**3GPP TSG-CT WG1 Meeting #133-eC1-21xxxx**

**E-meeting, 11-19 November 2021 (was C1-216557, C1-215666, C1-214339)**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **24.501** | **CR** | **3431** | **rev** | **2** | **Current version:** | **17.4.1** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Title:***  | Validity of cause code #78 |
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| ***Source to WG:*** | Apple, Ericsson, Oppo |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5GSAT\_ARCH-CT |  | ***Date:*** | 2021-11-15 |
|  |  |  |  |  |
| ***Category:*** | **B**  |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)...Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | With this CR the missing definition for the validity of the cause code #78 is introduced. |
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| ***Summary of change:*** | It is proposed to introduce a list of "PLMNs not allowed to operate at the present UE location" where each entry consists of the PLMN ID, the geographical location where the reject cause #78 was received and a corresponding back-off timer T3578 instance. This list is checked during PLMN selection in order to decide whether a PLMN on satellite NG-RAN access technology shall not be considered as candidate for PLMN selection and whether a LR attempt is allowed, as defined in TS 23.122. |
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| ***Consequences if not approved:*** | Missing conditions how to exclude PLMNs on satellite NG-RAN access technology for which cause #78 was received at specific locations. |
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| ***Clauses affected:*** | 2, 3.1, 4.23.3, 5.3.x, 5.5.1.2.5, 5.5.1.3.5, 5.5.2.3.2, 5.6.1.5, 8.2.9.1, 9.11.3.xx |
|  |  |
|  | **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 \*\*\**

###

Void

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

### 5.3.x List of "PLMNs not allowed to operate at the present UE location"

For 3GPP access in N1 mode the UE shall store a list of "PLMNs not allowed to operate at the present UE location". Each entry consists of:

a) the PLMN ID of the PLMN which sent a message including 5GMM cause value #78 "PLMN not allowed to operate at the present UE location" via satellite NG-RAN access technology;

b) the geographical location where 5GMM cause value #78 was received on satellite NG-RAN access technology, if known by the UE; and

c) a corresponding back-off timer T3578 instance. The timer value for timer T3578 is UE implementation specific with a minimum value as indicated by the network in the Access re-attempt restriction IE, if any, otherwise the minimum value is UE implementation specific.

The UE shall not attempt to access a PLMN via satellite NG-RAN access technology which is part of the list of "PLMNs not allowed to operate at the present UE location" if any of the following conditions are met:

1) the current UE location is known and for any entry of this PLMN, for which a location is stored, the distance to the current UE location is smaller than a UE implementation specific value which has a minimum value as indicated by the network in the Access re-attempt restriction IE, if any, otherwise the minimum value is UE implementation specific;

2) the current UE location is known and there is any entry of this PLMN, for which no location is stored and the corresponding back-off timer instance T3578 is running; or

3) the current UE location is unknown and the back-off timer instance T3578 for any of the list entries for this PLMN is running.

The list shall accommodate three or more entries. When the list is full and a new entry has to be inserted, the oldest entry shall be deleted.

Each list entry shall be removed if any of the following occurs for the entry:

a) the UE successfully registers to the PLMN stored in the entry, the current UE location is known, and the distance between the geographical location stored in the entry and the current UE location is smaller than a UE implementation specific value with a minimum distance as indicated by the network in the Access re-attempt restriction IE, if any, otherwise the minimum value is UE implementation specific. For this case the UE shall stop the corresponding back-off timer T3578 instance; or

NOTE: This can occur, e.g. as result of a manual PLMN selection.

b) the list entry does not include a geographical location and the corresponding back-off timer T3578 instance associated with the entry expires,

or periodically, with a period between 18 and 30 hours.

When the UE is switched off, the UE shall keep the list of "PLMNs not allowed to operate at the present UE location" in its non-volatile memory. The UE shall delete the list of "PLMNs not allowed to operate at the present UE location" if the USIM is removed.

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

##### 5.5.1.2.5 Initial registration not accepted by the network

If the initial registration request cannot be accepted by the network, the AMF shall send a REGISTRATION REJECT message to the UE including an appropriate 5GMM cause value.

If the initial registration request is rejected due to general NAS level mobility management congestion control, the network shall set the 5GMM cause value to #22 "congestion" and assign a value for back-off timer T3346.

In NB-N1 mode, if the registration request is rejected due to operator determined barring (see 3GPP TS 29.503 [20AB]), the network shall set the 5GMM cause value to #22 "congestion" and assign a value for back-off timer T3346.

If the REGISTRATION REJECT message with 5GMM cause #76 or #78 was received without integrity protection, then the UE shall discard the message. If the REGISTRATION REJECT message with 5GMM cause #62 was received without integrity protected, the behaviour of the UE is specified in subclause 5.3.20.2.

Based on operator policy, if the initial registration request is rejected due to core network redirection for CIoT optimizations, the network shall set the 5GMM cause value to #31 "Redirection to EPC required".

NOTE 1: The network can take into account the UE's S1 mode capability, the EPS CIoT network behaviour supported by the UE or the EPS CIoT network behaviour supported by the EPC to determine the rejection with the 5GMM cause value #31 "Redirection to EPC required".

If the initial registration request is rejected because:

a) all the S-NSSAI(s) included in the requested NSSAI are either rejected for the current PLMN, rejected for the current registration area, rejected for the failed or revoked NSSAA, or rejected for the maximum number of UEs reached; and

b) the UE set the NSSAA bit in the 5GMM capability IE to:

1) "Network slice-specific authentication and authorization supported" and:

i) there are no subscribed S-NSSAIs marked as default;

ii) all subscribed S-NSSAIs marked as default are not allowed; or

iii) network slice-specific authentication and authorization has failed or been revoked for all subscribed S-NSSAIs marked as default and based on network local policy, the network decides not to initiate the network slice-specific re-authentication and re-authorization procedures for any subscribed S-NSSAI marked as default requested by the UE; or

2) "Network slice-specific authentication and authorization not supported"; and

i) there are no subscribed S-NSSAIs which are marked as default; or

ii) all subscribed S-NSSAIs marked as default are either not allowed or are subject to network slice-specific authentication and authorization;

the network shall set the 5GMM cause value to #62 "No network slices available" and shall include the rejected S-NSSAI(s) in the rejected NSSAI of the REGISTRATION REJECT message. Otherwise, the network may include the rejected S-NSSAI(s) in the rejected NSSAI of the REGISTRATION REJECT message.

If the UE has set the ER-NSSAI bit to "Extended rejected NSSAI supported" in the 5GMM capability IE of the REGISTRATION REQUEST message, the rejected S-NSSAI(s) shall be included in the Extended rejected NSSAI IE of the REGISTRATION REJECT message. Otherwise the rejected S-NSSAI(s) shall be included in the Rejected NSSAI IE of the REGISTRATION REJECT message.

If the UE supports extended rejected NSSAI and the AMF determines that maximum number of UEs reached for all S-NSSAIs in the requested NSSAI as specified in subclause 4.6.2.5, the AMF shall include the rejected NSSAI containing one or more S-NSSAIs with the rejection cause "S-NSSAI not available due to maximum number of UEs reached" in the Extended rejected NSSAI IE in the REGISTRATION REJECT message. In addition, the AMF may include a back-off timer value for each S-NSSAI with the rejection cause "S-NSSAI not available due to maximum number of UEs reached" in the Extended rejected NSSAI IE of the REGISTRATION REJECT message.

If the AMF receives the initial registration request along with the authenticated indication over N2 reference point on non-3GPP access and does not receive the indication that authentication by the home network is not required over N12 reference point, the network shall set the 5GMM cause value to #72 "Non-3GPP access to 5GCN not allowed".

If the initial registration request from a UE supporting CAG is rejected due to CAG restrictions, the network shall set the 5GMM cause value to #76 "Not authorized for this CAG or authorized for CAG cells only" and should include the "CAG information list" in the CAG information list IE in the REGISTRATION REJECT message.

NOTE 2: The network cannot be certain that "CAG information list" stored in the UE is updated as result of sending of the REGISTRATION REJECT message with the CAG information list IE, as the REGISTRATION REJECT message is not necessarily delivered to the UE (e.g. due to abnormal radio conditions).

NOTE 3: The "CAG information list" can be provided by the AMF and include no entry if no "CAG information list" exists in the subscription.

If the initial registration request from a UE not supporting CAG is rejected due to CAG restrictions, the network shall operate as described in bullet j) of subclause 5.5.1.2.8.

If the UE's initial registration request is via a satellite NG-RAN cell and the network using the User Location Information provided by the NG-RAN, see 3GPP TS 38.413 [31], is able to determine that the UE is in a location where the network is not allowed to operate, the network shall set the 5GMM cause value in the REGISTRATION REJECT message to #78 "PLMN not allowed to operate at the present UE location" and may include an information element in the REGISTRATION REJECT message to indicate the country of the UE location.

Editor's note: [5GSAT\_ARCH-CT, CR#3217]. The name and the encoding of the information element providing the country of the UE location is FFS

If the AMF receives the initial registration request including the Service-level device ID set to the CAA-level UAV ID in the Service-level-AA container IE and the AMF determines that the UE is not allowed to use UAS services via 5GS based on the user's subscription data and the operator policy, the AMF shall return a REGISTRATION REJECT message with 5GMM cause #79 (UAS services not allowed).

The UE shall take the following actions depending on the 5GMM cause value received in the REGISTRATION REJECT message.

#3 (Illegal UE); or

#6 (Illegal ME).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI.

 In case of PLMN, the UE shall consider the USIM as invalid for 5GS services until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.1;

 In case of SNPN, if the UE does not support access to an SNPN using credentials from a credentials holder, the UE shall consider the entry of the "list of subscriber data" with the SNPN identity of the current SNPN as invalid until the UE is switched off, the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. In case of SNPN, if the UE supports access to an SNPN using credentials from a credentials holder, the UE shall consider the selected entry of the "list of subscriber data" as invalid for 3GPP access until the UE is switched off, the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. Additionally, if EAP based primary authentication and key agreement procedure using EAP-AKA' or 5G AKA based primary authentication and key agreement procedure was performed in the current SNPN, the UE shall consider the USIM as invalid for the current SNPN until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.2.

 The UE shall delete the list of equivalent PLMNs (if any) and enter the state 5GMM-DEREGISTERED.NO-SUPI. If the message has been successfully integrity checked by the NAS, then the UE shall:

1) set the counter for "SIM/USIM considered invalid for GPRS services" events and the counter for "USIM considered invalid for 5GS services over non-3GPP access" events in case of PLMN if the UE maintains these counters; or

2) set the counter for "the entry for the current SNPN considered invalid for 3GPP access" events and the counter for "the entry for the current SNPN considered invalid for non-3GPP access" events in case of SNPN if the UE maintains these counters;

 to a UE implementation-specific maximum value.

3) delete the 5GMM parameters stored in non-volatile memory of the ME as specified in annex C.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list and eKSI as specified in 3GPP TS 24.301 [15] for the case when the EPS attach request procedure is rejected with the EMM cause with the same value. The USIM shall be considered as invalid also for non-EPS services until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.7a in 3GPP TS 24.301 [15]. 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 a UE implementation-specific maximum value.

 If the message has been successfully integrity checked by the NAS and the UE also supports the registration procedure over the other access, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

#7 (5GS services not allowed).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI.

 In case of PLMN, the UE shall consider the USIM as invalid for 5GS services until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.1;

 In case of SNPN, if the UE does not support access to an SNPN using credentials from a credentials holder, the UE shall consider the entry of the "list of subscriber data" with the SNPN identity of the current SNPN as invalid for 5GS services until the UE is switched off, the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. In case of SNPN, if the UE supports access to an SNPN using credentials from a credentials holder, the UE shall consider the selected entry of the "list of subscriber data" as invalid for 3GPP access until the UE is switched off, the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. Additionally, if EAP based primary authentication and key agreement procedure using EAP-AKA' or 5G AKA based primary authentication and key agreement procedure was performed in the current SNPN, the UE shall consider the USIM as invalid for the current SNPN until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.2.

 The UE shall enter the state 5GMM-DEREGISTERED.NO-SUPI. If the message has been successfully integrity checked by the NAS, then the UE shall:

1) set the counter for "SIM/USIM considered invalid for GPRS services" events and the counter for "USIM considered invalid for 5GS services over non-3GPP access" events in case of PLMN if the UE maintains these counters; or

2) set the counter for "the entry for the current SNPN considered invalid for 3GPP access" events and the counter for "the entry for the current SNPN considered invalid for non-3GPP access" events in case of SNPN if the UE maintains these counters;

 to a UE implementation-specific maximum value.

3) delete the 5GMM parameters stored in non-volatile memory of the ME as specified in annex C.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list and eKSI as specified in 3GPP TS 24.301 [15] for the case when the EPS attach request procedure is rejected with the EMM cause with the same value.

 If the message has been successfully integrity checked by the NAS and the UE also supports the registration procedure over the other access, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

#11 (PLMN not allowed).

 This cause value received from a cell belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.2.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall delete the list of equivalent PLMNs and reset the registration attempt counter and store the PLMN identity in the forbidden PLMN list as specified in subclause 5.3.13A and if the UE is configured to use timer T3245 then the UE shall start timer T3245 and proceed as described in clause 5.3.19a.1. For 3GPP access the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform a PLMN selection according to 3GPP TS 23.122 [5], and for non-3GPP access the UE shall enter state 5GMM-DEREGISTERED.LIMITED-SERVICE and perform network selection as defined in 3GPP TS 24.502 [18]. If the message has been successfully integrity checked by the NAS and the UE mantains the PLMN-specific attempt counter and the PLMN-specific attempt counter for non-3GPP access for that PLMN, the UE shall set the PLMN-specific attempt counter and the PLMN-specific attempt counter for non-3GPP access for that PLMN to the UE implementation-specific maximum value.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list, eKSI and attach attempt counter as specified in 3GPP TS 24.301 [15] for the case when the EPS attach request procedure is rejected with the EMM cause with the same value.

 If the message has been successfully integrity checked by the NAS and the UE also supports the registration procedure over the other access to the same PLMN, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

#12 (Tracking area not allowed).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI. Additionally, the UE shall reset the registration attempt counter.

