core network redirection for CIoT optimizations, the network shall set the EMM cause value to #31 "Redirection to 5GCN required".

NOTE 2: The network can take into account the UE’s N1 mode capability, the 5GS CIoT network behaviour supported by the UE or the 5GS CIoT network behaviour supported by the 5GCN to determine the rejection with the EMM cause value #31 "Redirection to 5GCN required".

The MME may be configured to perform MME-based access control for mobile originating CS fallback calls for a certain area A by rejecting related service request with EMM cause #39 "CS service temporarily not available".

NOTE 3: Dependent on implementation and operator configuration the area A can be configured with the granularity of an MME area, tracking area or eNodeB service area.

The MME may further be configured for a certain area A' to exempt service requests for mobile originating CS fallback calls from this MME-based access control, if:

- the service request is initiated in EMM-IDLE mode; and

- the UE indicated support of eNodeB-based access control for mobile originating CS fallback calls during an attach or tracking area updating procedure.

NOTE 4: The operator can use this second option when the eNodeBs in area A' are supporting the eNodeB-based access control for CS fallback calls. The area A' can be part of area A or the whole area A. It is the responsibility of the operator to coordinate the activation of MME-based access control and eNodeB-based access control for mobile originating CS fallback calls.

When the EMM cause value is #39 "CS service temporarily not available", the MME shall include a value for timer T3442 in the SERVICE REJECT message. If a mobile terminating CS fallback call is aborted by the network during call establishment as specified in 3GPP TS 29.118 [16A], the MME shall include the EMM cause value #39 "CS service temporarily not available" and set the value of timer T3442 to zero.

If a service request from a UE with only LIPA PDN connections is not accepted due to the reasons specified in subclause 5.6.1.4, depending on the service request received, the MME shall include the following EMM cause value in the SERVICE REJECT message:

- if the service request received is not due to CS fallback or 1xCS fallback, EMM cause value #10 "implicitly detached"; or

- if the service request received is due to CS fallback or 1xCS fallback, EMM cause value #40 "no EPS bearer context activated".

If a service request from a UE with only remaining SIPTO at the local network PDN connections is not accepted due to the reasons specified in subclause 5.6.1.4, depending on the service request received, the MME shall:

- if the service request received is due to CS fallback or 1xCS fallback, include the EMM cause value #40 "no EPS bearer context activated" in the SERVICE REJECT message; or

- if the service request received is not due to CS fallback or 1xCS fallback, abort the service request procedure and send a DETACH REQUEST message to the UE with detach type "re-attach required" (see subclause 5.5.2.3.1).

If the service request for mobile originated services is rejected due to general NAS level mobility management congestion control, the network shall set the EMM cause value to #22 "congestion" and assign a value for back-off timer T3346.

If the service request for mobile originated services is rejected due to service gap control as specified in subclause 5.3.17 i.e. the T3447 timer is running, the network shall set the EMM cause value to #22 "congestion" and may assign a back-off timer T3346 with the remaining time of the running T3447 timer.

If the MME sends a SERVICE REJECT message upon receipt of the CONTROL PLANE SERVICE REQUEST message piggybacked with the ESM DATA TRANSPORT message:

- if the Release assistance indication IE is not set to "No further uplink and no further downlink data transmission subsequent to the uplink data transmission is expected" in the message;

- if the UE has indicated a support for the control plane data back-off timer; and

- if the MME decides to activate the congestion control for transport of user data via the control plane,

then the MME shall set the EMM cause value to #22 "congestion" and assign a value for control plane data back-off timer T3448.

On receipt of the SERVICE REJECT message, if the UE is in state EMM-SERVICE-REQUEST-INITIATED and the message is integrity protected or contains a reject cause other than EMM cause value #25, the UE shall reset the service request attempt counter, stop timer T3417, T3417ext or T3417ext-mt, if running.

If the SERVICE REJECT message with EMM cause #25 or #31 was received without integrity protection, then the UE shall discard the message.

The UE shall take the following actions depending on the received EMM cause value in the SERVICE REJECT message.

#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 subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and eKSI. 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 subclause 5.3.7a. Additionally, the UE shall delete the list of equivalent PLMNs and shall enter the state EMM-DEREGISTERED. If the message has been successfully integrity checked by the NAS and 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, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number and the MM parameters update status, TMSI, LAI and ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the service request procedure is rejected with the GMM cause with the same value. The USIM shall be considered as invalid also for non-EPS services until switching off or the UICC containing the USIM is removed or the timer T3245 expires as described in subclause 5.3.7a. If the message has been successfully integrity checked by the NAS and 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.

NOTE 5: 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.

 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 the service request procedure performed over 3GPP access is rejected with the 5GMM cause with the same value.

 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.

