**3GPP TSG-CT WG1 Meeting #130-eC1-21xxxx**

**Electronic meeting, 20-28 May 2021 (was C1-213164, C1-213566)**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **24.501** | **CR** | **3236** | **rev** | **2** | **Current version:** | **17.2.1** |  |
|  | | | | | | | | |
| *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 |  |

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| ***Title:*** | Access barring for access categories '0' and '2' while timer RRC T302 is active | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Apple | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5GProtoc17 | | | | |  | ***Date:*** | | | 2021-05-21 |
|  |  | | | |  | |  | | |  |
| ***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 can be 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:*** | | If upper layer request an access barring check while timer T302 is running and timer T390 is started or running for access categories '2', ERRC inform upper layer that *“barring is applicable for all access categories except category '0'”*. This indication is not covered in various places in 24.501 and in consequence the UE behaviour is undefined. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | In all occurences of the indication *“barring is applicable for all access categories except categories '0' and '2'”* the indication *“barring is applicable for all access categories except category '0'”* is added. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Undefined UE behaviour if timer T302 is running and timer T390 is started or running for access categories '2'. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.5.5, 5.3.1.4, 5.4.5.2.6, 5.5.1.2.7, 5.5.1.3.7, 5.5.2.2.6, 5.6.1.7 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

*\*\*\* first change \*\*\**

### 4.5.5 Exception handling and avoiding double barring

Access attempts are allowed to proceed without further access control checking in order to avoid double barring for any service request or registration procedure initiated for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclauses 5.3.1.2 and 5.3.1.4). For any service request or registration procedure of this kind the UE determines an access category as specified in subclause 4.5.1 and 4.5.2 or 4.5.2A, unless a different access category is specified in the rest of the present subclause.

NOTE 1: Although the access control checking is skipped, the access category is determined for the specific access attempt in order to derive an RRC establishment cause.

There are several services or an MO IMS registration related signalling for which the NAS needs to be informed when the service starts and stops,

- because, while the service is ongoing or the MO IMS registration related signalling is ongoing, the mapping of other access attempts to a specific access category can be affected; and

- in order to avoid double barring at the start of these services or at the start of the MO IMS registration related signalling.

These services are:

a) emergency service;

b) MMTEL voice;

c) MMTEL video;

d) SMSoIP;

e) SMS over NAS;

f) 5GC-MO-LR procedure;

g) UE triggered V2X policy provisioning procedure; and

h) CIoT user data transfer over the control plane.

The UE considers an emergency service a) as started when 5GMM receives a request from upper layers to register for emergency services or to establish a PDU session with request type = "initial emergency request" or "existing emergency PDU session". It considers the emergency service as stopped when this PDU session is released.

In addition, the UE considers an emergency service a) as started when the 5GMM receives a request from the upper layers to perform emergency services fallback and performs emergency services fallback as specified in subclause 4.13.4.2 of 3GPP TS 23.502 [9]. In this case, the UE considers the emergency service as stopped when:

- the emergency PDU session established during the emergency services fallback is released if the UE has moved to an E-UTRA cell connected to 5GCN; or

- the service request procedure involved in the emergency services fallback is completed otherwise.

While an emergency service a) is ongoing, any access attempt triggered by the initiation of a registration, de-registration or service request procedure or by an uplink user data packet to be sent for a PDU session with suspended user-plane resources is mapped to access category 2 = emergency.

Once the emergency service has successfully passed access control, then as long as the service is ongoing, the following access attempts are allowed to proceed without further access control checking in order to avoid double barring:

- any service request procedure related to the PDU session associated with request type = "initial emergency request" or "existing emergency PDU session"; and

- any uplink user data packet to be sent for a PDU session with suspended user-plane resources associated with request type = "initial emergency request" or "existing emergency PDU session".

NOTE 2: Although the access control checking is skipped, the mapping is performed in order to derive an RRC establishment cause.

For services b) to h) the 5GMM receives explicit start and stop indications from the upper layers.

For the case of handover of ongoing services b) to d) from non-3GPP access, the 5GMM receives an additional explicit handover of ongoing service from non-3GPP access indication from the upper layer.Once the service has successfully passed access control, then as long as the service is ongoing, the following access attempts are allowed to proceed without further access control checking in order to avoid double barring:

- for services b), c) and d):

1) any service request procedure related to the PDU session established for DNN = "IMS" except between receiving from the lower layers an indication that access barring is applicable for all access categories except categories 0 and 2, or access barring is applicable for all access categories except category 0, and receiving from the lower layers an indication that the barring is alleviated for the access category determined for the access attempt; and

2) any uplink user data packet to be sent for a PDU session with suspended user-plane resources established for DNN = "IMS" except between receiving from the lower layers an indication that access barring is applicable for all access categories except categories 0 and 2, or access barring is applicable for all access categories except category 0, and receiving from the lower layers an indication that the barring is alleviated for the access category determined for the access attempt;

- for service d), if the upper layers have indicated a DNN used for SMSoIP and the indicated DNN used for SMSoIP is different from "IMS":

1) any service request procedure related to the PDU session established for the DNN used for SMSoIP except between receiving from the lower layers an indication that access barring is applicable for all access categories except categories 0 and 2, or access barring is applicable for all access categories except category 0, and receiving from the lower layers an indication that the barring is alleviated for access category 6; and

2) any uplink user data packet to be sent for a PDU session with suspended user-plane resources established for the DNN used for SMSoIP except between receiving from the lower layers an indication that access barring is applicable for all access categories except categories 0 and 2, or access barring is applicable for all access category except category 0, and receiving from the lower layers an indication that the barring is alleviated for access category 6.

For the MO IMS registration related signalling, the 5GMM receives explicit start and stop indications from the upper layers.

Once the MO IMS registration related signalling has successfully passed access control, then as long as the MO IMS registration related signalling is ongoing, the following access attempts are allowed to proceed without further access control checking in order to avoid double barring:

1) any service request procedure related to the PDU session established for DNN = "IMS" and for the DNN used for SMSoIP, if the upper layers have indicated a DNN used for SMSoIP and the indicated DNN used for SMSoIP is different from "IMS", except between receiving from the lower layers an indication that access barring is applicable for all access categories except categories 0 and 2, or access barring is applicable for all access categories except category 0 and receiving from the lower layers an indication that the barring is alleviated for the access category determined for the access attempt; and

2) any uplink user data packet to be sent for a PDU session with suspended user-plane resources established for DNN = "IMS" and for the DNN used for SMSoIP except between receiving from the lower layers an indication that access barring is applicable for all access categories except categories 0 and 2, or access barring is applicable for all access categories except category 0 and receiving from the lower layers an indication that the barring is alleviated for the access category determined for the access attempt;

While an MMTEL voice call is ongoing:

- any service request procedure related to the PDU session established for DNN = "IMS" is mapped to access category 4;

- any uplink user data packet to be sent for a PDU session with suspended user-plane resources established for DNN = "IMS" is mapped to access category 4; and

- any:

1) service request procedure; or

2) registration procedure;

initiated in 5GMM-IDLE mode or 5GMM-IDLE mode with suspend indication for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclause 5.3.1.2 and 5.3.1.4) is mapped to access category 4.