 If:

1) the UE is not operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for regional provision of service" and enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE. If the REGISTRATION REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "5GS forbidden tracking areas for regional provision of service" for non-integrity protected NAS reject message; or

2) the UE is operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for regional provision of service" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, and enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE. If the REGISTRATION REJECT is not integrity protected, the UE shall memorize the current TAI was stored in the list of "5GS forbidden tracking areas for regional provision of service" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, for non-integrity protected NAS reject message.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list, eKSI and attach attempt counter as specified in 3GPP TS 24.301 [15] for the case when the EPS attach request procedure is rejected with the EMM cause with the same value.

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

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI. Additionally, the UE shall delete the list of equivalent PLMNs (if available) and reset the registration attempt counter.

 If:

1) the UE is not operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" and enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE or optionally 5GMM-DEREGISTERED.PLMN-SEARCH. If the REGISTRATION REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "5GS forbidden tracking areas for roaming" for non-integrity protected NAS reject message; or

2) the UE is operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, and enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE or optionally 5GMM-DEREGISTERED.PLMN-SEARCH. If the REGISTRATION REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "5GS forbidden tracking areas for roaming" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, for non-integrity protected NAS reject message.

 For 3GPP access, if the UE is registered in S1 mode and operating in dual-registration mode, the PLMN that the UE chooses to register in is specified in subclause 4.8.3. Otherwise the UE shall perform a PLMN selection or SNPN selection according to 3GPP TS 23.122 [5].

 For non-3GPP access, the UE shall perform network selection as defined in 3GPP TS 24.502 [18].

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list, eKSI and attach attempt counter as specified in 3GPP TS 24.301 [15] for the case when the EPS attach request procedure is rejected with the EMM cause with the same value.

#15 (No suitable cells in tracking area).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. Additionally, the UE shall reset the registration attempt counter.

 If:

1) the UE is not operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" and enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE. If the REGISTRATION REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "5GS forbidden tracking areas for roaming" for non-integrity protected NAS reject message; or

2) the UE is operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, and enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE. If the REGISTRATION REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "5GS forbidden tracking areas for roaming" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, for non-integrity protected NAS reject message.

 The UE shall search for a suitable cell in another tracking area according to 3GPP TS 38.304 [28] or 3GPP TS 36.304 [25C].

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list, eKSI and attach attempt counter as specified in 3GPP TS 24.301 [15] for the case when the EPS attach request procedure is rejected with the EMM cause with the same value.

 If received over non-3GPP access the cause shall be considered as an abnormal case and the behaviour of the UE for this case is specified in subclause 5.5.1.2.7.

#22 (Congestion).

 If the T3346 value IE is present in the REGISTRATION 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 5.5.1.2.7.

 The UE shall abort the initial registration procedure, set the 5GS update status to 5U2 NOT UPDATED, reset the registration attempt counter and enter state 5GMM-DEREGISTERED.ATTEMPTING-REGISTRATION.

 The UE shall stop timer T3346 if it is running.

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

 If the REGISTRATION 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 [12].

 The UE stays in the current serving cell and applies the normal cell reselection process. The initial registration procedure is started if still needed when timer T3346 expires or is stopped.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, and attach attempt counter as specified in 3GPP TS 24.301 [15] for the case when the EPS attach request procedure is rejected with the EMM cause with the same value.

#27 (N1 mode not allowed).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. Additionally, the UE shall reset the registration attempt counter and shall enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE. If the message has been successfully integrity checked by the NAS, the UE shall set:

1) the PLMN-specific N1 mode attempt counter for 3GPP access and the PLMN-specific N1 mode attempt counter for non-3GPP access for that PLMN in case of PLMN; or

2) the SNPN-specific attempt counter for 3GPP access for the current SNPN in case of SNPN and the SNPN-specific attempt counter for non-3GPP access for the current SNPN;

 to the UE implementation-specific maximum value.

 The UE shall disable the N1 mode capability for the specific access type for which the message was received (see subclause 4.9).

 If the message has been successfully integrity checked by the NAS, the UE shall disable the N1 mode capability also for the other access type (see subclause 4.9).

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition set the EPS update status to EU3 ROAMING NOT ALLOWED and shall delete any 4G-GUTI, last visited registered TAI, TAI list and eKSI. Additionally, the UE shall reset the attach attempt counter and enter the state EMM-DEREGISTERED.

#31 (Redirection to EPC required).

 5GMM cause #31 received by a UE that has not indicated support for CIoT optimizations or not indicated support for S1 mode or received by a UE over non-3GPP access is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.2.7.

 This cause value received from a cell belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.2.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. Additionally, the UE shall reset the registration attempt counter.

 The UE shall enable the E-UTRA capability if it was disabled, disable the N1 mode capability for 3GPP access (see subclause 4.9.2) and enter the 5GMM-DEREGISTERED.NO-CELL-AVAILABLE.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, TAI list, eKSI and attach attempt counter as specified in 3GPP TS 24.301 [15] for the case when the EPS attach procedure is rejected with the EMM cause with the same value.

#62 (No network slices available).

 The UE shall abort the initial registration procedure, set the 5GS update status to 5U2 NOT UPDATED and enter state 5GMM-DEREGISTERED.NORMAL-SERVICE or 5GMM-DEREGISTERED.PLMN-SEARCH. Additionally, the UE shall reset the registration attempt counter.

 The UE receiving the rejected NSSAI in the REGISTRATION REJECT message takes the following actions based on the rejection cause in the rejected S-NSSAI(s):

 "S-NSSAI not available in the current PLMN or SNPN"

 The UE shall store the rejected S-NSSAI(s) in the rejected NSSAI for the current PLMN or SNPN as specified in subclause 4.6.2.2 and shall not attempt to use this S-NSSAI(s) in the current PLMN or SNPN until switching off the UE, the UICC containing the USIM is removed, an entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated, or the rejected S-NSSAI(s) are removed or deleted as described in subclause 4.6.2.2.

 "S-NSSAI not available in the current registration area"

 The UE shall store the rejected S-NSSAI(s) in the rejected NSSAI for the current registration area as described in subclause 4.6.2.2 and shall not attempt to use this S-NSSAI(s) in the current registration area until switching off the UE, the UE moving out of the current registration area, the UICC containing the USIM is removed, the entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated, or the rejected S-NSSAI(s) are removed or deleted as described in subclause 4.6.2.2.

 "S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization"

 The UE shall store the rejected S-NSSAI(s) in the rejected NSSAI for the failed or revoked NSSAA as specified in subclause 4.6.2.2 and shall not attempt to use this S-NSSAI in the current PLMN over any access until switching off the UE, the UICC containing the USIM is removed, the entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated, or the rejected S-NSSAI(s) are removed or deleted as described in subclause 4.6.1 and 4.6.2.2.

 "S-NSSAI not available due to maximum number of UEs reached"

 The UE shall add the rejected S-NSSAI(s) in the rejected NSSAI for the maximum number of UEs reached as specified in subclause 4.6.2.2 and shall not attempt to use this S-NSSAI in the current PLMN over the current access until switching off the UE, the UICC containing the USIM is removed, the entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated, or the rejected S-NSSAI(s) are removed as described in subclause 4.6.2.2.

Editor's note [WI: eNS-Ph2, CR#3417]: Whether "S-NSSAI not available due to maximum number of UEs reached" is applicable in an SNPN is FFS.

 If there is one or more S-NSSAIs in the rejected NSSAI with the rejection cause "S-NSSAI not available due to maximum number of UEs reached", then the UE shall for each S-NSSAI behave as follows:

a) stop the timer T3526 associated with the S-NSSAI, if running; and

b) start the timer T3526 with:

1) the back-off timer value received along with the S-NSSAI, if a back-off timer value is received along with the S-NSSAI that is neither zero nor deactivated; or

2) an implementation specific back-off timer value, if no back-off timer value is received along with the S-NSSAI; and

c) remove the S-NSSAI from the rejected NSSAI for the maximum number of UEs reached when the timer T3526 associated with the S-NSSAI expires.

 If the UE has an allowed NSSAI or configured NSSAI that contains S-NSSAI(s) which are not included in the rejected NSSAI the UE may stay in the current serving cell, apply the normal cell reselection process and start an initial registration with a requested NSSAI that includes any S-NSSAI from the allowed NSSAI or the configured NSSAI that is not in the rejected NSSAI. Otherwise the UE may perform a PLMN selection or SNPN selection according to 3GPP TS 23.122 [5] and additionally, the UE may disable the N1 mode capability for the current PLMN or SNPN if the UE does not have an allowed NSSAI and each S-NSSAI in configured NSSAI, if available, was rejected with cause "S-NSSAI not available in the current PLMN or SNPN" or "S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization" as described in subclause 4.9.

 If the UE has neither allowed NSSAI for the current PLMN or SNPN nor configured NSSAI for the current PLMN and has a default configured NSSAI containing one or more S-NSSAIs that are not included in the rejected NSSAI,

1) the UE may stay in the current serving cell, apply the normal cell reselection process, and start an initial registration with a requested NSSAI with that default configured NSSAI; or

2) if all the S-NSSAI(s) in the default configured NSSAI are rejected and at least one S-NSSAI is rejected due to "S-NSSAI not available in the current registration area",

i) if the REGISTRATION REJECT message is integrity protected and the UE is not operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" and enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE; or

ii) if the REGISTRATION REJECT message is integrity protected and the UE is operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" for the current SNPN and enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE.

 Otherwise, the UE may perform a PLMN selection or SNPN selection according to 3GPP TS 23.122 [5] and additionally, the UE may disable the N1 mode capability for the current PLMN or SNPN if each S-NSSAI in the default configured NSSAI was rejected with cause "S-NSSAI not available in the current PLMN or SNPN" or "S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization" as described in subclause 4.9.

 If the UE has neither allowed NSSAI for the current PLMN or SNPN nor configured NSSAI for the current PLMN and has rejected NSSAI for the reached maximum number of UEs, and the UE wants to obtain services in the current serving cell without performing a PLMN selection or SNPN selection, the UE may stay in the current serving cell and attempt to use the rejected S-NSSAI(s) for the maximum number of UEs reached in the current serving cell after the rejected S-NSSAI(s) are removed as described in subclause 4.6.2.2.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition set the EPS update status to EU2 NOT UPDATED, reset the attach attempt counter and enter the state EMM-DEREGISTERED.

#72 (Non-3GPP access to 5GCN not allowed).

 When received over non-3GPP access the UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI. Additionally, the UE shall reset the registration attempt counter and enter the state 5GMM-DEREGISTERED. If the message has been successfully integrity checked by the NAS, the UE shall set:

1) the PLMN-specific N1 mode attempt counter for non-3GPP access for that PLMN in case of PLMN: or

2) the SNPN-specific attempt counter for non-3GPP access for that SNPN in case of SNPN;

 to the UE implementation-specific maximum value.

NOTE 4: The 5GMM sublayer states, the 5GMM parameters and the registration status are managed per access type independently, i.e. 3GPP access or non-3GPP access (see subclauses 4.7.2 and 5.1.3).

 The UE shall disable the N1 mode capability for non-3GPP access (see subclause 4.9.3).

 As an implementation option, the UE may enter the state 5GMM-DEREGISTERED.PLMN-SEARCH in order to perform a PLMN selection according to 3GPP TS 23.122 [5].

 If received over 3GPP access the cause shall be considered as an abnormal case and the behaviour of the UE for this case is specified in subclause 5.5.1.2.7.

#73 (Serving network not authorized).

 This cause value received from a cell belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.2.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall delete the list of equivalent PLMNs, reset the registration attempt counter, store the PLMN identity in the forbidden PLMN list as specified in subclause 5.3.13A. For 3GPP access the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH in order to perform a PLMN selection according to 3GPP TS 23.122 [5], and for non-3GPP access the UE shall enter state 5GMM-DEREGISTERED.LIMITED-SERVICE and perform network selection as defined in 3GPP TS 24.502 [18]. If the message has been successfully integrity checked by the NAS, the UE shall set the PLMN-specific attempt counter and the PLMN-specific attempt counter for non-3GPP access for that PLMN to the UE implementation-specific maximum value.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition set the EPS update status to EU3 ROAMING NOT ALLOWED and shall delete any 4G-GUTI, last visited registered TAI, TAI list and eKSI. Additionally, the UE shall reset the attach attempt counter and enter the state EMM-DEREGISTERED.

#74 (Temporarily not authorized for this SNPN).

 5GMM cause #74 is only applicable when received from a cell belonging to an SNPN. 5GMM cause #74 received from a cell not belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.2.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall reset the registration attempt counter and store the SNPN identity in the "temporarily forbidden SNPNs" list for the specific access type for which the message was received and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription. If the registration request is not for onboarding services in SNPN, the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform an SNPN selection according to 3GPP TS 23.122 [5]. If the registration request is for onboarding services in SNPN, the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform an SNPN selection for onboarding services according to 3GPP TS 23.122 [5]. If the message has been successfully integrity checked by the NAS, the UE shall set the SNPN-specific attempt counter for 3GPP access and the SNPN-specific attempt counter for non-3GPP access for the current SNPN to the UE implementation-specific maximum value.

 If the message has been successfully integrity checked by the NAS and the UE also supports the registration procedure over the other access to the same SNPN, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

NOTE 5: When 5GMM cause #74 is received over 3GPP access, the term "other access" in "the UE also supports the registration procedure over the other access to the same SNPN" is used to express access to SNPN services via a PLMN.

#75 (Permanently not authorized for this SNPN).

 5GMM cause #75 is only applicable when received from a cell belonging to an SNPN with a globally-unique SNPN identity. 5GMM cause #75 received from a cell not belonging to an SNPN or a cell belonging to an SNPN with a non-globally-unique SNPN identity is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.2.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall reset the registration attempt counter and store the SNPN identity in the "permanently forbidden SNPNs" list for the specific access type for which the message was received and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription. If the registration request is not for onboarding services in SNPN, the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform an SNPN selection according to 3GPP TS 23.122 [5]. If the registration request is for onboarding services in SNPN, the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform an SNPN selection for onboarding services according to 3GPP TS 23.122 [5]. If the message has been successfully integrity checked by the NAS, the UE shall set the SNPN-specific attempt counter for 3GPP access and the SNPN-specific attempt counter for non-3GPP access for the current SNPN to the UE implementation-specific maximum value.