#7 (EPS services not allowed);

 The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and eKSI. 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 subclause 5.3.7a. The UE shall enter the state EMM-DEREGISTERED. If the message has been successfully integrity checked by the NAS and 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.

 A UE operating in CS/PS mode 1 or CS/PS mode 2 of operation which is already IMSI attached for non-EPS services is still IMSI attached for non-EPS services.

 A 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 radio access technology and proceed with 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 A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the service request procedure is rejected with the GMM cause with the same value.

 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 the service request procedure performed over 3GPP access is rejected with the 5GMM cause with the same value.

#9 (UE identity cannot be derived by the network);

 The UE shall set the EPS update status to EU2 NOT UPDATED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and eKSI. The UE shall enter the state EMM-DEREGISTERED.

 If the service request was initiated for CS fallback and a CS fallback cancellation request was not received, the UE shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer.

 If the service request was initiated for 1xCS fallback, the UE shall select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS procedures.

 If the service request was initiated for 1xCS fallback and the UE has dual Rx/Tx configuration and supports enhanced 1xCS fallback, the UE shall perform a new attach procedure.

 If the service request was initiated for any reason other than CS fallback, 1x CS fallback or initiating a PDN connection for emergency bearer services, the UE shall perform a new attach procedure.

NOTE 6: User interaction is necessary in some cases when the UE cannot re-activate the EPS bearer(s) automatically.

 If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the service request procedure is rejected with the GMM cause with the same value.

 A UE operating in CS/PS mode 1 or CS/PS mode 2 of operation which is already IMSI attached for non-EPS services is still IMSI attached for non-EPS services.

 A UE operating in CS/PS mode 1 or CS/PS mode 2 of operation shall set the update status to U2 NOT UPDATED.

 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 the service request procedure performed over 3GPP access is rejected with the 5GMM cause with the same value.

#10 (Implicitly detached);

 A UE in CS/PS mode 1 or CS/PS mode 2 of operation is IMSI detached for both EPS services and non-EPS services.

 The UE shall enter the state EMM-DEREGISTERED.NORMAL-SERVICE. The UE shall delete any mapped EPS security context or partial native EPS security context.

 If the service request was initiated for CS fallback and a CS fallback cancellation request was not received, the UE shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer.

 If the service request was initiated for 1xCS fallback, the UE shall select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS procedures.

 If the service request was initiated for 1xCS fallback and the UE has dual Rx/Tx configuration and supports enhanced 1xCS fallback, the UE shall perform a new attach procedure.

 If the service request was initiated for any reason other than CS fallback, 1x CS fallback or initiating a PDN connection for emergency bearer services, the UE shall perform a new attach procedure.

NOTE 7: User interaction is necessary in some cases when the UE cannot re-activate the EPS bearer(s) automatically.

 If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM state as specified in 3GPP TS 24.008 [13] for the case when the service request procedure is rejected with the GMM cause with the same value.

 A UE operating in CS/PS mode 1 or CS/PS mode 2 of operation shall set the update status to U2 NOT UPDATED.

 If the UE is operating in single-registration mode, the UE shall in addition handle the 5GMM state as specified in 3GPP TS 24.501 [54] for the case when the service request procedure performed over 3GPP access is rejected with the 5GMM cause with the same value.

#11 (PLMN not allowed); or

#35 (Requested service option not authorized in this PLMN);

 The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and eKSI. The UE shall delete the list of equivalent PLMNs and shall 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 subclause 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 GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number and the MM parameters update status, TMSI, LAI, ciphering key sequence number and the location update attempt counter as specified in 3GPP TS 24.008 [13] for the case when the service request procedure is rejected with the GMM cause with the same value.

 For the EMM cause value #11, if the UE is operating in single-registration mode, the UE shall in addition 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 the service request procedure performed over 3GPP access is rejected with the 5GMM cause with the same value.

 For the EMM cause value #35, 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.

#12 (Tracking area not allowed);

 The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and eKSI. The UE 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 the SERVICE REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "forbidden tracking areas for regional provision of service" for non-integrity protected NAS reject message.

 If the UE initiated service request for mobile originated CS fallback and a CS fallback cancellation request was not received, then the UE shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer.

 If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the service request procedure is rejected with the GMM cause with the same value.

 If the UE is operating in single-registration mode, the UE shall in addition 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 the service request procedure performed over 3GPP access is rejected with the 5GMM cause with the same value.

#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 subclause 5.1.3.3). The UE shall enter the state EMM-REGISTERED.PLMN-SEARCH.

 The UE shall store the current TAI in the list of "forbidden tracking areas for roaming" and remove the current TAI from the stored TAI list if present. If the SERVICE REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "forbidden tracking areas for roaming" for non-integrity protected NAS reject message.

 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 and GPRS update status as specified in 3GPP TS 24.008 [13] for the case when the service request procedure is rejected with the GMM cause with the same value.