While an MMTEL video call is ongoing and no MMTEL voice call is ongoing:

- any service request procedure related to the PDU session established for DNN = "IMS" is mapped to access category 5;

- any uplink user data packet to be sent for a PDU session with suspended user-plane resources established for DNN = "IMS" is mapped to access category 5; and

- any:

1) service request procedure; or

2) registration procedure;

initiated in 5GMM-IDLE mode or 5GMM-IDLE mode with suspend indication for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclause 5.3.1.2 and 5.3.1.4) is mapped to access category 5.

While an SMSoIP is ongoing, no MMTEL video call is ongoing and no MMTEL voice call is ongoing:

- any service request procedure related to the PDU session established:

1) for DNN = "IMS"; or

2) for the DNN used for SMSoIP, if the upper layers have indicated a DNN used for SMSoIP and the indicated DNN used for SMSoIP is different from "IMS";

is mapped to access category 6; and

- any uplink user data packet to be sent for a PDU session with suspended user-plane resources established:

1) for DNN = "IMS"; or

2) for the DNN used for SMSoIP, if the upper layers have indicated a DNN used for SMSoIP and the indicated DNN used for SMSoIP is different from "IMS";

is mapped to access category 6; and

- any:

1) service request procedure; or

2) registration procedure;

initiated in 5GMM-IDLE mode or 5GMM-IDLE mode with suspend indication for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclause 5.3.1.2 and 5.3.1.4) is mapped to access category 6.

While an MO IMS registration related signalling is ongoing, no SMSoIP is ongoing, no MMTEL video call is ongoing and no MMTEL voice call is ongoing:

- any service request procedure related to the PDU session established:

1) for DNN = "IMS"; and

2) for the DNN used for SMSoIP, if the upper layers have indicated a DNN used for SMSoIP and the indicated DNN used for SMSoIP is different from "IMS";

is mapped to access category 9; and

- any uplink user data packet to be sent for a PDU session with suspended user-plane resources established:

1) for DNN = "IMS"; and

2) for the DNN used for SMSoIP, if the upper layers have indicated a DNN used for SMSoIP and the indicated DNN used for SMSoIP is different from "IMS";

is mapped to access category 9; and

- any:

1) service request procedure; or

2) registration procedure;

initiated in 5GMM-IDLE mode for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclause 5.3.1.2 and 5.3.1.4) is mapped to access category 9.

While an SMS over NAS is ongoing, no SMSoIP is ongoing, no MO IMS registration related signalling is ongoing, no MMTEL video call is ongoing and no MMTEL voice call is ongoing:

- any:

1) service request procedure; or

2) registration procedure;

initiated in 5GMM-IDLE mode or 5GMM-IDLE mode with suspend indication for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclause 5.3.1.2 and 5.3.1.4) is mapped to access category 6.

While a 5GC-MO-LR procedure is ongoing, no SMS over NAS is ongoing, no SMSoIP is ongoing, no MO IMS registration related signalling is ongoing, no MMTEL video call is ongoing, and no MMTEL voice call is ongoing:

- any:

1) service request procedure; or

2) registration procedure;

initiated in 5GMM-IDLE mode or 5GMM-IDLE mode with suspend indication for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclauses 5.3.1.2 and 5.3.1.4) is mapped to access category 3.

While a UE triggered V2X policy provisioning procedure is ongoing, no 5GC-MO-LR procedure is ongoing, no SMS over NAS is ongoing, no SMSoIP is ongoing, no MMTEL video call is ongoing, and no MMTEL voice call is ongoing:

- any:

1) service request procedure; or

2) registration procedure;

initiated in 5GMM-IDLE mode for the purpose of NAS signalling connection recovery or following a fallback indication from the lower layers (see subclauses 5.3.1.2 and 5.3.1.4) is mapped to access category 3.

While CIoT user data transfer over the control plane is ongoing, no 5GC-MO-LR procedure is ongoing, no SMS over NAS is ongoing, no SMSoIP is ongoing, no MMTEL video call is ongoing, and no MMTEL voice call is ongoing, any service request procedure initiated in 5GMM-IDLE mode following a fallback indication from the lower layers (see subclause 5.3.1.4) is mapped to access category 7.

NOTE 3: Although the access control checking is skipped, the mapping is performed in order to derive an RRC establishment cause.

If an access category is determined and the access control checking is skipped, the NAS shall determine the RRC establishment cause from one or more determined access identities and the access category as specified in subclause 4.5.6, the NAS shall initiate the procedure to send the initial NAS message for the access attempt and shall provide the RRC establishment cause to lower layers.

If the UE receives from the lower layers an indication that access barring is applicable for all access categories except categories 0 and 2, or access barring is applicable for all access categories except category 0:

a) if an MMTEL voice call or MMTEL video call is ongoing:

1) if the UE is operating in the single-registration mode and the UE's usage setting is "voice centric", the UE may attempt to select an E-UTRA cell connected to EPC. If the UE finds a suitable E-UTRA cell connected to EPC, it then proceeds with the appropriate EMM specific procedures and, if necessary, ESM procedures to make a PDN connection providing access to IMS available; see subclause 4.8.2 and 3GPP TS 24.301 [15]; and

2) if the UE is operating in the dual-registration mode, the UE may proceed in S1 mode with the appropriate EMM specific procedures and ESM procedures to make a PDN connection providing access to IMS available; see subclause 4.8.3 and 3GPP TS 24.301 [15]; and

b) if SMSoIP is ongoing or an MO IMS registration related signalling is ongoing:

1) if the UE is operating in the single-registration mode, the UE may attempt to select an E-UTRA cell connected to EPC. If the UE finds a suitable E-UTRA cell connected to EPC, it then proceeds with the appropriate EMM specific procedures and, if necessary, ESM procedures to make a PDN connection providing access to IMS available; see subclause 4.8.2 and 3GPP TS 24.301 [15]; and

2) if the UE is operating in the dual-registration mode, the UE may proceed in S1 mode with the appropriate EMM specific procedures and ESM procedures to make a PDN connection providing access to IMS available; see subclause 4.8.3 and 3GPP TS 24.301 [15].

*\*\*\* next change \*\*\**

#### 5.3.1.4 5GMM-CONNECTED mode with RRC inactive indication

This subclause is only applicable for UE's 5GMM mode over 3GPP access. The 5GMM-CONNECTED mode with RRC inactive indication is not supported when the UE is in NB-N1 mode.

The UE is in 5GMM-CONNECTED mode with RRC inactive indication when the UE is in:

a) 5GMM-CONNECTED mode over 3GPP access at the NAS layer; and

b) RRC\_INACTIVE state at the AS layer (see 3GPP TS 38.300 [27]).

Unless stated otherwise, the UE behaviour in 5GMM-CONNECTED mode with RRC inactive indication follows the UE behaviour in 5GMM-CONNECTED over 3GPP access, except that:

a) the UE shall apply the mobility restrictions; and

b) the UE shall perform the PLMN selection procedures

as in 5GMM-IDLE mode over 3GPP access.

The UE shall transition from 5GMM-CONNECTED mode over 3GPP access to 5GMM-CONNECTED mode with RRC inactive indication upon receiving an indication from the lower layers that the RRC connection has been suspended.

NOTE 0: Any pending procedure or uplink data packet when receiving an indication from the lower layers that the RRC connection has been suspended, triggers a request to the lower layers to transition to RRC\_CONNECTED state. This is also the case when the pending procedure or uplink data packet triggered a previous request to the lower layers to transition to RRC\_CONNECTED state.