 If the message has been successfully integrity checked by the NAS and the UE also supports the registration procedure over the other access to the same SNPN, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

NOTE 6: When 5GMM cause #75 is received over 3GPP access, the term "other access" in "the UE also supports the registration procedure over the other access to the same SNPN" is used to express access to SNPN services via a PLMN.

#76 (Not authorized for this CAG or authorized for CAG cells only).

 This cause value received via non-3GPP access or from a cell belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.2.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED, store the 5GS update status according to clause 5.1.3.2.2, and reset the registration attempt counter.

 If 5GMM cause #76 is received from:

1) a CAG cell, and if the UE receives a "CAG information list" in the CAG information list IE included in the REGISTRATION REJECT message, the UE shall:

i) replace the "CAG information list" stored in the UE with the received CAG information list IE when received in the HPLMN or EHPLMN;

ii) replace the serving VPLMN's entry of the "CAG information list" stored in the UE with the serving VPLMN's entry of the received CAG information list IE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN; or

NOTE 7: When the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN, entries of a PLMN other than the serving VPLMN, if any, in the received CAG information list IE are ignored.

iii) remove the serving VPLMN's entry of the "CAG information list" stored in the UE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN and the CAG information list IE does not contain the serving VPLMN's entry.

 Otherwise, then the UE shall delete the CAG-ID(s) of the cell from the "allowed CAG list" for the current PLMN. In the case the "allowed CAG list" for the current PLMN only contains a range of CAG-IDs, how the UE deletes the CAG-ID(s) of the cell from the "allowed CAG list" for the current PLMN is up to UE implementation. In addition:

i) if the entry in the "CAG information list" for the current PLMN does not include an "indication that the UE is only allowed to access 5GS via CAG cells" or if the entry in the "CAG information list" for the current PLMN includes an "indication that the UE is only allowed to access 5GS via CAG cells" and the updated "allowed CAG list" for the current PLMN includes one or more CAG-IDs, then the UE shall enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE and shall search for a suitable cell according to 3GPP TS 38.304 [28] or 3GPP TS 36.304 [25C] with the updated "CAG information list";

ii) if the entry in the "CAG information list" for the current PLMN includes an "indication that the UE is only allowed to access 5GS via CAG cells" and the updated "allowed CAG list" for the current PLMN does not include any CAG-ID, then the UE shall enter the state 5GMM-DEREGISTERED.PLMN-SEARCH and shall apply the PLMN selection process defined in 3GPP TS 23.122 [6] with the updated "CAG information list"; or

iii) if the "CAG information list" does not include an entry for the current PLMN, then the UE shall enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE and shall search for a suitable cell according to 3GPP TS 38.304 [28] or 3GPP TS 36.304 [25C] with the updated "CAG information list".

2) a non-CAG cell, and if the UE receives a "CAG information list" in the CAG information list IE included in the REGISTRATION REJECT message, the UE shall:

i) replace the "CAG information list" stored in the UE with the received CAG information list IE when received in the HPLMN or EHPLMN;

ii) replace the serving VPLMN's entry of the "CAG information list" stored in the UE with the serving VPLMN's entry of the received CAG information list IE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN; or

NOTE 8: When the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN, entries of a PLMN other than the serving VPLMN, if any, in the received CAG information list IE are ignored.

iii) remove the serving VPLMN's entry of the "CAG information list" stored in the UE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN and the CAG information list IE does not contain the serving VPLMN's entry.

 Otherwise, the UE shall store an "indication that the UE is only allowed to access 5GS via CAG cells" in the entry of the "CAG information list" for the current PLMN, if any. If the "CAG information list" stored in the UE does not include the current PLMN's entry, the UE shall add an entry for the current PLMN to the "CAG information list" and store an "indication that the UE is only allowed to access 5GS via CAG cells" in the entry of the "CAG information list" for the current PLMN. If the UE does not have a stored "CAG information list", the UE shall create a new "CAG information list" and add an entry with an "indication that the UE is only allowed to access 5GS via CAG cells" for the current PLMN.

In addition:

i) if the "allowed CAG list" for the current PLMN includes one or more CAG-IDs, then the UE shall enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE and shall search for a suitable cell according to 3GPP TS 38.304 [28] with the updated CAG information; or

ii) if the "allowed CAG list" for the current PLMN does not include any CAG-ID, then the UE shall enter the state 5GMM-DEREGISTERED.PLMN-SEARCH and shall apply the PLMN selection process defined in 3GPP TS 23.122 [6] with the updated "CAG information list".

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition set the EPS update status to EU3 ROAMING NOT ALLOWED, reset the attach attempt counter and enter the state EMM-DEREGISTERED.

#77 (Wireline access area not allowed).

 5GMM cause #77 is only applicable when received from a wireline access network by the 5G-RG or the W-AGF acting on behalf of the FN-CRG. 5GMM cause #77 received from a 5G access network other than a wireline access network and 5GMM cause #77 received by the W-AGF acting on behalf of the FN-BRG are considered as abnormal cases and the behaviour of the UE is specified in subclause 5.5.1.2.7.

 When received over wireline access network, the 5G-RG and the W-AGF acting on behalf of the FN-CRG shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2), shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI, shall reset the registration attempt counter, shall enter the state 5GMM-DEREGISTERED and shall act as specified in subclause 5.3.23.

NOTE 9: The 5GMM sublayer states, the 5GMM parameters and the registration status are managed per access type independently, i.e. 3GPP access or non-3GPP access (see subclauses 4.7.2 and 5.1.3).

#78 (PLMN not allowed to operate at the present UE location).

 This cause value received from a non-satellite NG-RAN cell is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.2.7.

 If the UE Access restriction IE is received, the UE shall apply the indicated values of Access restriction time and Access restriction distance as the minimum values for the timer T3578 value and the minimum value for the distance of the UE from the current UE location (see subclause 5.3.x).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI. Additionally, the UE shall delete the list of equivalent PLMNs (if available) and reset the registration attempt counter. The UE shall store the PLMN ID and, if it is known, the current UE location in the list of "PLMNs not allowed to operate at the present UE location" and shall start a corresponding T3578 timer instance. The UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform a PLMN selection according to 3GPP TS 23.122 [5].

#79 (UAS services not allowed).

 The UE shall abort the initial registration procedure, set the 5GS update status to 5U2 NOT UPDATED and enter state 5GMM-DEREGISTERED.NORMAL-SERVICE or 5GMM-DEREGISTERED.PLMN-SEARCH. Additionally, the UE shall reset the registration attempt counter. The UE shall not attempt the registration procedure with including the Service-level device ID set to the CAA-level UAV ID in the Service-level-AA container IE to the current PLMN until the UE is switched off or the UICC containing the USIM is removed.

Other values are considered as abnormal cases. The behaviour of the UE in those cases is specified in subclause 5.5.1.2.7.

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

##### 5.5.1.3.5 Mobility and periodic registration update not accepted by the network

If the mobility and periodic registration update request cannot be accepted by the network, the AMF shall send a REGISTRATION REJECT message to the UE including an appropriate 5GMM cause value.

If the mobility and periodic registration update request is rejected due to general NAS level mobility management congestion control, the network shall set the 5GMM cause value to #22 "congestion" and assign a value for back-off timer T3346.

In NB-N1 mode, if the mobility and periodic registration update request is rejected due to operator determined barring (see 3GPP TS 29.503 [20AB]), the network shall set the 5GMM cause value to #22 "congestion" and assign a value for back-off timer T3346.

When the UE performs inter-system change from S1 mode to N1 mode, if the AMF is informed that verification of the integrity protection of the TRACKING AREA UPDATE REQUEST message included by the UE in the EPS NAS message container IE of the REGISTRATION REQUEST message has failed in the MME, then:

a) If the AMF can retrieve the current 5G NAS security context as indicated by the ngKSI and 5G-GUTI sent by the UE, the AMF shall proceed as specified in subclause 5.5.1.3.4;

b) if the AMF cannot retrieve the current 5G NAS security context as indicated by the ngKSI and 5G-GUTI sent by the UE, or the ngKSI or 5G-GUTI was not sent by the UE, the AMF may initiate the identification procedure by sending the IDENTITY REQUEST message with the "Type of identity" of the 5GS identity type IE set to "SUCI" before taking actions as specified in subclause 4.4.4.3; or

c) If the AMF needs to reject the mobility and periodic registration update procedure, the AMF shall send REGISTRATION REJECT message including 5GMM cause #9 "UE identity cannot be derived by the network".

If the REGISTRATION REJECT message with 5GMM cause #76 or #78 was received without integrity protection, then the UE shall discard the message. If the REGISTRATION REJECT message with 5GMM cause #62 was received without integrity protected, the behaviour of the UE is specified in subclause 5.3.20.2.

Based on operator policy, if the mobility and periodic registration update request is rejected due to core network redirection for CIoT optimizations, the network shall set the 5GMM cause value to #31 "Redirection to EPC required".

NOTE 1: The network can take into account the UE's S1 mode capability, the EPS CIoT network behaviour supported by the UE or the EPS CIoT network behaviour supported by the EPC to determine the rejection with the 5GMM cause value #31 "Redirection to EPC required".

If the mobility and periodic registration update request is rejected because:

a) all the S-NSSAI(s) included in the requested NSSAI (i.e. Requested NSSAI IE or Requested mapped NSSAI IE) are either rejected for the current registration area, rejected for the current PLMN, rejected for the failed or revoked NSSAA or rejected for the maximum number of UEs reached;

b) the UE set the NSSAA bit in the 5GMM capability IE to:

1) "Network slice-specific authentication and authorization supported" and;

i) there are no subscribed S-NSSAIs marked as default;

ii) all subscribed S-NSSAIs marked as default are not allowed; or

iii) network slice-specific authentication and authorization has failed or been revoked for all subscribed S-NSSAIs marked as default and based on network local policy, the network decides not to initiate the network slice-specific re-authentication and re-authorization procedures for any subscribed S-NSSAI marked as default requested by the UE; or

2) "Network slice-specific authentication and authorization not supported" and;

i) there are no subscribed S-NSSAIs which are marked as default; or

ii) all subscribed S-NSSAIs marked as default are either not allowed or are subject to network slice-specific authentication and authorization; and

c) no emergency PDU session has been established for the UE;

the network shall set the 5GMM cause value to #62 "No network slices available". If the UE had included requested NSSAI in the REGISTRATION REQUEST message, then the network shall include the rejected S-NSSAI(s) in the rejected NSSAI of the REGISTRATION REJECT message. Otherwise, the network may include the rejected S-NSSAI(s) in the rejected NSSAI of the REGISTRATION REJECT message.

If the UE has set the ER-NSSAI bit to "Extended rejected NSSAI supported" in the 5GMM capability IE of the REGISTRATION REQUEST message, the rejected S-NSSAI(s) shall be included in the Extended rejected NSSAI IE of the REGISTRATION REJECT message. Otherwise the rejected S-NSSAI(s) shall be included in the Rejected NSSAI IE of the REGISTRATION REJECT message.

If the UE supports extended rejected NSSAI and the AMF determines that maximum number of UEs reached for one or more S-NSSAI(s) in the requested NSSAI as specified in subclause 4.6.2.5, the AMF shall include the rejected NSSAI containing one or more S-NSSAIs with the rejection cause "S-NSSAI not available due to maximum number of UEs reached" in the Extended rejected NSSAI IE in the REGISTRATION REJECT message. In addition, the AMF may include a back-off timer value for each S-NSSAI with the rejection cause "S-NSSAI not available due to maximum number of UEs reached" in the Extended rejected NSSAI IE of the REGISTRATION REJECT message.

If the mobility and periodic registration update request from a UE supporting CAG is rejected due to CAG restrictions, the network shall set the 5GMM cause value to #76 "Not authorized for this CAG or authorized for CAG cells only" and should include the "CAG information list" in the CAG information list IE in the REGISTRATION REJECT message.

NOTE 2: The network cannot be certain that "CAG information list" stored in the UE is updated as result of sending of the REGISTRATION REJECT message with the CAG information list IE, as the REGISTRATION REJECT message is not necessarily delivered to the UE (e.g due to abnormal radio conditions).

NOTE 3: The "CAG information list" can be provided by the AMF and include no entry if no "CAG information list" exists in the subscription.

If the mobility and periodic registration update request from a UE not supporting CAG is rejected due to CAG restrictions, the network shall operate as described in bullet i) of subclause 5.5.1.3.8.

If the UE's mobility and periodic registration update request is via a satellite NG-RAN cell and the network determines that the UE is in a location where the network is not allowed to operate, see 3GPP TS 23.502 [9], the network shall set the 5GMM cause value in the REGISTRATION REJECT message to #78 "PLMN not allowed at the present UE location" and may include an information element in the REGISTRATION REJECT message to indicate the country of the UE location.

Editor's note: [5GSAT\_ARCH-CT, CR#3217]. The name and the encoding of the information element providing the country of the UE location is FFS

If the AMF receives the mobility and periodic registration update request including the Service-level device ID set to the CAA-level UAV ID in the Service-level-AA container IE and the AMF determines that the UE is not allowed to use UAS services via 5GS based on the user's subscription data and the operator policy, the AMF shall return a REGISTRATION REJECT message with 5GMM cause #79 (UAS services not allowed).

Editor's note: It is FFS whether AMF can accept the registration request due to allowed S-NSSAI(s) other than the one for UAS services, which will be based on the stage-2 requirement if available.

The UE shall take the following actions depending on the 5GMM cause value received in the REGISTRATION REJECT message.

#3 (Illegal UE); or

#6 (Illegal ME).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI.

 In case of PLMN, the UE shall consider the USIM as invalid for 5GS services until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.1.

 In case of SNPN, if the UE does not support access to an SNPN using credentials from a credentials holder, the UE shall consider the entry of the "list of subscriber data" with the SNPN identity of the current SNPN as invalid until the UE is switched off, the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. In case of SNPN, if the UE supports access to an SNPN using credentials from a credentials holder, the UE shall consider the selected entry of the "list of subscriber data" as invalid for 3GPP access until the UE is switched off, the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. Additionally, if EAP based primary authentication and key agreement procedure using EAP-AKA' or 5G AKA based primary authentication and key agreement procedure was performed in the current SNPN, the UE shall consider the USIM as invalid for the current SNPN until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.2.