 If the UE is operating in single-registration mode, the UE shall in addition 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 the service request procedure performed over 3GPP access is rejected with the 5GMM cause with the same value.

#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 subclause 5.1.3.3). The UE shall enter the state EMM-REGISTERED.LIMITED-SERVICE.

 The UE shall store the current TAI in the list of "forbidden tracking areas for roaming" and remove the current TAI from the stored TAI list if present. If the SERVICE REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "forbidden tracking areas for roaming" for non-integrity protected NAS reject message.

 If the UE initiated service request for mobile originated CS fallback and a CS fallback cancellation request was not received, then the UE shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer.

 If the service request was not initiated for mobile originated CS fallback, 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 and GPRS update status as specified in 3GPP TS 24.008 [13] for the case when the service request procedure is rejected with the GMM cause with the same value.

 If the UE is operating in single-registration mode, the UE shall in addition 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 the service request procedure performed over 3GPP access is rejected with the 5GMM cause with the same value.

#18 (CS domain not available);

 If the request was related to CS fallback, the UE shall send an indication to the MM sublayer and shall not attempt CS fallback until combined tracking area updating procedure has been successfully completed. The UE shall enter the state EMM-REGISTERED.NORMAL-SERVICE.

 The UE shall set the update status to U2 NOT UPDATED.

 If the UE is in CS/PS mode 1 of operation with "IMS voice not available" and the request was related to CS fallback, the UE shall attempt to select GERAN or UTRAN radio access technology and disable the E-UTRA capability (see subclause 4.5).

 If the UE is in CS/PS mode 1 or CS/PS mode 2 mode of operation, the UE may provide a notification to the user or the upper layers that the CS domain is not available.

 If the request was related to 1xCS fallback, the UE shall cancel upper layer actions related to 1xCS fallback and enter the state EMM-REGISTERED.NORMAL-SERVICE.

#22 (Congestion);

 If the T3346 value IE is present in the SERVICE REJECT message and the value indicates that this timer is neither zero nor deactivated, the UE shall proceed as described below, otherwise it shall be considered as an abnormal case and the behaviour of the UE for this case is specified in subclause 5.6.1.6.

 If the rejected request was not for initiating a PDN connection for emergency bearer services, the UE shall abort the service request procedure and enter state EMM-REGISTERED, and stop timer T3417, T3417ext or T3417ext-mt if still running.

 The UE shall stop timer T3346 if it is running.

 If the SERVICE REJECT message is integrity protected, the UE shall start timer T3346 with the value provided in the T3346 value IE.

 If the SERVICE REJECT message is not integrity protected, the UE shall start timer T3346 with a random value from the default range specified in 3GPP TS 24.008 [13].

 If the service request was initiated for CS fallback and a CS fallback cancellation request was not received, the UE in CS/PS mode 1 of operation shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer.

NOTE 8: If the UE disables the E-UTRA capability, then subsequent mobile terminating calls could fail.

 If the service request was initiated for CS fallback for emergency call and a CS fallback cancellation request was not received, the UE may attempt to select GERAN or UTRAN radio access technology. It then proceeds with appropriate MM and CC specific procedures. The EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer.

 If the service request was initiated for 1xCS fallback, the UE shall select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS procedures.

 If the service request was initiated for 1xCS fallback for emergency call, the UE may select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS procedures.

 If the service request was initiated in EMM-CONNECTED mode with Control plane service type "mobile originating request" and with the "active" flag set to 1, the UE shall abort the procedure.

 If the service request procedure was initiated for an MO MMTEL voice call is started, a notification that the service request was not accepted due to congestion shall be provided to the upper layers.

NOTE 9: This can result in the upper layers requesting establishment of the originating voice call on an alternative manner e.g. requesting establishment of a CS voice call (see 3GPP TS 24.173 [13E]).

 For all other cases the UE stays in the current serving cell and applies normal cell reselection process. The service request procedure is started, if still necessary, when timer T3346 expires or is stopped.

 If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM parameters GMM state and GPRS update status as specified in 3GPP TS 24.008 [13] for the case when the service request procedure is rejected with the GMM cause with the same value.

 If the UE is using EPS services with control plane CIoT EPS optimization and if the T3448 value IE is present in the SERVICE REJECT message and the value indicates that this timer is neither zero nor deactivated, the UE shall:

- stop timer T3448 if it is running;

- consider the transport of user data via the control plane as unsuccessful; and

- start timer T3448:

- with the value provided in the T3448 value IE if the SERVICE REJECT message is integrity protected; or

- with a random value from the default range specified in table 10.2.1 if the SERVICE REJECT message is not integrity protected.

 If the UE is using EPS services with control plane CIoT EPS optimization and if the T3448 value IE is present in the SERVICE REJECT message and the value indicates that this timer is either zero or deactivated, the UE shall consider this case as an abnormal case and follow the behaviour specified in subclause 5.6.1.6.