Upon:

a) a trigger of a procedure which requires sending of a NAS message different from a REGISTRATION REQUEST message with the NG-RAN-RCU bit of the 5GS update type IE set to "UE radio capability update needed"; or

b) an uplink user data packet to be sent for a PDU session with suspended user-plane resources;

the UE in 5GMM-CONNECTED mode with RRC inactive indication over 3GPP access shall request the lower layers to transition to RRC\_CONNECTED state (see 3GPP TS 38.300 [27]).

Upon a trigger to send a REGISTRATION REQUEST message with the NG-RAN-RCU bit of the 5GS update type IE set to "UE radio capability update needed", the UE in 5GMM-CONNECTED mode with RRC inactive indication shall move to 5GMM-IDLE mode over 3GPP access and proceed with the registration procedure for mobility and periodic registration as specified in subclause 5.5.1.3.2.

The UE shall transition from 5GMM-CONNECTED mode with RRC inactive indication to 5GMM-CONNECTED mode over 3GPP access upon receiving an indication from the lower layers that the UE has transitioned to RRC\_CONNECTED state (see 3GPP TS 38.300 [27]).

NOTE 1: The AMF can be aware of the transition between 5GMM-CONNECTED mode and 5GMM-CONNECTED mode with RRC inactive indication for a UE (see 3GPP TS 23.502 [9]).

The UE shall trigger a transition from 5GMM-CONNECTED mode with RRC inactive indication to 5GMM-IDLE mode upon selection of a PLMN that is not an equivalent PLMN to the registered PLMN. The UE shall not trigger a transition from 5GMM-CONNECTED mode with RRC inactive indication to 5GMM-IDLE mode upon entering a new PLMN which is in the list of equivalent PLMNs.

The UE shall trigger a transition from 5GMM-CONNECTED mode with RRC inactive indication to 5GMM-IDLE mode upon receiving REFRESH command from the UICC as specified in subclause 5.4.5.3.3.

If the UE in 5GMM-CONNECTED mode with RRC inactive indication receives an indication from the lower layers that the RRC connection has been suspended, the UE shall stay in 5GMM-CONNECTED mode with RRC inactive indication. The UE shall re-initiate any pending procedure that had triggered the request to the lower layers to transition to RRC\_CONNECTED state, if still needed.

When the UE in 5GMM-CONNECTED mode with RRC inactive indication receives a fallback indication from lower layers, and the UE has no pending NAS procedure and no pending uplink user data for PDU session(s) with user-plane resources already established, the UE shall:

a) enter 5GMM-IDLE mode; and

b) initiate the registration procedure for mobility and periodic registration update and include the Uplink data status IE in the REGISTRATION REQUEST message indicating the PDU session(s) for which user-plane resources were active prior to receiving the fallback indication, if any (see subclause 5.5.1.3 for further details).

If the UE requests the lower layers to transition to RRC\_CONNECTED state at initiation of a registration procedure, a service request procedure or a de-registration procedure, upon fallback indication from lower layers, the UE shall:

- enter 5GMM-IDLE mode;

- proceed with the pending procedure; and

- if the pending procedure is a service request or registration request procedure, the UE shall include the Uplink data status IE in the SERVICE REQUEST message, the CONTROL PLANE SERVICE REQUEST message or in the REGISTRATION REQUEST message, indicating the PDU session(s) without active user-plane resources for which the UE has pending user data to be sent, if any, and the PDU session(s) for which user-plane resources were active prior to receiving the fallback indication, if any (see subclauses 5.5.1.3 and 5.6.1 for further details).

If the UE requests the lower layers to transition to RRC\_CONNECTED state for other reason than initiation of a registration procedure, or for other reason than a service request procedure, or for other reason than a de-registration procedure, upon fallback indication from lower layers, the UE shall:

1) enter 5GMM-IDLE mode;

2) initiate the service request procedure and include the Uplink data status IE in the SERVICE REQUEST message or the CONTROL PLANE SERVICE REQUEST message indicating the PDU session(s) for which user-plane resources were active prior to receiving the fallback indication, if any (see subclause 5.6.1 for further details). If the procedure that triggered the request to the lower layers to transition to RRC\_CONNECTED state is the UE-initiated NAS transport procedure and the UE had SMS, location services message, or CIoT user data to send, the UE shall also include the SMS, location services message, or CIoT user data in the CONTROL PLANE SERVICE REQUEST message as described in subclause 5.6.1.2.2; and

3) upon successful service request procedure completion, proceed with any pending procedure.

If the UE in 5GMM-CONNECTED mode with RRC inactive indication receives a fallback indication from lower layers, and the UE has pending uplink user data for PDU session(s) with user-plane resources already established but no pending NAS procedure, the UE shall:

1) enter 5GMM-IDLE mode; and

2) initiate the service request procedure and include the Uplink data status IE in the SERVICE REQUEST message or the CONTROL PLANE SERVICE REQUEST message indicating the PDU session(s) for which user-plane resources were active prior to receiving the fallback indication (see subclause 5.6.1 for further details).

In the above cases when the UE receives a fallback indication from lower layers, if the UE is in non-allowed area or not in allowed area, the UE shall behave as specified in subclause 5.3.5.

If the UE in 5GMM-CONNECTED mode with RRC inactive indication receives an indication from the lower layers that the resumption of the RRC connection has failed, and:

a) if the lower layers indicate that access barring is applicable for all access categories except categories 0 and 2, or access barring is applicable for all access categories except category 0, the UE shall:

1) stay in 5GMM-CONNECTED mode with RRC inactive indication;

b) else, the UE shall:

1) enter 5GMM-IDLE mode; and

2) initiate the registration procedure for mobility and periodic registration update used for mobility (i.e. the 5GS registration type IE set to "mobility registration updating" in the REGISTRATION REQUEST message) for N1 NAS signalling connection recovery as specified in subclause 5.5.1.3.2.

NOTE 2: An indication from the lower layer that the RRC connection has been released with cause "RRC resume failure" can be considered as an indication that the resumption of the RRC connection has failed.

The UE shall transition from 5GMM-CONNECTED mode with RRC inactive indication to 5GMM-IDLE mode over 3GPP access upon receiving from the lower layers:

a) indication of transition from RRC\_INACTIVE state to RRC\_IDLE state; or

b) indication of cell selection to E-UTRAN or another RAT that the UE supports.

If the UE in 5GMM-CONNECTED mode with RRC inactive indication receives an indication from the lower layers about the cell (re-)selection to different RAT that the UE supports, the UE shall initiate the registration procedure for mobility or periodic registration update used for mobility (i.e. the 5GS registration type IE set to "mobility registration updating" in the REGISTRATION REQUEST message) as specified in subclause 5.5.1.3.2.

If the UE in 5GMM-CONNECTED mode with RRC inactive indication receives an indication from the lower layers of a transition from RRC\_INACTIVE state to RRC\_IDLE state and 5GMM-REGISTERED.LIMITED-SERVICE is entered, the UE shall subsequently upon entering state 5GMM-REGISTERED.NORMAL-SERVICE and if there is no uplink user data or signalling pending, initiate the registration procedure for mobility and periodic registration update used for mobility (i.e. the 5GS registration type IE set to "mobility registration updating" in the REGISTRATION REQUEST message) for N1 NAS signalling connection recovery as specified in subclause 5.5.1.3.2.