 The UE shall delete the list of equivalent PLMNs (if any) and shall move to 5GMM-DEREGISTERED.NO-SUPI state. If the message has been successfully integrity checked by the NAS, then the UE shall:

1) set the counter for "SIM/USIM considered invalid for GPRS services" events and the counter for "USIM considered invalid for 5GS services over non-3GPP access" events in case of PLMN if the UE maintains these counters; or

2) set the counter for "the entry for the current SNPN considered invalid for 3GPP access" events and the counter for "the entry for the current SNPN considered invalid for non-3GPP access" events in case of SNPN if the UE maintains these counters;

3) delete the 5GMM parameters stored in non-volatile memory of the ME as specified in annex C.

 to UE implementation-specific maximum value.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list and eKSI as specified in 3GPP TS 24.301 [15] for the case when the normal tracking area updating procedure is rejected with the EMM 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 clause 5.3.7a in 3GPP TS 24.301 [15]. If the UE is in EMM-REGISTERED state, the UE shall move to EMM-DEREGISTERED state. 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.

 If the message has been successfully integrity checked by the NAS and the UE also supports the registration procedure over the other access, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

#7 (5GS services not allowed).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI.

 In case of PLMN, the UE shall consider the USIM as invalid for 5GS services until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.1;

 In case of SNPN, if the UE does not support access to an SNPN using credentials from a credentials holder, the UE shall consider the entry of the "list of subscriber data" with the SNPN identity of the current SNPN as invalid for 5GS services until the UE is switched off, the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. In case of SNPN, if the UE supports access to an SNPN using credentials from a credentials holder, the UE shall consider the selected entry of the "list of subscriber data" as invalid for 3GPP access until the UE is switched off, the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. Additionally, if EAP based primary authentication and key agreement procedure using EAP-AKA' or 5G AKA based primary authentication and key agreement procedure was performed in the current SNPN, the UE shall consider the USIM as invalid for the current SNPN until switching off or the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.2.

 The UE shall move to 5GMM-DEREGISTERED.NO-SUPI state. If the message has been successfully integrity checked by the NAS, then the UE shall:

1) set the counter for "SIM/USIM considered invalid for GPRS services" events and the counter for "USIM considered invalid for 5GS services over non-3GPP access" events in case of PLMN if the UE maintains these counters; or

2) set the counter for "the entry for the current SNPN considered invalid for 3GPP access" events and the counter for "the entry for the current SNPN considered invalid for non-3GPP access" events in case of SNPN if the UE maintains these counters;

 to UE implementation-specific maximum value.

3) delete the 5GMM parameters stored in non-volatile memory of the ME as specified in annex C.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list and eKSI as specified in 3GPP TS 24.301 [15] for the case when the normal tracking area updating procedure is rejected with the EMM cause with the same value.

 If the message has been successfully integrity checked by the NAS and the UE also supports the registration procedure over the other access, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

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

 The UE shall set the 5GS update status to 5U2 NOT UPDATED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall enter the state 5GMM-DEREGISTERED.

 If the UE has initiated the registration procedure in order to enable performing the service request procedure for emergency services fallback, the UE shall attempt to select an E-UTRA cell connected to EPC or 5GCN according to the domain priority and selection rules specified in 3GPP TS 23.167 [6]. If the UE finds a suitable E-UTRA cell, it then proceeds with the appropriate EMM or 5GMM procedures. If the UE operating in single-registration mode has changed to S1 mode, it shall disable the N1 mode capability for 3GPP access.

 If the rejected request was neither for initiating an emergency PDU session nor for emergency services fallback, the UE shall subsequently, automatically initiate the initial registration procedure.

NOTE 4: User interaction is necessary in some cases when the UE cannot re-establish the PDU session(s) automatically.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list and eKSI as specified in 3GPP TS 24.301 [15] for the case when the normal tracking area updating procedure is rejected with the EMM cause with the same value.

#10 (implicitly de-registered).

 The UE shall enter the state 5GMM-DEREGISTERED.NORMAL-SERVICE. The UE shall delete any mapped 5G NAS security context or partial native 5G NAS security context.

 If the UE has initiated the registration procedure in order to enable performing the service request procedure for emergency services fallback, the UE shall attempt to select an E-UTRA cell connected to EPC or 5GCN according to the domain priority and selection rules specified in 3GPP TS 23.167 [6]. If the UE finds a suitable E-UTRA cell, it then proceeds with the appropriate EMM or 5GMM procedures.

 If the rejected request was neither for initiating an emergency PDU session nor for emergency services fallback, the UE shall perform a new registration procedure for initial registration.

NOTE 5: User interaction is necessary in some cases when the UE cannot re-establish the PDU session(s) automatically.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM state as specified in 3GPP TS 24.301 [15] for the case when the normal tracking area updating procedure is rejected with the EMM cause with the same value.

#11 (PLMN not allowed).

 This cause value received from a cell belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.3.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall store the PLMN identity in the forbidden PLMN list as specified in subclause 5.3.13A and if the UE is configured to use timer T3245 then the UE shall start timer T3245 and proceed as described in clause 5.3.19a.1, delete the list of equivalent PLMNs, reset the registration attempt counter. For 3GPP access, the UE shall enter the state 5GMM-DEREGISTERED.PLMN-SEARCH and perform a PLMN selection according to 3GPP TS 23.122 [5]. For non-3GPP access the UE shall enter state 5GMM-DEREGISTERED.LIMITED-SERVICE and perform network selection as defined in 3GPP TS 24.502 [18]. If the message has been successfully integrity checked by the NAS and the UE mantains the PLMN-specific attempt counter and the PLMN-specific attempt counter for non-3GPP access for that PLMN, the UE shall set the PLMN-specific attempt counter and the PLMN-specific attempt counter for non-3GPP access for that PLMN to the UE implementation-specific maximum value.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list, eKSI and tracking area updating attempt counter as specified in 3GPP TS 24.301 [15] for the case when the normal tracking area updating procedure is rejected with the EMM cause with the same value.

 If the message has been successfully integrity checked by the NAS and the UE also supports the registration procedure over the other access to the same PLMN, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

#12 (Tracking area not allowed).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI. Additionally, the UE shall reset the registration attempt counter.

 If:

1) the UE is not operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for regional provision of service" and enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE. If the REGISTRATION REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "5GS forbidden tracking areas for regional provision of service" for non-integrity protected NAS reject message; or

2) the UE is operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for regional provision of service" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, and enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE. If the REGISTRATION REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "5GS forbidden tracking areas for regional provision of service" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, for non-integrity protected NAS reject message.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list, eKSI and tracking area updating attempt counter as specified in 3GPP TS 24.301 [15] for the case when the normal tracking area updating procedure is rejected with the EMM cause with the same value.

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

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete the list of equivalent PLMNs (if available). The UE shall reset the registration attempt counter. For 3GPP acess the UE shall change to state 5GMM-REGISTERED.PLMN-SEARCH, and for non-3GPP access the UE shall change to state 5GMM-REGISTERED.LIMITED-SERVICE.

 If the UE is registered in S1 mode and operating in dual-registration mode, the PLMN that the UE chooses to register in is specified in subclause 4.8.3. Otherwise if:

1) the UE is not operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" and shall remove the current TAI from the stored TAI list if present. If the REGISTRATION REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "5GS forbidden tracking areas for roaming" for non-integrity protected NAS reject message; or

2) the UE is operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription. If the REGISTRATION REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "5GS forbidden tracking areas for roaming" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, for non-integrity protected NAS reject message.

 For 3GPP access the UE shall perform a PLMN selection or SNPN selection according to 3GPP TS 23.122 [5], and for non-3GPP access the UE shall perform network selection as defined in 3GPP TS 24.502 [18].

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status and tracking area updating attempt counter as specified in 3GPP TS 24.301 [15] for the case when the normal tracking area updating procedure is rejected with the EMM cause with the same value.

#15 (No suitable cells in tracking area).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2). The UE shall reset the registration attempt counter and shall enter the state 5GMM-REGISTERED.LIMITED-SERVICE.

 If the UE has initiated the registration procedure in order to enable performing the service request procedure for emergency services fallback, the UE shall attempt to select an E-UTRA cell connected to EPC or 5GC according to the emergency services support indicator (see 3GPP TS 36.331 [25A]). If the UE finds a suitable E-UTRA cell, it then proceeds with the appropriate EMM or 5GMM procedures. If the UE operating in single-registration mode has changed to S1 mode, it shall disable the N1 mode capability for 3GPP access. Otherwise, the UE shall search for a suitable cell in another tracking area according to 3GPP TS 38.304 [28] or 3GPP TS 36.304 [25C].

 If:

1) the UE is not operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" and shall remove the current TAI from the stored TAI list, if present. If the REGISTRATION REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "5GS forbidden tracking areas for roaming" for non-integrity protected NAS reject message; or

2) the UE is operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, and shall remove the current TAI from the stored TAI list, if present. If the REGISTRATION REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "5GS forbidden tracking areas for roaming" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, for non-integrity protected NAS reject message.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status and tracking area updating attempt counter as specified in 3GPP TS 24.301 [15] for the case when the normal tracking area updating procedure is rejected with the EMM cause with the same value.

 If received over non-3GPP access the cause shall be considered as an abnormal case and the behaviour of the UE for this case is specified in subclause 5.5.1.3.7.

#22 (Congestion).

 If the T3346 value IE is present in the REGISTRATION 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 5.5.1.3.7.

 The UE shall abort the registration procedure for mobility and periodic registration update. If the rejected request was not for initiating an emergency PDU session, the UE shall set the 5GS update status to 5U2 NOT UPDATED, reset the registration attempt counter and change to state 5GMM-REGISTERED.ATTEMPTING-REGISTRATION-UPDATE.

 The UE shall stop timer T3346 if it is running.

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

 If the REGISTRATION 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 [12].

 The UE stays in the current serving cell and applies the normal cell reselection process. The registration procedure for mobility and periodic registration update is started, if still necessary, when timer T3346 expires or is stopped.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status and tracking area updating attempt counter as specified in 3GPP TS 24.301 [15] for the case when the normal tracking area updating procedure is rejected with the EMM cause with the same value.

 If the registration procedure for mobility and periodic registration update was initiated for an MO MMTEL voice call (i.e. access category 4), or an MO MMTEL video call (i.e. access category 5), or 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 ongoing 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 request was not accepted due to network congestion shall be provided to upper layers.

NOTE 6: Upper layers specified in 3GPP TS 24.173 [13C] and 3GPP TS 24.229 [14] handle the notification that the request was not accepted due to network congestion.

#27 (N1 mode not allowed).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2). Additionally, the UE shall reset the registration attempt counter and shall enter the state 5GMM-REGISTERED.LIMITED-SERVICE. If the message has been successfully integrity checked by the NAS, the UE shall set:

1) the PLMN-specific N1 mode attempt counter for 3GPP access and the PLMN-specific N1 mode attempt counter for non-3GPP access for that PLMN in case of PLMN; or

2) the SNPN-specific attempt counter for 3GPP access for the current SNPN and the SNPN-specific attempt counter for non-3GPP access for the current SNPN in case of SNPN;

 to the UE implementation-specific maximum value.

 The UE shall disable the N1 mode capability for the specific access type for which the message was received (see subclause 4.9).

 If the message has been successfully integrity checked by the NAS, the UE shall disable the N1 mode capability also for the other access type (see subclause 4.9).

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition set the EPS update status to EU3 ROAMING NOT ALLOWED. Additionally, the UE shall reset the tracking area updating attempt counter and enter the state EMM-REGISTERED.

#31 (Redirection to EPC required).

 5GMM cause #31 received by a UE that has not indicated support for CIoT optimizations or not indicated support for S1 mode or received by a UE over non-3GPP access is considered an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.3.7.

 This cause value received from a cell belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.3.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2). The UE shall reset the registration attempt counter and enter the state 5GMM- REGISTERED.LIMITED-SERVICE.

 The UE shall enable the E-UTRA capability if it was disabled and disable the N1 mode capability for 3GPP access (see subclause 4.9.2).

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, and tracking area updating attempt counter as specified in 3GPP TS 24.301 [15] for the case when the normal tracking area updating procedure is rejected with the EMM cause with the same value.

#62 (No network slices available).

 The UE shall abort the registration procedure for mobility and periodic registration update procedure, set the 5GS update status to 5U2 NOT UPDATED and enter state 5GMM-REGISTERED.ATTEMPTING-REGISTRATION-UPDATE. Additionally, the UE shall reset the registration attempt counter.

 The UE receiving the rejected NSSAI in the REGISTRATION REJECT message takes the following actions based on the rejection cause in the rejected S-NSSAI(s):

 "S-NSSAI not available in the current PLMN or SNPN"

 The UE shall add the rejected S-NSSAI(s) in the rejected NSSAI for the current PLMN or SNPN as specified in subclause 4.6.2.2 and shall not attempt to use this S-NSSAI(s) in the current PLMN or SNPN until switching off the UE, the UICC containing the USIM is removed, an entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated, or the rejected S-NSSAI(s) are removed as described in subclause 4.6.2.2.

 "S-NSSAI not available in the current registration area"

 The UE shall add the rejected S-NSSAI(s) in the rejected NSSAI for the current registration area as specified in subclause 4.6.2.2 and shall not attempt to use this S-NSSAI(s) in the current registration area until switching off the UE, the UE moving out of the current registration area, the UICC containing the USIM is removed, an entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated, or the rejected S-NSSAI(s) are removed as described in subclause 4.6.2.2.

 "S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization"

 The UE shall store the rejected S-NSSAI(s) in the rejected NSSAI for the failed or revoked NSSAA as specified in subclause 4.6.2.2 and shall not attempt to use this S-NSSAI in the current PLMN over any access until switching off the UE, the UICC containing the USIM is removed, the entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated, or the rejected S-NSSAI(s) are removed or deleted as described in subclause 4.6.1 and 4.6.2.2.

 "S-NSSAI not available due to maximum number of UEs reached"

 The UE shall add the rejected S-NSSAI(s) in the rejected NSSAI for the maximum number of UEs reached as specified in subclause 4.6.2.2 and shall not attempt to use this S-NSSAI in the current PLMN over the current access until switching off the UE, the UICC containing the USIM is removed, the entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated, or the rejected S-NSSAI(s) are removed as described in subclause 4.6.2.2.