 If the UE is operating in single-registration mode, the UE shall in addition handle the 5GMM parameters, 5GMM state and 5GS update status as specified in 3GPP TS 24.501 [54] for the case when the service request procedure performed over 3GPP access is rejected with the 5GMM cause with the same value.

#25 (Not authorized for this CSG);

 EMM cause #25 is only applicable when received from a CSG cell. EMM cause #25 received from a non-CSG cell is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.6.1.6.

 The UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and store it according to subclause 5.1.3.3). The UE shall enter the state EMM-REGISTERED.LIMITED-SERVICE.

 If the CSG ID and associated PLMN identity of the cell where the UE has initiated the service request procedure 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 CSG ID and associated PLMN identity of the cell where the UE has initiated the service request procedure are contained in the Operator CSG list, the UE shall apply the procedures defined in 3GPP TS 23.122 [6] subclause 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 and GPRS update status as specified in 3GPP TS 24.008 [13] for the case when the service request procedure is rejected with the GMM cause with the same value.

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

#31 (Redirection to 5GCN required);

 EMM cause #31 received by a UE that has not indicated support for CIoT optimizations is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.6.1.6.

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

 The UE shall enable N1 mode capability for 3GPP access if it was disabled and disable the E-UTRA capability (see subclause 4.5).

 If the UE is operating in single-registration mode, the UE shall in addition handle the 5GMM parameters, 5GMM state, and 5GS update status as specified in 3GPP TS 24.501 [54] for the case when the service request procedure performed over 3GPP access is rejected with the 5GMM cause with the same value.

#39 (CS service temporarily not available);

 If the T3442 value received in the SERVICE REJECT message is not zero, the UE shall start timer T3442 and enter the state EMM-REGISTERED.NORMAL-SERVICE. If the T3442 value received in the SERVICE REJECT message is zero, the UE shall not start timer T3442.

 The UE shall not try to send an EXTENDED SERVICE REQUEST message for mobile originating CS fallback to the network, except for mobile originating CS fallback for emergency calls, until timer T3442 expires or the UE sends a TRACKING AREA UPDATE REQUEST message.

#40 (No EPS bearer context activated);

 The UE shall enter the state EMM-DEREGISTERED.NORMAL-SERVICE. The UE shall delete any mapped EPS security context or partial native EPS security context.

 If the service request was initiated for CS fallback and a CS fallback cancellation request was not received, the UE shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer.

 If the service request was initiated for 1xCS fallback, the UE shall select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS procedures.

 If the service request was initiated for 1xCS fallback and the UE has dual Rx/Tx configuration and supports enhanced 1xCS fallback, the UE shall perform a new attach procedure.

 If the service request was initiated for any reason other than CS fallback or 1x CS fallback, the UE shall perform a new attach procedure.

NOTE 10: User interaction is necessary in some cases when the UE cannot re-activate the EPS bearer(s) automatically.

 If A/Gb mode or Iu mode is supported by the UE, the UE shall handle the GMM state as specified in 3GPP TS 24.008 [13] for the case when the service request procedure is rejected with the GMM cause value #10 "Implicitly detached".

 A UE operating in CS/PS mode 1 or CS/PS mode 2 of operation which is already IMSI attached for non-EPS services is still IMSI attached for non-EPS services in the network.

 A UE operating in CS/PS mode 1 or CS/PS mode 2 of operation shall set the update status to U2 NOT UPDATED.

 If the UE is operating in single-registration mode, the UE shall in addition set the 5GMM state to 5GMM-DEREGISTERED.

#42 (Severe network failure);

 The UE shall set the EPS update status to EU2 NOT UPDATED, and shall delete any GUTI, last visited registered TAI, TAI list, eKSI, and list of equivalent PLMNs. The UE shall start an implementation specific timer, setting its value to 2 times the value of T as defined in 3GPP TS 23.122 [6]. While this timer is running, the UE shall not consider the PLMN + RAT combination that provided this reject cause as a candidate for PLMN selection. The UE then enters state EMM-DEREGISTERED.PLMN-SEARCH in order to 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 in addition set the GMM state to GMM-DEREGISTERED, GPRS update status to GU2 NOT UPDATED, and shall delete the P-TMSI, P-TMSI signature, RAI and GPRS ciphering key sequence number.

 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 5U2 NOT UPDATED, and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI.

Other values are considered as abnormal cases. The specification of the UE behaviour in those cases is described in subclause 5.6.1.6.

\*\*\*\*\*\* NEXT CHANGE \*\*\*\*\*\*

#### 5.6.1.6 Abnormal cases in the UE

The following abnormal cases can be identified:

a) Access barred because of access class barring, EAB, ACDC or NAS signalling connection establishment rejected by the network without "Extended wait time" received from lower layers

 In WB-S1 mode, if the service request procedure is started in response to a paging request from the network, access class barring, EAB or ACDC is not applicable.