Upon receiving AMF paging indication from the lower layers, the UE shall transition from 5GMM-CONNECTED mode with RRC inactive indication to 5GMM-IDLE mode over 3GPP access and handle the AMF paging same as the paging request received in the 5GMM-IDLE mode over 3GPP access as specified in subclause 5.6.1.

*\*\*\* next change \*\*\**

##### 5.4.5.2.6 Abnormal cases in the UE

The following abnormal cases can be identified:

a) The lower layers indicate that the access attempt is barred.

The UE shall not start the UE-initiated NAS transport procedure. The UE stays in the current serving cell and applies the normal cell reselection process.

If the access category for the access attempt is 6 due to a request from upper layers to send a mobile originated SMS over NAS and the UE is registered to the network via both 3GPP access and non-3GPP access, the UE may transmit the UL NAS TRANSPORT message via non-3GPP access, if available.

Otherwise, the UE-initiated NAS transport procedure is started, if still needed, when the lower layers indicate that the barring is alleviated for the access category with which the access attempt was associated.

aa) The lower layers indicate that:

- access barring is applicable for all access categories except categories 0 and 2 and the access category with which the access attempt was associated is other than 0 and 2; or

- access barring is applicable for all access categories except category 0 and the access category with which the access attempt was associated is other than 0.

The UE shall proceed as specified for case a. For additional UE requirements see subclause 4.5.5.

b) If the Payload container type IE is set to "N1 SM information", the Request type IE is set to "initial request" or "MA PDU request" and registration procedure for mobility and periodic registration update is pending due to receipt by the UE of new network slicing information via the generic UE configuration update procedure with re-registration request; and an emergency PDU session exists then:

1) The UE shall not send the UL NAS TRANSPORT message; and

2) The UL NAS TRANSPORT message can be sent, if still necessary, after a successful procedure for mobility and periodic registration update.

c) Transmission failure of the UL NAS TRANSPORT message with TAI change from lower layers.

If the current TAI is not in the TAI list, the UE-initiated NAS transport procedure shall be aborted and a registration procedure for mobility and periodic registration update shall be initiated. The UL NAS TRANSPORT message can be sent, if still necessary, after a successful procedure for mobility and periodic registration update.

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

d) Transmission failure of the UL NAS TRANSPORT message indication without TAI change from lower layers.

It is up to the UE implementation how to re-run the ongoing procedure that triggered the UE-initiated NAS transport procedure.

e) Void.

f) Timer T3447 is running.

The UE shall not send the UL NAS TRANSPORT message unless:

1) the Payload container type IE is set to "N1 SM information" and:

i) the Request type IE is set to:

A) "initial emergency request";

B) "existing emergency PDU session"; or

C) "modification request" and the PDU session being modified is an emergency PDU session (see error cases described in subclause 6.4.1.3 and subclause 6.3.2.3); or

ii) the Request type IE is not included and the PDU session modification procedure is used to indicate a change of 3GPP PS data off UE status for a PDU session;

2)- the UE is a UE configured for high priority access in selected PLMN;

3) a paging request triggered the establishment of the current NAS signalling connection; or

4) the UE in 5GMM-CONNECTED mode receives mobile terminated signalling or downlink data over the user-plane.

The UL NAS TRANSPORT message can be sent, if still necessary, when timer T3447 expires or timer T3447 is stopped.

g) The lower layers indicate that the RRC connection has been suspended.

The UE shall abort the UE-initiated NAS transport procedure.

h) Timer T3346 is running.

The UE shall not send the UL NAS TRANSPORT message unless:

1) the Payload container type IE is set to "N1 SM information" and:

i) the Request type IE is set to:

A) "initial emergency request";

B) "existing emergency PDU session"; or

C) "modification request" and the PDU session being modified is an emergency PDU session; or

ii) the Request type IE is not included and the PDU session modification procedure is used to indicate a change of 3GPP PS data off UE status for a PDU session; or

2) the UE is a UE configured for high priority access in selected PLMN.

The UL NAS TRANSPORT message can be sent, if still necessary, when timer T3346 expires.

i) NAS MAC calculation indication from lower layers.

If lower layers indicate to calculate an NAS MAC, the UE shall calculate an NAS MAC as specified in 3GPP TS 33.501 [24] and then provide the calculated NAS MAC and 5 least significant bits of the uplink NAS COUNT used to calculate the NAS MAC to lower layers (see 3GPP TS 36.331 [25A]). The UE shall increase the uplink NAS COUNT by one after the calculation of the NAS MAC.

*\*\*\* next change \*\*\**

##### 5.5.1.2.7 Abnormal cases in the UE

The following abnormal cases can be identified:

a) Timer T3346 is running.

The UE shall not start the registration procedure for initial registration unless:

1) the UE is a UE configured for high priority access in selected PLMN;

2) the UE needs to perform the registration procedure for initial registration for emergency services;

3) the UE receives a DEREGISTRATION REQUEST message with the "re-registration required" indication;

4) the UE in NB-N1 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 [17] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [22]); and

- timer T3346 was not started when N1 NAS signalling connection was established with RRC establishment cause set to "mo-ExceptionData"; or

5) the UE needs to perform the registration procedure with 5GS registration type IE set to "initial registration" for initiating of an emergency PDU session, upon request of the upper layers to establish the emergency PDU session.

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

NOTE 1: It is considered an abnormal case if the UE needs to initiate a registration procedure for initial registration while timer T3346 is running independent on whether timer T3346 was started due to an abnormal case or a non-successful case.

b) The lower layers indicate that the access attempt is barred.

The UE shall not start the initial registration procedure. The UE stays in the current serving cell and applies the normal cell reselection process. Receipt of the access barred indication shall not trigger the selection of a different core network type (EPC or 5GCN).

The initial registration procedure is started, if still needed, when the lower layers indicate that the barring is alleviated for the access category with which the access attempt was associated.

ba) The lower layers indicate that:

- access barring is applicable for all access categories except categories 0 and 2 and the access category with which the access attempt was associated is other than 0 and 2; or

- access barring is applicable for all access categories except category 0 and the access category with which the access attempt was associated is other than 0.

If the REGISTRATION REQUEST message has not been sent, the UE shall proceed as specified for case b. If the REGISTRATION REQUEST message has been sent, the UE shall proceed as specified for case e and, additionally, the registration procedure for initial registration is started, if still needed, when the lower layers indicate that the barring is alleviated for the access category with which the access attempt was associated.

c) T3510 timeout.

The UE shall abort the registration procedure for initial registration and the NAS signalling connection, if any, shall be released locally if the initial registration request is neither for emergency services nor for initiating a PDU session for emergency services with request type set to "existing emergency PDU session". The UE shall proceed as described below.

d) REGISTRATION REJECT message, other 5GMM cause values than those treated in subclause 5.5.1.2.5, and cases of 5GMM cause values #11, #15, #22, #31, #72, #73, #74, #75, #76 and #77, if considered as abnormal cases according to subclause 5.5.1.2.5.

If the registration request is neither an initial registration request for emergency services nor an initial registration request for initiating a PDU session for emergency services with request type set to "existing emergency PDU session", upon reception of the 5GMM causes #95, #96, #97, #99 and #111 the UE should set the registration attempt counter to 5.