Editor's note [WI: eNS-Ph2, CR#3417]: Whether "S-NSSAI not available due to maximum number of UEs reached" is applicable in an SNPN is FFS.

 If there is one or more S-NSSAIs in the rejected NSSAI with the rejection cause "S-NSSAI not available due to maximum number of UEs reached", then the UE shall for each S-NSSAI behave as follows:

a) stop the timer T3526 associated with the S-NSSAI, if running; and

b) start the timer T3526 with:

1) the back-off timer value received along with the S-NSSAI, if a back-off timer value is received along with the S-NSSAI that is neither zero nor deactivated; or

2) an implementation specific back-off timer value, if no back-off timer value is received along with the S-NSSAI; and

c) remove the S-NSSAI from the rejected NSSAI for the maximum number of UEs reached when the timer T3526 associated with the S-NSSAI expires.

 If the UE has an allowed NSSAI or configured NSSAI that contains S-NSSAIs which are not included in the rejected NSSAI, the UE may stay in the current serving cell, apply the normal cell reselection process and start a registration procedure for mobility and periodic registration update with a requested NSSAI that includes any S-NSSAI from the allowed S-NSSAI or the configured NSSAI that is not in the rejected NSSAI. Otherwise the UE may perform a PLMN selection or SNPN selection according to 3GPP TS 23.122 [5] and additionally, the UE may disable the N1 mode capability for the current PLMN or SNPN if the UE does not have an allowed NSSAI and each S-NSSAI in the configured NSSAI, if available, was rejected with cause "S-NSSAI not available in the current PLMN or SNPN" or "S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization" as described in subclause 4.9.

 If the UE has neither allowed NSSAI for the current PLMN or SNPN nor configured NSSAI for the current PLMN and has a default configured NSSAI containing one or more S-NSSAIs that are not included in the rejected NSSAI,

1) the UE may stay in the current serving cell, apply the normal cell reselection process, and start a registration procedure for mobility and periodic registration update with a requested NSSAI with that default configured NSSAI; or

2) if all the S-NSSAI(s) in the default configured NSSAI are rejected and at least one S-NSSAI is rejected due to "S-NSSAI not available in the current registration area",

i) if the REGISTRATION REJECT message is integrity protected and the UE is not operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" and enter the state 5GMM-REGISTERED.LIMITED-SERVICE; or

ii) If the REGISTRATION REJECT message is integrity protected and the UE is operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" for the current SNPN and enter the state 5GMM-REGISTERED.LIMITED-SERVICE.

 Otherwise, the UE may perform a PLMN selection or SNPN selection according to 3GPP TS 23.122 [5] and additionally, the UE may disable the N1 mode capability for the current PLMN or SNPN if each S-NSSAI in the default configured NSSAI was rejected with cause "S-NSSAI not available in the current PLMN or SNPN" or "S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization" as described in subclause 4.9.

 If the UE has neither allowed NSSAI for the current PLMN or SNPN nor configured NSSAI for the current PLMN and has rejected NSSAI for the reached maximum number of UEs, and the UE wants to obtain services in the current serving cell without performing a PLMN selection or SNPN selection, the UE may stay in the current serving cell and attempt to use the rejected S-NSSAI(s) for the maximum number of UEs reached in the current serving cell after rejected S-NSSAI(s) are removed as described in subclause 4.6.2.2.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition set the EPS update status to EU2 NOT UPDATED, reset the attach attempt counter and enter the state EMM-REGISTERED.

#72 (Non-3GPP access to 5GCN not allowed).

 When received over non-3GPP access the UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI. Additionally, the UE shall reset the registration attempt counter and enter the state 5GMM-DEREGISTERED. If the message has been successfully integrity checked by the NAS, the UE shall set:

1) the PLMN-specific N1 mode attempt counter for non-3GPP access for that PLMN in case of PLMN; or

2) the SNPN-specific attempt counter for non-3GPP access for that SNPN in case of SNPN;

 to the UE implementation-specific maximum value.

NOTE 7: The 5GMM sublayer states, the 5GMM parameters and the registration status are managed per access type independently, i.e. 3GPP access or non-3GPP access (see subclauses 4.7.2 and 5.1.3).

 The UE shall disable the N1 mode capability for non-3GPP access (see subclause 4.9.3).

 As an implementation option, the UE may enter the state 5GMM-DEREGISTERED.PLMN-SEARCH in order to perform a PLMN selection according to 3GPP TS 23.122 [5].

 If received over 3GPP access the cause shall be considered as an abnormal case and the behaviour of the UE for this case is specified in subclause 5.5.1.3.7.

#73 (Serving network not authorized).

 This cause value received from a cell belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.3.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall delete the list of equivalent PLMNs, reset the registration attempt counter, store the PLMN identity in the forbidden PLMN list as specified in subclause 5.3.13A. For 3GPP access the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH in order to perform a PLMN selection according to 3GPP TS 23.122 [5], and for non-3GPP access the UE shall enter state 5GMM-DEREGISTERED.LIMITED-SERVICE and perform network selection as defined in 3GPP TS 24.502 [18]. If the message has been successfully integrity checked by the NAS, the UE shall set the PLMN-specific attempt counter and the PLMN-specific attempt counter for non-3GPP access for that PLMN to the UE implementation-specific maximum value.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition set the EPS update status to EU3 ROAMING NOT ALLOWED and shall delete any 4G-GUTI, last visited registered TAI, TAI list and eKSI. Additionally, the UE shall reset the tracking area updating attempt counter and enter the state EMM-DEREGISTERED.

#74 (Temporarily not authorized for this SNPN).

 5GMM cause #74 is only applicable when received from a cell belonging to an SNPN. 5GMM cause #74 received from a cell not belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.3.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall reset the registration attempt counter and store the SNPN identity in the "temporarily forbidden SNPNs" list for the specific access type for which the message was received and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription. If the UE is not registered for onboarding services in SNPN, the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform an SNPN selection according to 3GPP TS 23.122 [5]. If the UE is registered for onboarding services in SNPN, the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform an SNPN selection for onboarding services according to 3GPP TS 23.122 [5]. If the message has been successfully integrity checked by the NAS, the UE shall set the SNPN-specific attempt counter for 3GPP access and the SNPN-specific attempt counter for non-3GPP access for the current SNPN to the UE implementation-specific maximum value.

 If the message has been successfully integrity checked by the NAS and the UE also supports the registration procedure over the other access to the same SNPN, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

NOTE 8: When 5GMM cause #74 is received over 3GPP access, the term "other access" in "the UE also supports the registration procedure over the other access to the same SNPN" is used to express access to SNPN services via a PLMN.

#75 (Permanently not authorized for this SNPN).

 5GMM cause #75 is only applicable when received from a cell belonging to an SNPN with a globally-unique SNPN identity. 5GMM cause #75 received from a cell not belonging to an SNPN or a cell belonging to an SNPN with a non-globally-unique SNPN identity is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.3.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall reset the registration attempt counter and store the SNPN identity in the "permanently forbidden SNPNs" list for the specific access type for which the message was received and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription. If the UE is not registered for onboarding services in SNPN, the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform an SNPN selection according to 3GPP TS 23.122 [5]. If the UE is registered for onboarding services in SNPN, the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform an SNPN selection for onboarding services according to 3GPP TS 23.122 [5]. If the message has been successfully integrity checked by the NAS, the UE shall set the SNPN-specific attempt counter for 3GPP access and the SNPN-specific attempt counter for non-3GPP access for the current SNPN to the UE implementation-specific maximum value.

 If the message has been successfully integrity checked by the NAS and the UE also supports the registration procedure over the other access to the same SNPN, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

NOTE 9: When 5GMM cause #75 is received over 3GPP access, the term "other access" in "the UE also supports the registration procedure over the other access to the same SNPN" is used to express access to SNPN services via a PLMN.

#76 (Not authorized for this CAG or authorized for CAG cells only).

 This cause value received via non-3GPP access or from a cell belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.3.7.

 The UE shall set the 5GS update status to 5U3.ROAMING NOT ALLOWED, store the 5GS update status according to clause 5.1.3.2.2, and reset the registration attempt counter.

 If 5GMM cause #76 is received from:

1) a CAG cell, and if the UE receives a "CAG information list" in the CAG information list IE included in the REGISTRATION REJECT message, the UE shall:

i) replace the "CAG information list" stored in the UE with the received CAG information list IE when received in the HPLMN or EHPLMN;

ii) replace the serving VPLMN's entry of the "CAG information list" stored in the UE with the serving VPLMN's entry of the received CAG information list IE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN; or

NOTE 10: When the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN, entries of a PLMN other than the serving VPLMN, if any, in the received CAG information list IE are ignored.

iii) remove the serving VPLMN's entry of the "CAG information list" stored in the UE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN and the CAG information list IE does not contain the serving VPLMN's entry.

 Otherwise, the UE shall delete the CAG-ID(s) of the cell from the "allowed CAG list" for the current PLMN. In the case the "allowed CAG list" for the current PLMN only contains a range of CAG-IDs, how the UE deletes the CAG-ID(s) of the cell from the "allowed CAG list" for the current PLMN is up to UE implementation. In addition:

i) if the entry in the "CAG information list" for the current PLMN does not include an "indication that the UE is only allowed to access 5GS via CAG cells" or if the entry in the "CAG information list" for the current PLMN includes an "indication that the UE is only allowed to access 5GS via CAG cells" and the updated "allowed CAG list" for the current PLMN includes one or more CAG-IDs, then the UE shall enter the state 5GMM-REGISTERED.LIMITED-SERVICE and shall search for a suitable cell according to 3GPP TS 38.304 [28] or 3GPP TS 36.304 [25C] with the updated "CAG information list";

ii) if the entry in the "CAG information list" for the current PLMN includes an "indication that the UE is only allowed to access 5GS via CAG cells" and the updated "allowed CAG list" for the current PLMN does not include any CAG-ID, then the UE shall enter the state 5GMM-DEREGISTERED.PLMN-SEARCH and shall apply the PLMN selection process defined in 3GPP TS 23.122 [6] with the updated "CAG information list"; or

iii) if the "CAG information list" does not include an entry for the current PLMN, then the UE shall enter the state 5GMM-REGISTERED.LIMITED-SERVICE and shall search for a suitable cell according to 3GPP TS 38.304 [28] or 3GPP TS 36.304 [25C] with the updated "CAG information list".

2) a non-CAG cell, and if the UE receives a "CAG information list" in the CAG information list IE included in the REGISTRATION REJECT message, the UE shall:

i) replace the "CAG information list" stored in the UE with the received CAG information list IE when received in the HPLMN or EHPLMN;

ii) replace the serving VPLMN's entry of the "CAG information list" stored in the UE with the serving VPLMN's entry of the received CAG information list IE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN; or

NOTE 11: When the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN, entries of a PLMN other than the serving VPLMN, if any, in the received CAG information list IE are ignored.

iii) remove the serving VPLMN's entry of the "CAG information list" stored in the UE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN and the CAG information list IE does not contain the serving VPLMN's entry.

 Otherwise, the UE shall store an "indication that the UE is only allowed to access 5GS via CAG cells" in the entry of the "CAG information list" for the current PLMN, if any. If the "CAG information list" stored in the UE does not include the current PLMN's entry, the UE shall add an entry for the current PLMN to the "CAG information list" and store an "indication that the UE is only allowed to access 5GS via CAG cells" in the entry of the "CAG information list" for the current PLMN. If the UE does not have a stored "CAG information list", the UE shall create a new "CAG information list" and add an entry with an "indication that the UE is only allowed to access 5GS via CAG cells" for the current PLMN.

In addition:

i) if the "allowed CAG list" for the current PLMN includes one or more CAG-IDs, then the UE shall enter the state 5GMM-REGISTERED.LIMITED-SERVICE and shall search for a suitable cell according to 3GPP TS 38.304 [28] with the updated CAG information; or

ii) if the "allowed CAG list" for the current PLMN does not include any CAG-ID, then the UE shall enter the state 5GMM-DEREGISTERED.PLMN-SEARCH and shall apply the PLMN selection process defined in 3GPP TS 23.122 [6] with the updated "CAG information list".

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition set the EPS update status to EU3 ROAMING NOT ALLOWED, reset the attach attempt counter and enter the state EMM-REGISTERED.

#77 (Wireline access area not allowed).

 5GMM cause #77 is only applicable when received from a wireline access network by the 5G-RG or the W-AGF acting on behalf of the FN-CRG (or on behalf of the N5GC device). 5GMM cause #77 received from a 5G access network other than a wireline access network and 5GMM cause #77 received by the W-AGF acting on behalf of the FN-BRG are considered as abnormal cases and the behaviour of the UE is specified in subclause 5.5.1.3.7.

 When received over wireline access network, the 5G-RG and the W-AGF acting on behalf of the FN-CRG (or on behalf of the N5GC device) shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2), shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI, shall reset the registration attempt counter, shall enter the state 5GMM-DEREGISTERED and shall act as specified in subclause 5.3.23.

NOTE 12: The 5GMM sublayer states, the 5GMM parameters and the registration status are managed per access type independently, i.e. 3GPP access or non-3GPP access (see subclauses 4.7.2 and 5.1.3).

#78 (PLMN not allowed to operate at the present UE location).

 This cause value received from a non-satellite NG-RAN cell is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.1.3.7.

 If the UE Access restriction IE is received, the UE shall apply the indicated values of Access restriction time and Access restriction distance as the minimum values for the timer T3578 value and the minimum value for the distance of the UE from the current UE location (see subclause 5.3.x).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI. Additionally, the UE shall delete the list of equivalent PLMNs (if available) and reset the registration attempt counter. The UE shall store the PLMN ID and, if it is known, the current UE location in the list of "PLMNs not allowed to operate at the present UE location" and shall start a corresponding T3578 timer instance. The UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform a PLMN selection according to 3GPP TS 23.122 [5].

#79 (UAS services not allowed).

 The UE shall abort the registration procedure for mobility and periodic registration update procedure, set the 5GS update status to 5U2 NOT UPDATED and enter state 5GMM-REGISTERED.ATTEMPTING-REGISTRATION-UPDATE. Additionally, the UE shall reset the registration attempt counter. The UE shall not attempt the registration procedure with including the Service-level device ID set to the CAA-level UAV ID in the Service-level-AA container IE to the current PLMN until the UE is switched off or the UICC containing the USIM is removed. The UE may re-attempt the registration procedure without including the Service-level device ID set to the CAA-level UAV ID in the Service-level-AA container IE of REGISTRATION REQUEST message to the current PLMN for services other than UAS services.