 In NB-S1 mode, if the service request procedure is started in response to a paging request from the network, access barring is not applicable.

 If the trigger for the service request procedure is the response to a paging request from the network and the NAS signalling connection establishment is rejected by the network, the service request procedure shall not be started. The UE stays in the current serving cell and applies normal cell reselection process. During an implementation dependent time period, the service request procedure may be started when access for "terminating calls" is granted or upon a cell change.

 If the service request was initiated for CS fallback and the access is barred for "mobile originating CS fallback" (see 3GPP TS 36.331 [22]) and the lower layer indicates "the barring is due to CSFB specific access barring information", the service request procedure shall not be started. The UE stays in the current serving cell and applies normal cell reselection process. The service request procedure may be started if it is still necessary, i.e. when access for "mobile originating CS fallback" is granted or because of a cell change.

 If the service request was initiated for CS fallback and a CS fallback cancellation request was not received and the access is barred for "mobile originating CS fallback" (see 3GPP TS 36.331 [22]) and the lower layer does not indicate "the barring is due to CSFB specific access barring information", the UE shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer.

 If the service request was initiated for 1xCS fallback and the access is barred for "originating calls" (see 3GPP TS 36.331 [22]), the UE shall select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS procedures.

 If the lower layer indicated the access was barred because of access class barring for "originating calls" (see 3GPP TS 36.331 [22]) and if:

- the service request is initiated due to a request from upper layers for user plane radio resources, and the MO MMTEL voice call is started, the MO MMTEL video call is started or the MO SMSoIP is started;

- the service request is initiated due to a mobile originated SMS over NAS or SMS over S102; or

- the service request is initiated due to a request from upper layers for user plane radio resources, ACDC is applicable to the request and the UE supports ACDC.

 then the service request procedure shall be started. The call type used shall be per annex D of this document.

NOTE 1: If more than one of MO MMTEL voice call is started, MO MMTEL video call is started or MO SMSoIP is started conditions are satisfied, it is left to UE implementation to determine the call type based on annex D of this document.

 If access is barred for a certain ACDC category (see 3GPP TS 36.331 [22]), and if the upper layers request user plane radio resources for a higher ACDC category and the UE supports ACDC, then the service request procedure shall be started.

 If an access request for an uncategorized application is barred due to ACDC (see 3GPP TS 36.331 [22]), and if the upper layers request user plane radio resources for a certain ACDC category and the UE supports ACDC, then the service request procedure shall be started.

 Otherwise:

- In WB-S1 mode, if access is barred for "originating calls" (see 3GPP TS 36.331 [22]), the service request procedure shall not be started. The UE stays in the current serving cell and applies normal cell reselection process. The service request procedure may be started if it is still necessary when access for "originating calls" is granted or because of a cell change.

- In NB-S1 mode, if access is barred for "originating calls" (see 3GPP TS 36.331 [22]), the service request procedure shall not be started. The UE stays in the current serving cell and applies normal cell reselection process. Further UE behaviour is implementation specific, e.g. the service request procedure is started again after an implementation dependent time; or

 In NB-S1 mode, if access is barred for "originating calls" (see 3GPP TS 36.331 [22]), and a request for an exceptional event is received from the upper layers, then the service request procedure shall be started.

NOTE 2: In NB-S1 mode, the EMM layer cannot receive the access barring alleviation indication from the lower layers (see 3GPP TS 36.331 [22]).

b) Lower layer failure or release of the NAS signalling connection without "Extended wait time", without "Extended wait time CP data", and without redirection indication received from lower layers before the service request procedure is completed (see subclause 5.6.1.4) or before SERVICE REJECT message is received

 If the service request was initiated for CS fallback and a CS fallback cancellation request was not received, the UE shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer, and the UE shall also set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE.

 If the service request was initiated for CS fallback and a CS fallback cancellation request was received, the UE shall set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE.

 If the service request was initiated for 1xCS fallback, the UE shall either:

- attempt to select cdma2000® 1x radio access technology and proceed with appropriate cdma2000® 1x CS procedures. If the UE fails to select cdma2000® 1x radio access technology, the UE shall set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE; or

- set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE, and perform cell selection according to 3GPP TS 36.304 [21].

 If the service request was not initiated for CS fallback or 1xCS fallback, the UE shall enter state EMM-REGISTERED.

 The UE shall abort the service request procedure, stop timer T3417, T3417ext or T3417ext-mt and locally release any resources allocated for the service request procedure.

c) T3417 expired

 The UE shall enter the state EMM-REGISTERED.