The UE shall proceed as described below.

e) Lower layer failure or release of the NAS signalling connection received from lower layers before the REGISTRATION ACCEPT or REGISTRATION REJECT message is received.

The UE shall abort the registration procedure for initial registration and proceed as described below.

f) UE initiated de-registration required.

The registration procedure for initial registration shall be aborted, and the UE initiated de-registration procedure shall be performed.

g) De-registration procedure collision.

If the UE receives a DEREGISTRATION REQUEST message from the network in state 5GMM-REGISTERED-INITIATED the de-registration procedure shall be aborted and the initial registration procedure shall be progressed.

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

h) Change of cell into a new tracking area.

If a cell change into a new tracking area occurs before the registration procedure for initial registration is completed, the registration procedure for initial registration shall be aborted and re-initiated immediately.

If the REGISTRATION COMPLETE message needs to be sent and a tracking area border is crossed when the REGISTRATION ACCEPT message has been received but before a REGISTRATION COMPLETE message is sent and:

1) if the new tracking area is in the TAI list, the UE sends the REGISTRATION COMPLETE message to the network; and

2) otherwise, the registration procedure for initial registration shall be aborted and the registration procedure for mobility registration update shall be initiated.

If a 5G-GUTI was allocated during the registration procedure, this 5G-GUTI shall be used in the registration procedure.

i) Transmission failure of REGISTRATION COMPLETE message indication with TAI change from lower layers.

1) If the current TAI is still part of the TAI list, the UE resends the REGISTRATION COMPLETE message to the network; and

2) otherwise, the registration procedure for initial registration shall be aborted and the registration procedure for mobility registration update shall be initiated.

j) Transmission failure of REGISTRATION COMPLETE message indication without TAI change from lower layers.

It is up to the UE implementation how to re-run the ongoing procedure.

k) Transmission failure of REGISTRATION REQUEST message indication from the lower layers.

The registration procedure for initial registration shall be aborted and re-initiated immediately.

l) Timer T3447 is running.

The UE shall not start the registration procedure for initial registration with Follow-on request indicator set to "Follow-on request pending" unless:

1) the UE is a UE configured for high priority access in selected PLMN; or

2) the UE needs to perform the registration procedure for initial registration for emergency services.

The UE stays in the current serving cell and applies the normal cell reselection process. The registration procedure for initial registration is started, if still necessary, when timer T3447 expires or timer T3447 is stopped.

For the cases c, d and e, the UE shall proceed as follows:

Timer T3510 shall be stopped if still running.

If the registration procedure is neither an initial registration for emergency services nor for establishing an emergency PDU session with registration type not set to "emergency registration", the registration attempt counter shall be incremented, unless it was already set to 5.

If the registration attempt counter is less than 5:

- if the initial registration request is not for emergency services, timer T3511 is started and the state is changed to 5GMM-DEREGISTERED.ATTEMPTING-REGISTRATION. When timer T3511 expires the registration procedure for initial registration shall be restarted, if still required.

If the registration attempt counter is equal to 5

- the UE shall delete 5G-GUTI, TAI list, last visited registered TAI, list of equivalent PLMNs (if any), and ngKSI, start timer T3502 and shall set the 5GS update status to 5U2 NOT UPDATED. The state is changed to 5GMM-DEREGISTERED.ATTEMPTING-REGISTRATION or optionally to 5GMM-DEREGISTERED.PLMN-SEARCH in order to perform a PLMN selection or SNPN selection according to 3GPP TS 23.122 [5].

- if the procedure is performed via 3GPP access and the UE is operating in single-registration mode:

- the UE shall in addition handle the EMM parameters EPS update status, EMM state, 4G-GUTI, TAI list, last visited registered TAI, list of equivalent PLMNs and eKSI as specified in 3GPP TS 24.301 [15] for the abnormal cases when an EPS attach procedure fails and the attach attempt counter is equal to 5; and

- the UE shall attempt to select E-UTRAN radio access technology and proceed with appropriate EMM specific procedures. Additionally, The UE may disable the N1 mode capability as specified in subclause 4.9.

*\*\*\* next change \*\*\**

##### 5.5.1.3.7 Abnormal cases in the UE

The following abnormal cases can be identified:

a) Timer T3346 is running.

The UE shall not start the registration procedure for mobility and periodic registration update unless:

1) the UE is in 5GMM-CONNECTED mode;

2) the UE received a paging;

3) the UE receives a NOTIFICATION message over non-3GPP access when the UE is in 5GMM-CONNECTED mode over non-3GPP access and in 5GMM-IDLE mode over 3GPP access;

4) the UE is a UE configured for high priority access in selected PLMN;

5) the UE has an emergency PDU session established or is establishing an emergency PDU session;

6) the UE receives a request from the upper layers to perform emergency services fallback;

7) the UE receives the CONFIGURATION UPDATE COMMAND message as specified in subclause 5.4.4.3; or

8) the UE in NB-N1 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 [17] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [22]); and

- timer T3346 was not started when N1 NAS signalling connection was established with RRC establishment cause set to "mo-ExceptionData".

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

NOTE 1: It is considered an abnormal case if the UE needs to initiate a registration procedure for mobility and periodic registration update while timer T3346 is running independent on whether timer T3346 was started due to an abnormal case or a non-successful case.

If the registration procedure for mobility and periodic registration update was initiated for an MO MMTEL voice call (i.e. access category 4), for an MO MMTEL video call (i.e. access category 5), for an MO IMS registration related signalling (i.e. access category 9) or for NAS signalling connection recovery during an ongoing MO MMTEL voice call (i.e. access category 4), or during an MO MMTEL video call (i.e. access category 5) or during an ongoing MO IMS registration related signalling (i.e. access category 9), then a notification that the procedure was not initiated due to network congestion shall be provided to upper layers.

b) The lower layers indicate that the access attempt is barred.

The UE shall not start the registration procedure for mobility and periodic registration update. The UE stays in the current serving cell and applies the normal cell reselection process. Receipt of the access barred indication shall not trigger the selection of a different core network type (EPC or 5GCN).

The registration procedure for mobility and periodic registration update is started, if still needed, when the lower layers indicate that the barring is alleviated for the access category with which the access attempt was associated.

ba) The lower layers indicate that:

- access barring is applicable for all access categories except categories 0 and 2 and the access category with which the access attempt was associated is other than 0 and 2; or

- access barring is applicable for all access categories except category 0 and the access category with which the access attempt was associated is other than 0.

If the REGISTRATION REQUEST message has not been sent, the UE shall proceed as specified for case b. If the REGISTRATION REQUEST message has been sent, the UE shall proceed as specified for case e and, additionally, the registration procedure for mobility and periodic registration update is started, if still needed, when the lower layers indicate that the barring is alleviated for the access category with which the access attempt was associated. For additional UE requirements for both cases see subclause 4.5.5.

c) T3510 timeout.

The UE shall abort the registration update procedure and the N1 NAS signalling connection, if any, shall be released locally.

If the UE has initiated the registration procedure in order to enable performing the service request procedure for emergency services fallback,the UE shall inform the upper layers of the failure of the emergency services fallback (see 3GP P TS 24.229 [14]). Otherwise, the UE shall proceed as described below.

d) REGISTRATION REJECT message, other 5GMM cause values than those treated in subclause 5.5.1.3.5, and cases of 5GMM cause values #11, #15, #22, #31, #72, #73, #74, #75, #76 and #77, if considered as abnormal cases according to subclause 5.5.1.3.5.