Other values are considered as abnormal cases. The behaviour of the UE in those cases is specified in subclause 5.5.1.3.7.

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

##### 5.5.2.3.2 Network-initiated de-registration procedure completion by the UE

Upon receiving the DEREGISTRATION REQUEST message, if the DEREGISTRATION REQUEST message indicates "re-registration required" and the de-registration request is for 3GPP access, the UE shall perform a local release of the PDU sessions over 3GPP access, if any. If there is an MA PDU session with user plane resources established on both 3GPP access and non-3GPP access in the same PLMN or in different PLMNs, the UE shall perform a local release of the user plane resources on 3GPP access. If there is an MA PDU session with user plane resources established on 3GPP access only, the UE shall perform a local release of the MA PDU session. The UE shall stop the timer(s) T3346, T3396, T3584, T3585 and 5GSM back-off timer(s) not related to congestion control (see subclause 6.2.12), if running. The UE shall send a DEREGISTRATION ACCEPT message to the network and enter the state 5GMM-DEREGISTERED for 3GPP access. Furthermore, the UE shall, after the completion of the de-registration procedure, and the release of the existing NAS signalling connection, initiate an initial registration. The UE should also re-establish any previously established PDU sessions over 3GPP access. For any previously established MA PDU sessions with user plane resources established on both accesses the UE should also re-establish the user plane resources over 3GPP access, and for any previously established MA PDU sessions with user plane resources established only on the 3GPP access the UE should re-establish the MA PDU session over 3GPP access.

Upon receiving the DEREGISTRATION REQUEST message, if the DEREGISTRATION REQUEST message indicates "re-registration required" and the de-registration request is for non-3GPP access, the UE shall perform a local release of the PDU sessions over non-3GPP access, if any. If there is an MA PDU session with user plane resources established on both 3GPP access and non-3GPP access in the same PLMN or in different PLMNs, the UE shall perform a local release of the user plane resources on non-3GPP access. If there is an MA PDU session with user plane resources established on non-3GPP access only, the UE shall perform a local release of the MA PDU session. The UE shall stop the timer(s) T3346, T3396, T3584 and T3585, if it is running. The UE shall send a DEREGISTRATION ACCEPT message to the network and enter the state 5GMM-DEREGISTERED for non-3GPP access. Furthermore, the UE shall, after the completion of the de-registration procedure, and the release of the existing NAS signalling connection, initiate an initial registration over non-3GPP. The UE should also re-establish any previously established PDU sessions over non-3GPP access. For any previously established MA PDU sessions with user plane resources established on both accesses the UE should also re-establish the user plane resources over non-3GPP access, and for any previously established MA PDU sessions with user plane resources established only on the non-3GPP access the UE should re-establish the MA PDU session over 3GPP access.

Upon receiving the DEREGISTRATION REQUEST message, if the DEREGISTRATION REQUEST message indicates "re-registration required" and the de-registration request is for both 3GPP access and non-3GPP access when the UE is registered in the same PLMN for both accesses, the UE shall perform a local release of the MA PDU sessions and PDU sessions over both 3GPP access and non-3GPP access, if any. The UE shall stop the timer(s) T3346, T3396, T3584 and T3585, if it is running. The UE shall send a DEREGISTRATION ACCEPT message to the network and enter the state 5GMM-DEREGISTERED for both 3GPP access and non-3GPP access. Furthermore, the UE shall, after the completion of the de-registration procedure, and the release of the existing NAS signalling connection, initiate an initial registration over both 3GPP access and non-3GPP access. The UE should also re-establish any previously established PDU sessions over both 3GPP access and non-3GPP access. For any previously established MA PDU sessions the UE should also re-establish the the MA PDU session and the user plane resources which were established previously.

NOTE 1: When the de-registration type indicates "re-registration required", user interaction is necessary in some cases when the UE cannot re-establish the PDU session (s), if any, automatically.

Upon receiving the DEREGISTRATION REQUEST message, if the DEREGISTRATION REQUEST message indicates "re-registration not required" and the de-registration request is for 3GPP access, the UE shall perform a local release of the PDU sessions over 3GPP access, if any. If there is an MA PDU session with user plane resources established on both 3GPP access and non-3GPP access in the same PLMN or in different PLMNs, the UE shall perform a local release of the user plane resources on 3GPP access. If there is an MA PDU session with user plane resources established on 3GPP access only, the UE shall perform a local release of the MA PDU session. The UE shall send a DEREGISTRATION ACCEPT message to the network and enter the state 5GMM-DEREGISTERED for 3GPP access.

Upon receiving the DEREGISTRATION REQUEST message, if the DEREGISTRATION REQUEST message indicates "re-registration not required" and the de-registration request is for non-3GPP access, the UE shall perform a local release of the PDU sessions over non-3GPP access, if any. If there is an MA PDU session with user plane resources established on both 3GPP access and non-3GPP access in the same PLMN or in different PLMNs, the UE shall perform a local release of the user plane resources on non-3GPP access. If there is an MA PDU session with user plane resources established on non-3GPP access only, the UE shall perform a local release of the MA PDU session. The UE shall send a DEREGISTRATION ACCEPT message to the network and enter the state 5GMM-DEREGISTERED for non-3GPP access.

Upon receiving the DEREGISTRATION REQUEST message, if the DEREGISTRATION REQUEST message indicates "re-registration not required" and the de-registration request is for both 3GPP access and non-3GPP access when the UE is registered in the same PLMN for both accesses, the UE shall perform a local release of the MA PDU sessions and PDU sessions over both 3GPP access and non-3GPP access, if any. The UE shall send a DEREGISTRATION ACCEPT message to the network and enter the state 5GMM-DEREGISTERED for both 3GPP access and non-3GPP access.

Upon receiving the DEREGISTRATION REQUEST message, if the DEREGISTRATION REQUEST message includes the rejected NSSAI, the UE takes the following actions based on the rejection cause in the rejected S-NSSAI(s):

"S-NSSAI not available in the current PLMN or SNPN"

 The UE shall store the rejected S-NSSAI(s) in the rejected NSSAI for the current PLMN or SNPN as specified in subclause 4.6.2.2 and shall not attempt to use this S-NSSAI in the current PLMN or SNPN until switching off the UE, the UICC containing the USIM is removed, or the rejected S-NSSAI(s) are removed as described in subclause 4.6.2.2.

"S-NSSAI not available in the current registration area"

 The UE shall store the rejected S-NSSAI(s) in the rejected NSSAI for the current registration area as described in subclause 4.6.2.2 and shall not attempt to use this S-NSSAI(s) in the current registration area until switching off the UE, the UE moving out of the current registration area, the UICC containing the USIM is removed, an entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated, or the rejected S-NSSAI(s) are removed as described in subclause 4.6.2.2.

"S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization"

 The UE shall store the rejected S-NSSAI(s) in the rejected NSSAI for the failed or revoked NSSAA as specified in subclause 4.6.2.2 and shall not attempt to use this S-NSSAI in the current PLMN over any access until switching off the UE, the UICC containing the USIM is removed, the entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated, or the rejected S-NSSAI(s) are removed or deleted as described in subclause 4.6.1 and 4.6.2.2.

"S-NSSAI not available due to maximum number of UEs reached"

 The UE shall add the rejected S-NSSAI(s) in the rejected NSSAI for the maximum number of UEs reached as specified in subclause 4.6.2.2 and shall not attempt to use this S-NSSAI in the current PLMN over any access until switching off the UE, the UICC containing the USIM is removed, the entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated, or the rejected S-NSSAI(s) are removed as described in subclause 4.6.2.2.

 If there is one or more S-NSSAIs in the rejected NSSAI with the rejection cause "S-NSSAI not available due to maximum number of UEs reached", then the UE shall for each S-NSSAI behave as follows:

a) stop the timer T3526 associated with the S-NSSAI, if running; and

b) start the timer T3526 with:

1) the back-off timer value received along with the S-NSSAI, if a back-off timer value is received along with the S-NSSAI that is neither zero nor deactivated; or

2) an implementation specific back-off timer value, if no back-off timer value is received along with the S-NSSAI; and

c) remove the S-NSSAI from the rejected NSSAI for the maximum number of UEs reached when the timer T3526 associated with the S-NSSAI expires.

Upon sending a DEREGISTRATION ACCEPT message, the UE shall delete the rejected NSSAI as specified in subclause 4.6.2.2.

If the de-registration type indicates "re-registration required", then the UE shall ignore the 5GMM cause IE if received.

If the de-registration type indicates "re-registration not required", the UE shall take the actions depending on the received 5GMM cause value:

#3 (Illegal UE);

#6 (Illegal ME)

 The message was received via 3GPP access and the UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI.

- In case of PLMN, the UE shall consider the USIM as invalid for 5GS services until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.1;

 In case of SNPN, if the UE does not support access to an SNPN using credentials from a credentials holder, the UE shall consider the entry of the "list of subscriber data" with the SNPN identity of the current SNPN as invalid until the UE is switched off, the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. In case of SNPN, if the UE supports access to an SNPN using credentials from a credentials holder, the UE shall consider the selected entry of the "list of subscriber data" as invalid for 3GPP access until the UE is switched off, the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. Additionally, if EAP based primary authentication and key agreement procedure using EAP-AKA' or 5G AKA based primary authentication and key agreement procedure was performed in the current SNPN, the UE shall consider the USIM as invalid for the current SNPN until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.2.

 The UE shall delete the list of equivalent PLMNs (if any) and shall enter the state 5GMM-DEREGISTERED.NO-SUPI.

 The UE shall delete the 5GMM parameters stored in non-volatile memory of the ME as specified in annex C.

 If the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, TAI list and eKSI as specified in 3GPP TS 24.301 [15] for the case when a DETACH REQUEST is received with the EMM cause with the same value and with detach type set to "re-attach not required". 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 clause 5.3.7a in 3GPP TS 24.301 [15].

 If the UE also supports the registration procedure over the other access, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

#7 (5GS services not allowed).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI.

 In case of PLMN, the UE shall consider the USIM as invalid for 5GS services until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.1;

 In case of SNPN, if the UE does not support access to an SNPN using credentials from a credentials holder, the UE shall consider the entry of the "list of subscriber data" with the SNPN identity of the current SNPN as invalid for 5GS services until the UE is switched off, or the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. In case of SNPN, if the UE supports access to an SNPN using credentials from a credentials holder, the UE shall consider the selected entry of the "list of subscriber data" as invalid for 3GPP access until the UE is switched off, the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. Additionally, if EAP based primary authentication and key agreement procedure using EAP-AKA' or 5G AKA based primary authentication and key agreement procedure was performed in the current SNPN, the UE shall consider the USIM as invalid for the current SNPN until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.2.

 The UE shall enter the state 5GMM-DEREGISTERED.NO-SUPI.

 The UE shall delete the 5GMM parameters stored in non-volatile memory of the ME as specified in annex C.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list and eKSI as specified in 3GPP TS 24.301 [15] for the case when a DETACH REQUEST is received with the EMM cause with the same value and with detach type set to "re-attach not required".

 If the UE also supports the registration procedure over the other access, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

#11 (PLMN not allowed).

 This cause value received from a cell belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.2.3.4.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall delete the list of equivalent PLMNs, shall reset the registration attempt counter. For 3GPP access the UE shall enter the state 5GMM-DEREGISTERED.PLMN-SEARCH, and for non-3GPP access the UE shall enter state 5GMM-DEREGISTERED.LIMITED-SERVICE.

 The UE shall store the PLMN identity in the forbidden PLMN list as specified in subclause 5.3.13A and if the UE is configured to use timer T3245 then the UE shall start timer T3245 and proceed as described in clause 5.3.19a.1.

 For 3GPP access the UE shall perform a PLMN selection according to 3GPP TS 23.122 [5], and for non-3GPP access the UE shall perform network selection as defined in 3GPP TS 24.502 [18].

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list, eKSI and attach attempt counter as specified in 3GPP TS 24.301 [15] for the case when a DETACH REQUEST is received with the EMM cause with the same value and with detach type set to "re-attach not required".

 If the UE also supports the registration procedure over the other access to the same PLMN, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

#12 (Tracking area not allowed).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall reset the registration attempt counter and shall enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE.

 If the UE is not operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for regional provision of service". Otherwise, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for regional provision of service" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters, EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list, eKSI and attach attempt counter as specified in 3GPP TS 24.301 [15] for the case when a DETACH REQUEST is received with the EMM cause with the same value and with detach type set to "re-attach not required".

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

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall delete the list of equivalent PLMNs (if available), reset the registration attempt counter. For 3GPP access the UE shall change to state 5GMM-DEREGISTERED.PLMN-SEARCH, and for non-3GPP access the UE shall change to state 5GMM-DEREGISTERED.LIMITED-SERVICE.

 If the UE is not operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming". Otherwise, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription.

 For 3GPP access the UE shall perform a PLMN selection or SNPN selection according to 3GPP TS 23.122 [5], and for non-3GPP access the UE shall perform network selection as defined in 3GPP TS 24.502 [18].

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list, eKSI and attach attempt counter as specified in 3GPP TS 24.301 [15] for the case when a DETACH REQUEST is received with the EMM cause with the same value and with detach type set to "re-attach not required".

#15 (No suitable cells in tracking area).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall reset the registration attempt counter and shall enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE.

 If the UE is not operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming". Otherwise the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription.

 The UE shall search for a suitable cell in another tracking area according to 3GPP TS 38.304 [28] or 3GPP TS 36.304 [25C].

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list, eKSI and attach attempt counter as specified in 3GPP TS 24.301 [15] for the case when a DETACH REQUEST is received with the EMM cause with the same value and with detach type set to "re-attach not required".

 If received over non-3GPP access and de-registration request is for non-3GPP access only, the cause shall be considered as an abnormal case and the behaviour of the UE for this case is specified in subclause 5.5.2.3.4.

#22 (Congestion).

 If the T3346 value IE is present in the DEREGISTRATION REQUEST 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 5.5.2.3.4.