 If the UE triggered the service request procedure in EMM-IDLE mode in order to obtain packet services, then the EMM sublayer shall increment the service request attempt counter, abort the procedure and release locally any resources allocated for the service request procedure. The service request counter shall not be incremented, if:

- the service request procedure is initiated to establish a PDN connection for emergency bearer services;

- the UE has a PDN connection for emergency bearer services established;

- the UE is a UE configured to use AC11 – 15 in selected PLMN;

- the service request is initiated in response to paging from the network; or

- the UE in NB-S1 mode is requested by the upper layer to transmit user data related to an exceptional event and the UE is allowed to use exception data reporting (see the ExceptionDataReportingAllowed leaf of the NAS configuration MO in 3GPP TS 24.368 [15A] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [17]).

 If the service request attempt counter is greater than or equal to 5, the UE shall start timer T3325 (see 3GPP TS 24.008 [13]). Additionally if the service request was initiated for an "originating MMTEL voice" call type, a notification that the service request was not accepted and that timer T3325 is running shall be provided to the upper layers.

NOTE 3: This can result in the upper layers requesting establishment of a CS voice call (if not already attempted in the CS domain), or other implementation specific mechanisms (see 3GPP TS 24.173 [13E]).

 The UE shall not attempt service request until expiry of timer T3325 unless:

- the service request is initiated in response to paging from the network;

- the UE is a UE configured to use AC11 – 15 in selected PLMN;

- the service request is initiated to establish a PDN connection for emergency bearer services;

- the UE has a PDN connection for emergency bearer services established;

- the UE is registered in a new PLMN; or

- the UE in NB-S1 mode is requested by the upper layer to transmit user data related to an exceptional event and the UE is allowed to use exception data reporting (see the ExceptionDataReportingAllowed leaf of the NAS configuration MO in 3GPP TS 24.368 [15A] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [17]).

 If the service request for "originating MMTEL voice" call type was triggered while T3325 is running, a notification that the service request was not accepted and that timer T3325 is running shall be provided to the upper layers.

NOTE 4: This can result in the upper layers requesting establishment of a CS voice call (if not already attempted in the CS domain), or other implementation specific mechanisms (see 3GPP TS 24.173 [13E]).

NOTE 5: The NAS signalling connection can also be released if the UE deems that the network has failed the authentication check as specified in subclause 5.4.2.7.

 If the UE triggered the service request procedure in order to obtain services other than packet services from EMM-IDLE mode, then the EMM sublayer shall abort the procedure and release locally any resources allocated for the service request procedure.

 If the UE triggered the service request procedure in EMM-CONNECTED mode, the EMM sublayer shall abort the procedure and consider the service request procedure with "active" flag set or the 1xCS fallback procedure as failed. The UE shall stay in EMM-CONNECTED mode.

d) T3417ext or T3417ext-mt expired

 If a CS fallback cancellation request was not received, the UE shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer, and the UE shall also set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE.

 If a CS fallback cancellation request was received the UE shall set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE.

e) SERVICE REJECT received, other EMM cause values than those treated in subclause 5.6.1.5, and cases of EMM cause values #22, #25, and #31, if considered as abnormal cases according to subclause 5.6.1.5

 If the service request was initiated for CS fallback and a CS fallback cancellation request was not received, the UE shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer, and the UE shall also set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE.

 If the service request was initiated for CS fallback and a CS fallback cancellation request was received, the UE shall set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE.

 If the service request was initiated for 1xCS fallback, the UE shall select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS procedures.

 If the service request was initiated for 1xCS fallback and the UE has dual Rx/Tx configuration and supports enhanced 1xCS fallback, then upon entering EMM-IDLE mode the UE shall perform tracking area updating procedure.

 If the service request was not initiated for CS fallback or 1xCS fallback, the UE shall enter state EMM-REGISTERED.

 The UE shall abort the service request procedure, stop timer T3417, T3417ext or T3417ext-mt and locally release any resources allocated for the service request procedure.

f) Tracking area updating procedure is triggered

 The UE shall abort the service request procedure, stop timer T3417, T3417ext or T3417ext-mt if running and perform the tracking area updating procedure. The "active" flag shall be set in the TRACKING AREA UPDATE REQUEST message. If the service request was initiated for CS fallback or 1xCS fallback, and the CS fallback cancellation request was not received, the UE shall send the EXTENDED SERVICE REQUEST message to the MME by using the existing NAS signalling connection after the completion of the tracking area updating procedure.

g) Switch off

 If the UE is in state EMM-SERVICE-REQUEST-INITIATED at switch off, the detach procedure shall be performed.

h) Detach procedure collision

 EPS detach containing detach type "re-attach required":

 If the UE receives a DETACH REQUEST message from the network in state EMM-SERVICE-REQUEST-INITIATED, the UE shall take the following actions:

- If the service request was initiated for CS fallback, the UE shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM, CC and GMM specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer;

- If the service request was initiated for 1xCS fallback, the UE shall attempt to select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS procedures; or

- If the service request was not initiated for CS fallback or 1xCS fallback, the detach procedure shall be progressed and the service request procedure shall be aborted.