Upon reception of the 5GMM causes #95, #96, #97, #99 and #111 the UE should set the registration attempt counter to 5.

The UE shall proceed as described below.

e) Lower layer failure, release of the NAS signalling connection received from lower layers or the lower layers indicate that the RRC connection has been suspended without a cell change before the REGISTRATION ACCEPT or REGISTRATION REJECT message is received.

The UE shall abort the registration procedure and proceed as described below.

f) Change of cell into a new tracking area.

If a cell change into a new tracking area occurs before the registration procedure for mobility and periodic registration update is completed, the registration procedure for mobility and periodic registration update shall be aborted and re-initiated immediately. The UE shall set the 5GS update status to 5U2 NOT UPDATED.

g) Registration procedure for mobility and periodic registration update and de-registration procedure collision.

If the UE receives a DEREGISTRATION REQUEST message without 5GMM cause value #11, #12, #13 or #15 before the registration procedure for mobility and periodic registration update has been completed, the registration procedure for mobility and periodic registration update shall be aborted and the de-registration procedure shall be progressed.

If the UE receives a DEREGISTRATION REQUEST message with 5GMM cause value #11, #12, #13 or #15 before the registration procedure for mobility and periodic registration update has been completed, the registration procedure for mobility and periodic registration update shall be progressed and the de-registration procedure shall be aborted.

NOTE 2: The registration procedure for mobility and periodic registration update shall be aborted only if the DEREGISTRATION REQUEST message indicates in the access type that the access in which the registration procedure for mobility and periodic registration update was attempted shall be de-registered. Otherwise both the procedures shall be progressed.

h) Void

i) Transmission failure of REGISTRATION REQUEST message indication from the lower layers or the lower layers indicate that the RRC connection has been suspended with a cell change.

The registration procedure for mobility and periodic registration update shall be aborted and re-initiated immediately. The UE shall set the 5GS update status to 5U2 NOT UPDATED.

j) Transmission failure of REGISTRATION COMPLETE message indication with TAI change from lower layers.

If the current TAI is not in the TAI list, the registration procedure for mobility and periodic registration update shall be aborted and re-initiated immediately. The UE shall set the 5GS update status to 5U2 NOT UPDATED.

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

k) Transmission failure of REGISTRATION COMPLETE message indication without TAI change from lower layers.

It is up to the UE implementation how to re-run the ongoing procedure.

l) UE-initiated de-registration required.

De-registration due to removal of USIM or entry update in the "list of subscriber data" or due to switch off:

The registration procedure for mobility and periodic registration update shall be aborted, and the UE initiated de-registration procedure shall be performed.

De-registration not due to removal of USIM or entry update in the "list of subscriber data" and not due to switch off:

the UE initiated de-registration procedure shall be initiated after successful completion of the registration procedure for mobility and periodic registration update.

m) Timer T3447 is running

The UE shall not start any mobility and periodic registration update procedure with Uplink data status IE or Follow-on request indicator set to "Follow-on request pending" unless:

- the UE received a paging;

- the UE is a UE configured for high priority access in selected PLMN;

- the UE has an emergency PDU session established or is establishing an emergency PDU session; or

- the UE receives a request from the upper layers to perform emergency services fallback;

The UE stays in the current serving cell and applies the normal cell reselection process. The mobility and periodic registration update procedure is started, if still necessary, when timer T3447 expires or timer T3447 is stopped.

n) Timer T3448 is running

The UE in 5GMM-IDLE mode shall not start any mobility and periodic registration update procedure with Follow-on request indicator set to "Follow-on request pending" unless:

1) the UE is a UE configured for high priority access in selected PLMN;

2) the UE which is only using 5GS services with control plane CIoT 5GS optimization received a paging request; or

3) the UE in NB-N1 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 [17] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [22]).

The UE stays in the current serving cell and applies the normal cell reselection process. The mobility and periodic registration update procedure is started, if still necessary, when timer T3448 expires.

For the cases c, d and e the UE shall proceed as follows:

Timer T3510 shall be stopped if still running.

If the registration procedure is not for initiating an emergency PDU session, the registration attempt counter shall be incremented, unless it was already set to 5.

If the registration attempt counter is less than 5:

- if the TAI of the current serving cell is not included in the TAI list or the 5GS update status is different to 5U1 UPDATED or if the registration procedure was triggered due to cases c, g, n, v in subclause 5.5.1.3.2, the UE shall start timer T3511, shall set the 5GS update status to 5U2 NOT UPDATED and change to state 5GMM-REGISTERED.ATTEMPTING-REGISTRATION-UPDATE. When timer T3511 expires, the registration update procedure is triggered again.

- if the TAI of the current serving cell is included in the TAI list, the 5GS update status is equal to 5U1 UPDATED, and the UE is not performing the registration procedure after an inter-system change from S1 mode to N1 mode, the UE shall keep the 5GS update status to 5U1 UPDATED and enter state 5GMM-REGISTERED.NORMAL-SERVICE or 5GMM-REGISTERED.NON-ALLOWED-SERVICE (as described in subclause 5.3.5.2). The UE shall start timer T3511. If in addition the REGISTRATION REQUEST message did not include the MICO indication IE or the Extended DRX IE, and:

- the REGISTRATION REQUEST message indicated "periodic registration updating";

- the registration procedure was initiated to recover the NAS signalling connection due to "RRC Connection failure" from the lower layers; or

- the registration procedure was initiated by the UE in 5GMM-CONNECTED mode with RRC inactive indication entering a cell in the current registration area belonging to an equivalent PLMN of the registered PLMN and not belonging to the registered PLMN,

and none of the other reasons for initiating the registration updating procedure listed in subclause 5.5.1.3.2 was applicable, the timer T3511 may be stopped when the UE enters 5GMM-CONNECTED mode.

- if the TAI of the current serving cell is included in the TAI list, the 5GS update status is equal to 5U1 UPDATED and the UE is performing the registration procedure after an inter-system change from S1 mode to N1 mode, the UE shall change the 5GS update status to 5U2 NOT UPDATED and enter state 5GMM-REGISTERED.ATTEMPTING-REGISTRATION-UPDATE. The UE shall start timer T3511.

- If the procedure is performed via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition handle the EPS update status as specified in 3GPP TS 24.301 [15] for the abnormal cases when a normal or periodic tracking area updating procedure fails and the tracking area attempt counter is less than 5 and the EPS update status is different from EU1 UPDATED.

If the registration attempt counter is equal to 5

- the UE shall start timer T3502, shall set the 5GS update status to 5U2 NOT UPDATED.

- the UE shall delete the list of equivalent PLMNs (if any) and shall change to state 5GMM-REGISTERED.ATTEMPTING-REGISTRATION-UPDATE or optionally to 5GMM-REGISTERED.PLMN-SEARCH in order to perform a PLMN selection or SNPN selection according to 3GPP TS 23.122 [5].

- if the procedure is performed via 3GPP access and the UE is operating in single-registration mode:

- the UE shall in addition handle the EPS update status as specified in 3GPP TS 24.301 [15] for the abnormal cases when a normal or periodic tracking area updating procedure fails and the tracking area attempt counter is equal to 5; and

- if the UE does not change to state 5GMM-REGISTERED.PLMN-SEARCH, the UE shall attempt to select E-UTRAN radio access technology. The UE may disable the N1 mode capability as specified in subclause 4.9.