 The UE shall stop timer T3346 if it is running, set the 5GS update status to 5U2 NOT UPDATED, reset the registration attempt counter and enter the state 5GMM-DEREGISTERED.ATTEMPTING-REGISTRATION.

 The UE shall start timer T3346 with the value provided in the T3346 value IE.

 If the message was received via 3GPP access and the UE is operating in the single-registration mode, the UE shall set the EPS update status to EU2 NOT UPDATED, reset the attach attempt counter and shall enter the state EMM-DEREGISTERED.

#27 (N1 mode not allowed).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. Additionally, the UE shall reset the registration attempt counter and shall enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE.

 The UE shall disable the N1 mode capability for both 3GPP access and non-3GPP access (see subclause 4.9).

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition set the EPS update status to EU3 ROAMING NOT ALLOWED and shall delete any 4G-GUTI, last visited registered TAI, TAI list and eKSI. Additionally, the UE shall reset the attach attempt counter and enter the state EMM-DEREGISTERED.

#62 (No network slices available).

 The UE shall set the 5GS update status to 5U2 NOT UPDATED and enter state 5GMM-DEREGISTERED.NORMAL-SERVICE or 5GMM-DEREGISTERED.PLMN-SEARCH. Additionally, the UE shall reset the registration attempt counter.

 The UE receiving the rejected NSSAI in the DEREGISTRATION REQUEST message takes the following actions based on the rejection cause in the rejected S-NSSAI(s):

 "S-NSSAI not available in the current PLMN or SNPN"

 The UE shall store the rejected S-NSSAI(s) in the rejected NSSAI for the current PLMN or SNPN as specified in subclause 4.6.2.2 and shall not attempt to use this S-NSSAI(s) in the current PLMN or SNPN until switching off the UE, the UICC containing the USIM is removed, an entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated, or the rejected S-NSSAI(s) are removed or deleted as described in subclause 4.6.2.2.

 "S-NSSAI not available in the current registration area"

 The UE shall store the rejected S-NSSAI(s) in the rejected NSSAI for the current registration area as described in subclause 4.6.2.2 and shall not attempt to use this S-NSSAI(s) in the current registration area until switching off the UE, the UE moving out of the current registration area, the UICC containing the USIM is removed, the entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated, or the rejected S-NSSAI(s) are removed or deleted as described in subclause 4.6.2.2.

 "S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization"

 The UE shall store the rejected S-NSSAI(s) in the rejected NSSAI for the failed or revoked NSSAA as specified in subclause 4.6.2.2 and shall not attempt to use this S-NSSAI in the current PLMN over any access until switching off the UE, the UICC containing the USIM is removed, the entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated, or the rejected S-NSSAI(s) are removed or deleted as described in subclause 4.6.1 and 4.6.2.2.

 If the UE has an allowed NSSAI or configured NSSAI that contains S-NSSAI(s) which are not included any of the rejected NSSAI for the current PLMN or SNPN, the rejected NSSAI for the current registration area, the rejected NSSAI for the failed or revoked NSSAA, and rejected NSSAI for the maximum number of UEs reached, the UE may stay in the current serving cell, apply the normal cell reselection process and start an initial registration with a requested NSSAI that includes any S-NSSAI from the allowed NSSAI or the configured NSSAI that is neither in the rejected NSSAI for the PLMN or SNPN nor in the rejected NSSAI for the current registration area nor in the rejected NSSAI for the failed or revoked NSSAA nor rejected NSSAI for the maximum number of UEs reached. Otherwise the UE may perform a PLMN selection or SNPN selection according to 3GPP TS 23.122 [5] and additionally, the UE may disable the N1 mode capability for the current PLMN or SNPN if the UE does not have an allowed NSSAI and each S-NSSAI in configured NSSAI, if available, was rejected with cause "S-NSSAI not available in the current PLMN or SNPN" or "S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization" or "S-NSSAI not available due to maximum number of UEs reached" as described in subclause 4.9.

 If the UE has neither allowed NSSAI for the current PLMN or SNPN nor configured NSSAI for the current PLMN and has a default configured NSSAI containing one or more S-NSSAIs that are not included in any of the rejected NSSAI for the PLMN or SNPN, the rejected NSSAI for the current registration area, the rejected NSSAI for the failed or revoked NSSAA, and rejected NSSAI for the maximum number of UEs reached,

1) the UE may stay in the current serving cell, apply the normal cell reselection process, and start an initial registration with a requested NSSAI with that default configured NSSAI; or

2) if all the S-NSSAI(s) in the default configured NSSAI are rejected and at least one S-NSSAI is rejected due to "S-NSSAI not available in the current registration area",

i) if the UE is not operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" and enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE; or

ii) if the UE is operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" for the current SNPN and enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE.

 Otherwise, the UE may perform a PLMN selection or SNPN selection according to 3GPP TS 23.122 [5] and additionally, the UE may disable the N1 mode capability for the current PLMN or SNPN if each S-NSSAI in the default configured NSSAI was rejected with cause "S-NSSAI not available in the current PLMN or SNPN" or "S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization" as described in subclause 4.9.

 If the UE has neither allowed NSSAI for the current PLMN or SNPN nor configured NSSAI for the current PLMN and has rejected NSSAI for the reached maximum number of UEs, and the UE wants to obtain services in the current serving cell without performing a PLMN selection or SNPN selection, the UE may stay in the current serving cell and attempt to use the rejected S-NSSAI(s) for the maximum number of UEs reached in the current serving cell after the rejected S-NSSAI(s) are removed as described in subclause 4.6.2.2.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition set the EPS update status to EU2 NOT UPDATED, reset the attach attempt counter and enter the state EMM-DEREGISTERED.

#72 (Non-3GPP access to 5GCN not allowed).

 If received over non-3GPP access when the UE is registered over non-3GPP access, or received over 3GPP access and de-registration request is for non-3GPP access when the UE is registered in the same PLMN for both accesses, the UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI for non-3GPP access. Additionally, the UE shall reset the registration attempt counter and enter the state 5GMM-DEREGISTERED for non-3GPP access.

NOTE 2: The 5GMM sublayer states, the 5GMM parameters and the registration status are managed per access type independently, i.e. 3GPP access or non-3GPP access (see subclauses 4.7.2 and 5.1.3).

 The UE shall disable the N1 mode capability for non-3GPP access (see subclause 4.9.3).

 As an implementation option, if the UE is not currently registered over 3GPP access, the UE may enter the state 5GMM-DEREGISTERED.PLMN-SEARCH in order to perform a PLMN selection according to 3GPP TS 23.122 [5].

 If received over 3GPP access and de-registration request is for 3GPP access only, the cause shall be considered as an abnormal case and the behaviour of the UE for this case is specified in subclause 5.5.2.3.4.

#74 (Temporarily not authorized for this SNPN).

 5GMM cause #74 is only applicable when received from a cell belonging to an SNPN. 5GMM cause #74 received from a cell not belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.2.3.4.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall reset the registration attempt counter and shall store the SNPN identity in the "temporarily forbidden SNPNs" list for the specific access type for which the message was received and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription. If the UE is not registered for onboarding services in SNPN, the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform an SNPN selection according to 3GPP TS 23.122 [5]. If the UE is registered for onboarding services in SNPN, the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform an SNPN selection for onboarding services according to 3GPP TS 23.122 [5].

#75 (Permanently not authorized for this SNPN).

 5GMM cause #75 is only applicable when received from a cell belonging to an SNPN with a globally-unique SNPN identity. 5GMM cause #75 received from a cell not belonging to an SNPN or a cell belonging to an SNPN with a non-globally-unique SNPN identity is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.2.3.4.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall reset the registration attempt counter and store the SNPN identity in the "permanently forbidden SNPNs" list for the specific access type for which the message was received and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription. The UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform an SNPN selection according to 3GPP TS 23.122 [5].

#76 (Not authorized for this CAG or authorized for CAG cells only).

 This cause value received via non-3GPP access or from a cell belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.2.3.4.

 The UE shall set the 5GS update status to 5U3.ROAMING NOT ALLOWED, store the 5GS update status according to clause 5.1.3.2.2, and reset the registration attempt counter.

 If 5GMM cause #76 is received from:

1) a CAG cell, and if the UE receives a "CAG information list" in the CAG information list IE included in the DEREGISTRATION REQUEST message, the UE shall:

i) replace the "CAG information list" stored in the UE with the received CAG information list IE when received in the HPLMN or EHPLMN;

ii) replace the serving VPLMN's entry of the "CAG information list" stored in the UE with the serving VPLMN's entry of the received CAG information list IE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN; or

NOTE 3: When the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN, entries of a PLMN other than the serving VPLMN, if any, in the received CAG information list IE are ignored.

iii) remove the serving VPLMN's entry of the "CAG information list" stored in the UE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN and the CAG information list IE does not contain the serving VPLMN's entry.

 Otherwise, the UE shall delete the CAG-ID(s) of the cell from the "allowed CAG list" for the current PLMN. In the case the "allowed CAG list" for the current PLMN only contains a range of CAG-IDs, how the UE deletes the CAG-ID(s) of the cell from the "allowed CAG list" for the current PLMN is up to UE implementation. In addition:

i) if the entry in the "CAG information list" for the current PLMN does not include an "indication that the UE is only allowed to access 5GS via CAG cells" or if the entry in the "CAG information list" for the current PLMN includes an "indication that the UE is only allowed to access 5GS via CAG cells" and the updated "allowed CAG list" for the current PLMN includes one or more CAG-IDs, then the UE shall enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE and shall search for a suitable cell according to 3GPP TS 38.304 [28] or 3GPP TS 36.304 [25C] with the updated "CAG information list"; or

ii) if the entry in the "CAG information list" for the current PLMN includes an "indication that the UE is only allowed to access 5GS via CAG cells" and the updated "allowed CAG list" for the current PLMN does not include any CAG-ID, then the UE shall enter the state 5GMM-DEREGISTERED.PLMN-SEARCH and shall apply the PLMN selection process defined in 3GPP TS 23.122 [6] with the updated "CAG information list".

2) a non-CAG cell, and if the UE receives a "CAG information list" in the CAG information list IE included in the DEREGISTRATION REQUEST message, the UE shall:

i) replace the "CAG information list" stored in the UE with the received CAG information list IE when received in the HPLMN or EHPLMN;

ii) replace the serving VPLMN's entry of the "CAG information list" stored in the UE with the serving VPLMN's entry of the received CAG information list IE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN; or

NOTE 4: When the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN, entries of a PLMN other than the serving VPLMN, if any, in the received CAG information list IE are ignored.

iii) remove the serving VPLMN's entry of the "CAG information list" stored in the UE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN and the CAG information list IE does not contain the serving VPLMN's entry.

 Otherwise, the UE shall store an "indication that the UE is only allowed to access 5GS via CAG cells" in the entry of the "CAG information list" for the current PLMN, if any. If the "CAG information list" stored in the UE does not include the current PLMN's entry, the UE shall add an entry for the current PLMN to the "CAG information list" and store an "indication that the UE is only allowed to access 5GS via CAG cells" in the entry of the "CAG information list" for the current PLMN. If the UE does not have a stored "CAG information list", the UE shall create a new "CAG information list" and add an entry with an "indication that the UE is only allowed to access 5GS via CAG cells" for the current PLMN.

In addition:

i) if the "allowed CAG list" for the current PLMN includes one or more CAG-IDs, then the UE shall enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE and shall search for a suitable cell according to 3GPP TS 38.304 [28] with the updated CAG information; or

ii) if the "allowed CAG list" for the current PLMN does not include any CAG-ID, then the UE shall enter the state 5GMM-DEREGISTERED.PLMN-SEARCH and shall apply the PLMN selection process defined in 3GPP TS 23.122 [6] with the updated "CAG information list".

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition set the EPS update status to EU3 ROAMING NOT ALLOWED, reset the attach attempt counter and enter the state EMM-DEREGISTERED.

#77 (Wireline access area not allowed).

 5GMM cause #77 is only applicable when received from a wireline access network by the 5G-RG or the W-AGF acting on behalf of the FN-CRG (or on behalf of the N5GC device). 5GMM cause #77 received from a 5G access network other than a wireline access network and 5GMM cause #77 received by the W-AGF acting on behalf of the FN-BRG are considered as abnormal cases and the behaviour of the UE is specified in subclause 5.5.2.3.4.

 When received over wireline access network, the 5G-RG and the W-AGF acting on behalf of the FN-CRG (or on behalf of the N5GC device) shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2), shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI, shall reset the registration attempt counter, shall enter the state 5GMM-DEREGISTERED and shall act as specified in subclause 5.3.23.

NOTE 5: The 5GMM sublayer states, the 5GMM parameters and the registration status are managed per access type independently, i.e. 3GPP access or non-3GPP access (see subclauses 4.7.2 and 5.1.3).

#78 (PLMN not allowed to operate at the present UE location).

 This cause value received from a non-satellite NG-RAN cell is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.5.2.3.4.

 If the UE Access restriction IE is received, the UE shall apply the indicated values of Access restriction time and Access restriction distance as the minimum values for the timer T3578 value and the minimum value for the distance of the UE from the current UE location (see subclause 5.3.x).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI. Additionally, the UE shall delete the list of equivalent PLMNs (if available) and reset the registration attempt counter. The UE shall store the PLMN ID and, if it is known, the current UE location in the list of "PLMNs not allowed to operate at the present UE location" and shall start a corresponding T3578 timer instance. The UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform a PLMN selection according to 3GPP TS 23.122 [5].

#79 (UAS services not allowed).

- A UE which is not a UE supporting UAS services receiving this cause value shall considered it as an abnormal case and the behaviour of the UE is specified in subclause 5.5.2.3.4.

 A UE supporting UAS service shall set the 5GS update status to 5U2 NOT UPDATED and enter state 5GMM-DEREGISTERED.NORMAL-SERVICE or 5GMM-DEREGISTERED.PLMN-SEARCH. Additionally, the UE shall reset the registration attempt counter. The UE shall not attempt to register for UAS services to the current PLMN until the UE is switched off or the UICC containing the USIM is removed.

*\*\*\* 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 5GMM cause value.

If the SERVICE REJECT message with 5GMM cause #76 or #78 was received without integrity protection, then the UE shall discard the message.