 EPS detach containing detach type "re-attach not required":

 If the UE receives a DETACH REQUEST message from the network in state EMM-SERVICE-REQUEST-INITIATED, the UE shall take the following actions:

- If the DETACH REQUEST message contains an EMM cause other than #2 "IMSI unknown in HSS" or no EMM cause IE, the detach procedure shall be progressed and the service request procedure shall be aborted. Additionally, if the service request was initiated for CS fallback or 1xCS fallback, but not for CS fallback for emergency call or 1xCS fallback for emergency call, the EMM sublayer shall indicate to the MM sublayer or the cdma2000® upper layers that the CS fallback or 1xCS fallback procedure has failed; or

 If the DETACH REQUEST message contains EMM cause #2 "IMSI unknown in HSS", the UE will follow the procedure as described below for the detach type "IMSI detach".

 EPS detach containing detach type "IMSI detach":

 If the UE receives a DETACH REQUEST message from the network in state EMM-SERVICE-REQUEST-INITIATED, the UE shall take the following actions:

- if the service request was initiated for SMS over NAS or CS fallback, but not for CS fallback for emergency call, the UE shall abort the service request procedure and progress the detach procedure; or

- otherwise the UE shall progress both procedures.

i) Transmission failure of SERVICE REQUEST, CONTROL PLANE SERVICE REQUEST or EXTENDED SERVICE REQUEST message indication with TAI change from lower layers

 If the current TAI is not in the TAI list, the service request procedure shall be aborted to perform the tracking area updating procedure. The "active" flag shall be set in the TRACKING AREA UPDATE REQUEST message. If the service request was initiated for CS fallback or 1xCS fallback, and the CS fallback cancellation request was not received, the UE shall send the EXTENDED SERVICE REQUEST message to the MME by using the existing NAS signalling connection after the completion of the tracking area updating procedure.

 If the current TAI is still part of the TAI list, the UE shall restart the service request procedure.

j) Transmission failure of SERVICE REQUEST, CONTROL PLANE SERVICE REQUEST or EXTENDED SERVICE REQUEST message indication without TAI change from lower layers

 The UE shall restart the service request procedure.

k) Default or dedicated bearer set up failure

 If the lower layers indicate a failure to set up a radio bearer, the UE shall locally deactivate the EPS bearer as described in subclause 6.4.4.6.

l) "Extended wait time" from the lower layers

 The UE shall abort the service request procedure, enter state EMM-REGISTERED, and stop timer T3417, T3417ext or T3417ext-mt if still running.

 If the EXTENDED SERVICE REQUEST or CONTROL PLANE SERVICE REQUEST message contained the low priority indicator set to "MS is configured for NAS signalling low priority", the UE shall start timer T3346 with the "Extended wait time" value.

 If the SERVICE REQUEST message was sent by a UE configured for NAS signalling low priority, the UE shall start timer T3346 with the "Extended wait time" value.

 If the EXTENDED SERVICE REQUEST or CONTROL PLANE SERVICE REQUEST message did not contain the low priority indicator set to "MS is configured for NAS signalling low priority" or if the SERVICE REQUEST message was sent by a UE not configured for NAS signalling low priority, the UE is operating in NB-S1 mode and the UE is not a UE configured to use AC11 – 15 in selected PLMN, then the UE shall start timer T3346 with the "Extended wait time" value.

 In other cases the UE shall ignore the "Extended wait time".

 The UE stays in the current serving cell and applies normal cell reselection process. The service request procedure is started, if still necessary, when timer T3346 expires or is stopped.

 If the service request was initiated for CS fallback and a CS fallback cancellation request was not received, the UE in CS/PS mode 1 of operation shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer.

NOTE 5: If the UE disables the E-UTRA capability, then subsequent mobile terminating calls could fail.

 If the service request was initiated for CS fallback for emergency call and a CS fallback cancellation request was not received, the UE may attempt to select GERAN or UTRAN radio access technology. It then proceeds with appropriate MM and CC specific procedures. The EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer.

 If the service request was initiated for 1xCS fallback, the UE shall select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS procedures.

 If the service request was initiated for 1xCS fallback for emergency call, the UE may select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS procedures.

 If the service request was initiated due to a request from the SMS entity to send an SMS and timer T3246 is not running, the UE, if operating in CS/PS mode 1 of operation, may select GERAN or UTRAN radio access technology. It then proceeds with the appropriate MM procedure.