*\*\*\* next change \*\*\**

##### 5.5.2.2.6 Abnormal cases in the UE

The following abnormal cases can be identified:

a) Lower layer failure or release of the N1 NAS signalling connection before reception of DEREGISTRATION ACCEPT message.

The de-registration procedure shall be aborted and the UE proceeds as follows:

1) if the de-registration procedure was performed due to disabling of 5GS services, the UE shall enter the 5GMM-NULL state; or

2) if the de-registration type "normal de-registration" was requested for reasons other than disabling of 5GS services, the UE shall enter the 5GMM-DEREGISTERED state.

b) The lower layers indicate that the access attempt is barred.

The UE shall not start the de-registration signalling procedure. The UE stays in the current serving cell and applies the normal cell reselection process. Receipt of the access barred indication shall not trigger the selection of a different core network type (EPC or 5GCN).

The UE may perform a local de-registration either immediately or after an implementation-dependent time.

The de-registration signalling procedure is started, if still needed, when the lower layers indicate that the barring is alleviated for the access category with which the access attempt was associated.

ba) The lower layers indicate that:

- access barring is applicable for all access categories except categories 0 and 2 and the access category with which the access attempt was associated is other than 0 and 2; or

- access barring is applicable for all access categories except category 0 and the access category with which the access attempt was associated is other than 0.

If the DEREGISTRATION REQUEST message has not been sent, the UE shall proceed as specified for case b. If the DEREGISTRATION REQUEST message has been sent, the UE shall proceed as specified for case a.

c) T3521 timeout.

On the first four expiries of the timer, the UE shall retransmit the DEREGISTRATION REQUEST message and shall reset and restart timer T3521. On the fifth expiry of timer T3521, the de-registration procedure shall be aborted and the UE proceeds as follows:

1) if the de-registration procedure was performed due to disabling of 5GS services, the UE shall enter the 5GMM-NULL state; or

2) if the de-registration type "normal de-registration" was requested for reasons other than disabling of 5GS services, the UE shall enter the 5GMM-DEREGISTERED state.

d) De-registration procedure collision.

De-registration containing de-registration type "switch off":

- If the UE receives a DEREGISTRATION REQUEST message before the UE-initiated de-registration procedure has been completed, this message shall be ignored and the UE-initiated de-registration procedure shall continue.

Otherwise:

- If the UE receives a DEREGISTRATION REQUEST message before the UE-initiated de-registration procedure has been completed, it shall treat the message as specified in subclause 5.5.2.3.2 with the following modification:

- If the DEREGISTRATION REQUEST message received by the UE contains de-registration type "re-registration required", and the UE-initiated de-registration procedure is with de-registration type "normal de-registration", the UE need not initiate the registration procedure for initial registration.

e) De-registration and 5GMM common procedure collision.

De-registration containing de-registration type "switch off":

- If the UE receives a message used in a 5GMM common procedure before the de-registration procedure has been completed, this message shall be ignored and the de-registration procedure shall continue.

Otherwise:

- If the UE receives a message used in a 5GMM common procedure before the de-registration procedure has been completed, both the 5GMM common procedure and the de-registration procedure shall continue.

f) Change of cell into a new tracking area.

If a cell change into a new tracking area that is not in the stored TAI list occurs before the UE-initiated de-registration procedure is completed, the UE proceeds as follows:

1) if the de-registration procedure was initiated for reasons other than removal of the USIM and the UE is to be switched off, the de-registration procedure shall be aborted and re-initiated after successfully performing a registration procedure for mobility or periodic update used for mobility (i.e. the 5GS registration type IE set to "mobility registration updating" in the REGISTRATION REQUEST message); or

2) if the de-registration procedure was initiated due to removal of the USIM or the UE is to be switched off, the UE shall abort the de-registration procedure, perform a local de-registration and enter the state 5GMM-DEREGISTERED.

g) Transmission failure of DEREGISTRATION REQUEST message indication with TAI change from lower layers.

If the current TAI is not in the TAI list, the UE proceeds as follows:

1) if the de-registration procedure was initiated for reasons other than removal of the USIM and the UE is to be switched off, the de-registration procedure shall be aborted and re-initiated after successfully performing a registration procedure for mobility or periodic update; or

2) if the de-registration procedure was initiated due to removal of the USIM or the UE is to be switched off, the UE shall abort the de-registration procedure, perform a local de-registration and enter the state 5GMM-DEREGISTERED.

If the current TAI is still part of the TAI list, the UE shall restart the de-registration procedure.

h) Transmission failure of DEREGISTRATION REQUEST message indication without TAI change from lower layers.

The UE shall restart the de-registration procedure.

i) The lower layers indicate that the RRC connection has been suspended.

De-registration containing de-registration type "switch off":

- The UE may perform a local de-registration either immediately or after an implementation-dependent time.

Otherwise:

- The UE shall wait for an implementation-dependent time and shall restart the de-registration procedure, if still needed, upon expiration of the implementation-dependent time.

For the cases a, f, g and i:

- Timer T3521 shall be stopped if still running.

*\*\*\* next change \*\*\**

#### 5.6.1.7 Abnormal cases in the UE

The following abnormal cases can be identified:

a) T3517 expired.

The UE shall enter the state 5GMM-REGISTERED.

If the UE triggered the service request procedure in 5GMM-IDLE mode sending a:

1) SERVICE REQUEST message and the service type of the SERVICE REQUEST message was not set to "emergency services fallback"; or

2) CONTROL PLANE SERVICE REQUEST message and the control plane service type of the CONTROL PLANE SERVICE REQUEST message was not set to "emergency services fallback";

then the 5GMM 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 attempt counter shall not be incremented, if:

1) the service request procedure is initiated to establish an emergency PDU session;

2) the UE has an emergency PDU session established;

3) the UE is a UE configured for high priority access in selected PLMN;

4) the service request procedure is initiated in response to paging or notification from the network; or

5) the UE in NB-N1 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 [17] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [22]).

If the service request attempt counter is greater than or equal to 5, the UE shall start timer T3525. Additionally, if the service request procedure was initiated for an MO MMTEL voice call or for an MO MMTEL video call or for an MO IMS registration related signalling, a notification that the service request was not initiated due to the UE having started timer T3525 shall be provided to the upper layers.

NOTE 1: This can result in the upper layers requesting implementation specific mechanisms, e.g. the MMTEL voice call being attempted to another IP-CAN, or establishment of a CS voice call (if supported and not already attempted in the CS domain).

The UE shall not attempt service request until expiry of timer T3525 unless:

1) the service request procedure is initiated in response to paging or notification from the network;

2) the UE is a UE configured for high priority access in selected PLMN;

3) the service request procedure is initiated to establish an emergency PDU session;

4) the UE has an emergency PDU session established;

5) the service request procedure is initiated for emergency services fallback;

6) the UE is registered in a new PLMN; or

NOTE 2: According to Table 10.2.1, when "UE camped on a new PLMN other than the PLMN on which timer started", timer T3525 is stopped, hence this check may be skipped.

7) the UE in NB-N1 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 [17] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [22]).

NOTE 3: The NAS signalling connection can also be released if the UE deems that the network has failed the authentication check as specified in subclause 5.4.1.3.7.

If the UE triggered the service request procedure in 5GMM-CONNECTED mode sending a:

1) SERVICE REQUEST message and the service type of the SERVICE REQUEST message was not set to "emergency services fallback"; or

2) CONTROL PLANE SERVICE REQUEST message and the control plane service type of the CONTROL PLANE SERVICE REQUEST message was not set to "emergency services fallback",

the 5GMM sublayer shall abort the procedure, and stay in 5GMM-CONNECTED mode.

If the service type of the SERVICE REQUEST message was set to "emergency services fallback" or the control plane service type of the CONTROL PLANE SERVICE REQUEST message was set to "emergency services fallback" and:

1) the service request procedure was triggered in 5GMM-IDLE mode, the 5GMM sublayer shall abort the procedure, release locally any resources allocated for the service request procedure; or

2) the service request procedure was triggered in 5GMM-CONNECTED mode, the 5GMM sublayer shall abort the procedure, stay in 5GMM-CONNECTED mode.

b) The lower layers indicate that the access attempt is barred.

The UE shall not start the service request procedure. The UE stays in the current serving cell and applies the normal cell reselection process. Receipt of the access barred indication shall not trigger the selection of a different core network type (EPC or 5GCN).

The service request procedure is started, if still needed, when the lower layers indicate that the barring is alleviated for the access category with which the access attempt was associated.

ba) The lower layers indicate that:

- access barring is applicable for all access categories except categories 0 and 2 and the access category with which the access attempt was associated is other than 0 and 2; or

- access barring is applicable for all access categories except category 0 and the access category with which the access attempt was associated is other than 0.

If the SERVICE REQUEST message or CONTROL PLANE SERVICE REQUEST has not been sent, the UE shall proceed as specified for case b.

If the SERVICE REQUEST message or CONTROL PLANE SERVICE REQUEST has been sent:

1) the UE shall abort the service request procedure and stop timer T3517. The UE stays in the current serving cell and applies the normal cell reselection process; and

2) the service request procedure is started, if still needed, when the lower layers indicate that the barring is alleviated for the access category with which the access attempt was associated.

For additional UE requirements for both cases see subclause 4.5.5.

c) Timer T3346 is running.

The UE shall not start the service request procedure unless:

1) the UE receives a paging;

2) the UE receives a NOTIFICATION message over non-3GPP access when the UE is in 5GMM-CONNECTED mode over non-3GPP access and in 5GMM-IDLE mode over 3GPP access;

3) the UE receives a NOTIFICATION message over 3GPP access when the UE is in 5GMM-CONNECTED mode over 3GPP access and in 5GMM-IDLE mode over non-3GPP access;

4) the UE is a UE configured for high priority access in selected PLMN;

5) the UE has an emergency PDU session established or is establishing an emergency PDU session;

6) the service request procedure is initiated for emergency services fallback;

7) the service request procedure is initiated for elevated signalling; or

8) the UE in NB-N1 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 [17] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [22]); and

- timer T3346 was not started when N1 NAS signalling connection was established with RRC establishment cause set to "mo-ExceptionData".

If the UE is in 5GMM-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.

If the service request procedure was triggered for an MO MMTEL voice call (i.e. access category 4), or for an MO MMTEL video call (i.e. access category 5) or for an MO IMS registration related signalling (i.e. access category 9), a notification that the service request procedure was not initiated due to congestion shall be provided to the upper layers.

If the UE receives a paging with access type set to "Non-3GPP access" and the non-3GPP access is available and UE is in 5GMM-REGISTERED.NORMAL SERVICE over non-3GPP access, the UE shall stop timer T3346 and send the SERVICE REQUEST message over non-3GPP access.

d) Registration procedure for mobility and periodic registration update is triggered.

The UE shall abort the service request procedure, stop timer T3517, if running and perform the registration procedure for mobility and periodic registration update. The Follow-on request indicator shall be set to "Follow-on request pending" in the REGISTRATION REQUEST message.

e) Switch off.

If the UE is in state 5GMM-SERVICE-REQUEST-INITIATED at switch off, the de-registration procedure shall be performed.

f) De-registration procedure collision.

If the UE receives a DEREGISTRATION REQUEST message from the network in state 5GMM-SERVICE-REQUEST-INITIATED, the UE shall progress the DEREGISTRATION REQUEST message and the service request procedure shall be aborted.

NOTE 4: The above collision case is valid if the DEREGISTRATION REQUEST message indicates the access type over which the service request procedure is attempted otherwise both the procedures are progressed.

g) Transmission failure of SERVICE REQUEST or CONTROL PLANE SERVICE REQUEST message indication with TAI change from lower layers.

If the current TAI is not in the TAI list, UE shall abort the service request procedure to perform the registration procedure for mobility and periodic registration update as specified in subclause 5.5.1.3.2. If the current TAI is part of the TAI list, the UE shall restart the service request procedure.

h) Transmission failure of SERVICE REQUEST or CONTROL PLANE SERVICE REQUEST message indication without TAI change from lower layers.

The UE shall restart the service request procedure.

i) SERVICE REJECT message received with other 5GMM cause values than those treated in subclause 5.6.1.5, and cases of 5GMM cause values #11, #15, #22, #31, #72, #73, #74, #75, #76 and #77 that are considered as abnormal cases according to subclause 5.6.1.5.

The UE shall enter state 5GMM-REGISTERED.

The UE shall abort the service request procedure, stop timer T3517 and locally release any resources allocated for the service request procedure.

j) The UE in 5GMM-CONNECTED mode with RRC inactive indication over the 3GPP access, and in 5GMM-CONNECTED mode over non-3GPP access, receives a NOTIFICATION message over the non-3GPP access with access type indicating 3GPP access.

The UE shall transition from 5GMM-CONNECTED mode with RRC inactive indication to 5GMM-IDLE mode over 3GPP access and initiate the service request procedure over the 3GPP access.

k) Timer T3447 is running

The UE shall not start any service request procedure unless:

1) the UE in 5GMM-IDLE receives a paging request;

2) the UE is a UE configured for high priority access;

3) the UE has a PDU session for emergency services established or is establishing a PDU session for emergency services;

4) the service request procedure is initiated for emergency services fallback;

5) the UE in 5GMM-CONNECTED mode receives mobile terminated signalling or downlink data over the user-plane; or

6) the service request procedure is initiated for elevated signalling.

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 or timer T3447 is stopped.

l) Lower layer failure, release of the N1 signalling connection received from lower layers or the lower layers indicate that the RRC connection has been suspended before the service request procedure is completed or SERVICE REJECT message is received.

The UE shall abort the service request procedure, stop timer T3517, locally release any resources allocated for the service request procedure and enters state 5GMM-REGISTERED.

m) Timer T3448 is running

The UE in 5GMM-IDLE mode shall not initiate the service request procedure for transport of user data via the control plane unless:

1) the UE is a UE configured for high priority access in selected PLMN;

2) the UE which is only using 5GS services with control plane CIoT 5GS optimization received a paging request;

3) the UE in NB-N1 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 [17] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [22]); or

4) the UE is initiating the service request procedure to request emergency services or emergency services fallback.

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 T3448 expires.

*\*\*\* last change \*\*\**