NOTE 6: If the UE disables the E-UTRA capability, then subsequent mobile terminating calls could fail.

la) "Extended wait time CP data" from the lower layers

 The UE shall abort the service request procedure for transfer of user data via the control plane, enter state EMM-REGISTERED, and stop timer T3417 if still running.

 If the UE is operating in NB-S1 mode and supports the timer T3448, the UE shall start the timer T3448 with the "Extended wait time CP data" value. If the UE is operating in NB-S1 mode and does not support the timer T3448, the UE shall start the timer T3346 with the "Extended wait time CP data" value.

 In other cases the UE shall ignore the "Extended wait time CP data".

 The UE stays in the current serving cell and applies normal cell reselection process. The service request procedure for transfer of user data via the control plane is started, if still necessary, when the timer T3448 expires or is stopped.

m) Timer T3346 is running

 The UE shall not start the service request procedure unless:

- the UE receives a paging;

- the UE is a UE configured to use AC11 – 15 in selected PLMN;

- the UE has a PDN connection for emergency bearer services established or is establishing a PDN connection for emergency bearer services;

- the UE is requested by the upper layer for a CS fallback for emergency call or a 1xCS fallback for emergency call;

- the UE has a PDN connection established without the NAS signalling low priority indication or is establishing a PDN connection without the NAS signalling low priority indication and if the timer T3346 was started due to rejection of a NAS request message (e.g. ATTACH REQUEST, TRACKING AREA UPDATE REQUEST, EXTENDED SERVICE REQUEST or CONTROL PLANE SERVICE REQUEST) which contained the low priority indicator set to "MS is configured for NAS signalling low priority"; or

- the UE in NB-S1 mode is requested by the upper layer to transmit user data related to an exceptional event and:

- the UE is allowed to use exception data reporting (see the ExceptionDataReportingAllowed leaf of the NAS configuration MO in 3GPP TS 24.368 [15A] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [17]); and

- timer T3346 was not started when NAS signaling connection was established with RRC establishment cause set to "MO exception data".

 If the UE is in EMM-IDLE mode, the UE stays in the current serving cell and applies normal cell reselection process. The service request procedure is started, if still necessary, when timer T3346 expires or is stopped.

 Upon upper layer's request for a mobile originated CS fallback which is not for emergency call, the UE in CS/PS mode 1 of operation shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer.

NOTE 7: If the UE disables the E-UTRA capability, then subsequent mobile terminating calls could fail.

 Upon upper layer's request for a CS fallback for emergency call, the UE may select GERAN or UTRAN radio access technology. It then proceeds with appropriate MM and CC specific procedures. The EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer.

 Upon a request from the SMS entity to send an SMS and timer T3246 is not running, the UE, if operating in CS/PS mode 1 of operation, may select GERAN or UTRAN radio access technology. It then proceeds with the appropriate MM procedure.

NOTE 8: If the UE disables the E-UTRA capability, then subsequent mobile terminating calls could fail.

 Upon upper layer's request for a mobile originated 1x CS fallback which is not for emergency call, the UE shall select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS call procedures.

 Upon upper layer's request for a 1xCS fallback for emergency call, the UE may select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS call procedures.

 If the service request procedure was triggered for an MO MMTEL voice call is started, a notification that the service request procedure was not initiated due to congestion shall be provided to the upper layers.

NOTE 9: This can result in the upper layers requesting establishment of the originating voice call on an alternative manner e.g. requesting establishment of a CS voice call (see 3GPP TS 24.173 [13E]).

n) Failure to find a suitable GERAN or UTRAN cell, after release of the NAS signalling connection without "Extended wait time" and with redirection indication received from lower layers when the service request was initiated for CS fallback

 The EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer, and the UE shall also set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE.

 The UE shall abort the service request procedure, stop timer T3417ext or T3417ext-mt and locally release any resources allocated for the service request procedure.

o) Timer T3448 is running

 The UE in EMM-IDLE mode shall not initiate the service request procedure for transport of user data via the control plane unless:

- the UE is a UE configured to use AC11 – 15 in selected PLMN;

- the UE which is only using EPS services with control plane CIoT EPS optimization received a paging; or

- the UE in NB-S1 mode is requested by the upper layer to transmit user data related to an exceptional event and the UE is allowed to use exception data reporting (see the ExceptionDataReportingAllowed leaf of the NAS configuration MO in 3GPP TS 24.368 [15A] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [17]).

 The UE stays in the current serving cell and applies the normal cell reselection process.

p) Timer T3447 is running

 The UE shall not start any service request procedure unless:

- the UE receives a paging;

- the UE is a UE configured to use AC11 – 15 in selected PLMN;

- the UE has a PDN connection for emergency bearer services established or is establishing a PDN connection for emergency bearer services.

 The UE stays in the current serving cell and applies the normal cell reselection process. The service request procedure is started, if still necessary, when timer T3447 expires.