If the AMF needs to initiate PDU session status synchronisation or a PDU session status IE was included in the SERVICE REQUEST message, the AMF shall include a PDU session status IE in the SERVICE REJECT message to indicate which PDU sessions associated with the access type the SERVICE REJECT message is sent over are active in the AMF. If the PDU session status IE is included in the SERVICE REJECT message and if the message is integrity protected, then:

a) for single access PDU sessions, the UE shall perform a local release of all those PDU sessions which are not in 5GSM state PDU SESSION INACTIVE or PDU SESSION ACTIVE PENDING on the UE side associated with the access type the SERVICE REJECT message is sent over, but are indicated by the AMF as being in 5GSM state PDU SESSION INACTIVE; and

b) for MA PDU sessions, for all those PDU sessions which are not in 5GSM state PDU SESSION INACTIVE or PDU SESSION ACTIVE PENDING and have user plane resources established on the UE side associated with the access the SERVICE REJECT message is sent over, but are indicated by the AMF as no user plane resources established:

1) for MA PDU sessions having user plane resources established only on the access type the SERVICE REJECT message is sent over, the UE shall perform a local release of those MA PDU sessions; and

2) for MA PDU sessions having user plane resources established on both accesses, the UE shall perform a local release on the user plane resources on the access type the SERVICE REJECT message is sent over.

If the service request for mobile originated services is rejected due to general NAS level mobility management congestion control, the network shall set the 5GMM cause value to #22 "congestion" and assign a value for back-off timer T3346.

In NB-N1 mode, if the service request for mobile originated services is rejected due to operator determined barring (see 3GPP TS 29.503 [20AB]), the network shall set the 5GMM cause value to #22 "congestion" and assign a value for back-off timer T3346.

If the service request from a UE supporting CAG is rejected due to CAG restrictions, the network shall set the 5GMM cause value to #76 "Not authorized for this CAG or authorized for CAG cells only" and should include the "CAG information list" in the CAG information list IE in the SERVICE REJECT message.

NOTE 1: The network cannot be certain that "CAG information list" stored in the UE is updated as result of sending of the SERVICE REJECT message with the CAG information list IE, as the SERVICE REJECT message is not necessarily delivered to the UE (e.g., due to abnormal radio conditions).

NOTE 2: The "CAG information list" can be provided by the AMF and include no entry if no "CAG information list" exists in the subscription.

If the service request from a UE not supporting CAG is rejected due to CAG restrictions, the network shall operate as described in bullet h) of subclause 5.6.1.8.

Upon receipt of the CONTROL PLANE SERVICE REQUEST message with uplink data:

- if the AMF decides to not forward the uplink data piggybacked in the CONTROL PLANE SERVICE REQUEST message; and

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

then the AMF shall send a SERVICE REJECT message and set the 5GMM cause value to #22 "congestion" and assign a value for control plane data back-off timer T3448.

If the AMF determines that the UE is in a non-allowed area or is not in an allowed area as specified in subclause 5.3.5, then:

a) if the service type IE in the SERVICE REQUEST message is set to "signalling" or "data", the AMF shall send a SERVICE REJECT message with the 5GMM cause value set to #28 "Restricted service area";

b) otherwise, if the service type IE in the SERVICE REQUEST message is set to "mobile terminated services", "emergency services", "emergency services fallback", "high priority access" or "elevated signalling", the AMF shall continue the process as specified in subclause 5.6.1.4 unless for other reasons the service request cannot be accepted.

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 in AMF, the network shall set the 5GMM cause value to #22 "Congestion" and may include T3346 value IE in the SERVICE REJECT message set to the remaining time of the running T3447 timer.

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

NOTE 3: The network can take into account the UE's S1 mode capability, the EPS CIoT network behaviour supported by the UE or the EPS CIoT network behaviour supported by the EPC to determine the rejection with the 5GMM cause value #31 "Redirection to EPC required".

If the service request is via a satellite NG-RAN cell, and the network determines that the UE is in a location where the network is not allowed to operate, see 3GPP TS 23.502 [9], the network shall set the 5GMM cause value in the SERVICE REJECT message to #78 "PLMN not allowed to operate at the present UE location" and may include an information element in the SERVICE REJECT message to indicate the country of the UE location.

Editor's note: [5GSAT\_ARCH-CT, CR#3217]. The name and the encoding of the information element providing the country of the UE location is FFS

On receipt of the SERVICE REJECT message, if the UE is in state 5GMM-SERVICE-REQUEST-INITIATED, the UE shall reset the service request attempt counter and stop timer T3517 if running.

The UE shall take the following actions depending on the 5GMM cause value received in the SERVICE REJECT message.

#3 (Illegal UE);

#6 (Illegal ME);

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI.

 In case of PLMN, the UE shall consider the USIM as invalid for 5GS services until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.1;

 In case of SNPN, if the UE does not support access to an SNPN using credentials from a credentials holder, the UE shall consider the entry of the "list of subscriber data" with the SNPN identity of the current SNPN as invalid until the UE is switched off, the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. In case of SNPN, if the UE supports access to an SNPN using credentials from a credentials holder, the UE shall consider the selected entry of the "list of subscriber data" as invalid for 3GPP access until the UE is switched off, the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. Additionally, if EAP based primary authentication and key agreement procedure using EAP-AKA' or 5G AKA based primary authentication and key agreement procedure was performed in the current SNPN, the UE shall consider the USIM as invalid for the current SNPN until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.2.

 The UE shall delete the list of equivalent PLMNs (if any) and shall enter the state 5GMM-DEREGISTERED.NO-SUPI. If the message has been successfully integrity checked by the NAS, then the UE shall:

1) set the counter for "SIM/USIM considered invalid for GPRS services" events and the counter for "USIM considered invalid for 5GS services over non-3GPP access" events in case of PLMN if the UE maintains these counters; or

2) set the counter for "the entry for the current SNPN considered invalid for 3GPP access" events and the counter for "the entry for the current SNPN considered invalid for non-3GPP access" events in case of SNPN if the UE maintains these counters;

 to UE implementation-specific maximum value.

3) delete the 5GMM parameters stored in non-volatile memory of the ME as specified in annex C.

 If the message was received via 3GPP access and the UE is operating in the single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list and eKSI as specified in 3GPP TS 24.301 [15] for the case when the service request procedure is rejected with the EMM cause with the same value. The USIM shall be considered as invalid also for non-EPS services until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.7a in 3GPP TS 24.301 [15]. 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.

 If the message has been successfully integrity checked by the NAS and the UE also supports the registration procedure over the other access, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

#7 (5GS services not allowed).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI.

 In case of PLMN, the UE shall consider the USIM as invalid for 5GS services until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.1;

 In case of SNPN, if the UE does not support access to an SNPN using credentials from a credentials holder, the UE shall consider the entry of the "list of subscriber data" with the SNPN identity of the current SNPN as invalid for 5GS services until the UE is switched off, the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. In case of SNPN, if the UE supports access to an SNPN using credentials from a credentials holder, the UE shall consider the selected entry of the "list of subscriber data" as invalid for 3GPP access until the UE is switched off, the entry is updated or the timer T3245 expires as described in clause 5.3.19a.2. Additionally, if EAP based primary authentication and key agreement procedure using EAP-AKA' or 5G AKA based primary authentication and key agreement procedure was performed in the current SNPN, the UE shall consider the USIM as invalid for the current SNPN until switching off, the UICC containing the USIM is removed or the timer T3245 expires as described in clause 5.3.19a.2.

 The UE shall enter the state 5GMM-DEREGISTERED.NO-SUPI. If the message has been successfully integrity checked by the NAS, then the UE shall:

1) set the counter for "SIM/USIM considered invalid for GPRS services" events and the counter for "USIM considered invalid for 5GS services over non-3GPP access" events in case of PLMN if the UE maintains these counters; or

2) set the counter for "the entry for the current SNPN considered invalid for 3GPP access" events and the counter for "the entry for the current SNPN considered invalid for non-3GPP access" events in case of SNPN if the UE maintains these counters;

 to UE implementation-specific maximum value.

3) delete the 5GMM parameters stored in non-volatile memory of the ME as specified in annex C.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list and eKSI as specified in 3GPP TS 24.301 [15] for the case when the service request procedure is rejected with the EMM cause with the same value.

 If the message has been successfully integrity checked by the NAS and the UE also supports the registration procedure over the other access, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

NOTE 4: 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 outside the scope of the present document.

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

 The UE shall set the 5GS update status to 5U2 NOT UPDATED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall enter the state 5GMM-DEREGISTERED.

 If the service request was initiated for emergency services fallback, the UE shall attempt to select an E-UTRA cell connected to EPC or 5GCN according to the domain priority and selection rules specified in 3GPP TS 23.167 [6]. If the UE finds a suitable E-UTRA cell, it then proceeds with the appropriate EMM or 5GMM procedures. If the UE operating in single-registration mode has changed to S1 mode, it shall disable the N1 mode capability for 3GPP access.

 If the service request was initiated for any reason other than emergency services fallback or initiating an emergency PDU session, the UE shall perform a new initial registration procedure.

NOTE 5: User interaction is necessary in some cases when the UE cannot re-establish the PDU session(s) automatically.

 If the message was received via 3GPP access and the UE is operating in the single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list and eKSI as specified in 3GPP TS 24.301 [15] for the case when the service request procedure is rejected with the EMM cause with the same value.

#10 (Implicitly de-registered).

 The UE shall enter the state 5GMM-DEREGISTERED.NORMAL-SERVICE. The UE shall delete any mapped 5G NAS security context or partial native 5G NAS security context.

 If the service request was initiated for emergency services fallback, the UE shall attempt to select an E-UTRA cell connected to EPC or 5GCN according to the domain priority and selection rules specified in 3GPP TS 23.167 [6]. If the UE finds a suitable E-UTRA cell, it then proceeds with the appropriate EMM or 5GMM procedures. If the UE operating in single-registration mode has changed to S1 mode, it shall disable the N1 mode capability for 3GPP access.

 If the rejected request was neither for initiating an emergency PDU session nor for emergency services fallback, the UE shall perform a new initial registration procedure.

NOTE 6: User interaction is necessary in some cases when the UE cannot re-establish the PDU session(s) automatically.

 If the message was received via 3GPP access and the UE is operating in the single-registration mode, the UE shall handle the EMM state as specified in 3GPP TS 24.301 [15] for the case when the service request procedure is rejected with the EMM cause with the same value.

#11 (PLMN not allowed).

 This cause value received from a cell belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.6.1.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall delete the list of equivalent PLMNs and store the PLMN identity in the forbidden PLMN list as specified in subclause 5.3.13A and if the UE is configured to use timer T3245 then the UE shall start timer T3245 and proceed as described in clause 5.3.19a.1. For 3GPP access, the UE shall enter the state 5GMM-DEREGISTERED.PLMN-SEARCH and perform a PLMN selection according to 3GPP TS 23.122 [5], and for non-3GPP access the UE shall enter state 5GMM-DEREGISTERED.LIMITED-SERVICE and perform network selection as defined in 3GPP TS 24.502 [18]. If the message has been successfully integrity checked by the NAS and the UE mantains the PLMN-specific attempt counter and the PLMN-specific attempt counter for non-3GPP access for that PLMN, the UE shall set the PLMN-specific attempt counter and the PLMN-specific attempt counter for non-3GPP access for that PLMN to the UE implementation-specific maximum value.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list and eKSI as specified in 3GPP TS 24.301 [15] for the case when the service request procedure is rejected with the EMM cause with the same value.

 If the message has been successfully integrity checked by the NAS and the UE also supports the registration procedure over the other access to the same PLMN, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

#12 (Tracking area not allowed).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI.

 If:

1) the UE is not operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for regional provision of service" and enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE. If the SERVICE REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "5GS forbidden tracking areas for regional provision of service" for non-integrity protected NAS reject message; or

2) the UE is operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for regional provision of service" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, and enter the state 5GMM-DEREGISTERED.LIMITED-SERVICE. If the SERVICE REJECT message is not integrity protected, the UE shall memorize the current TAI was stored in the list of "5GS forbidden tracking areas for regional provision of service" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, for non-integrity protected NAS reject message.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state, EPS update status, 4G-GUTI, last visited registered TAI, TAI list and eKSI as specified in 3GPP TS 24.301 [15] for the case when the service request procedure is rejected with the EMM cause with the same value.

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

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2). For 3GPP access the UE shall enter the state 5GMM-REGISTERED.PLMN-SEARCH, and for non-3GPP access the UE shall enter the state 5GMM-REGISTERED.LIMITED-SERVICE.

 If:

1) the UE is not operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS 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 "5GS forbidden tracking areas for roaming" for non-integrity protected NAS reject message; or

2) the UE is operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, 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 "5GS forbidden tracking areas for roaming" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, for non-integrity protected NAS reject message.

 For 3GPP access the UE shall perform a PLMN selection or SNPN selection according to 3GPP TS 23.122 [5], and for non-3GPP access the UE shall perform network selection as defined in 3GPP TS 24.502 [18].

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters EMM state and EPS update status as specified in 3GPP TS 24.301 [15] for the case when the service request procedure is rejected with the EMM cause with the same value.

#15 (No suitable cells in tracking area).

 The UE shall enter the state 5GMM-REGISTERED.LIMITED-SERVICE.

 If:

1) the UE is not operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS 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 "5GS forbidden tracking areas for roaming" for non-integrity protected NAS reject message; or

2) the UE is operating in SNPN access operation mode, the UE shall store the current TAI in the list of "5GS forbidden tracking areas for roaming" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, 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 "5GS forbidden tracking areas for roaming" for the current SNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription, for non-integrity protected NAS reject message.

 If the UE initiated service request for emergency services fallback, the UE shall attempt to select an E-UTRA cell connected to EPC or 5GC according to the emergency services support indicator (see 3GPP TS 36.331 [25A]). If the UE finds a suitable E-UTRA cell, it then proceeds with the appropriate EMM or 5GMM procedures. If the UE operating in single-registration mode has changed to S1 mode, it shall disable the N1 mode capability for 3GPP access.

 If the service request was not initiated for emergency services fallback, the UE shall search for a suitable cell in another tracking area according to 3GPP TS 38.304 [28] or 3GPP TS 36.304 [25C].

 If the message was received via 3GPP access and the UE is operating in the single-registration mode, the UE shall handle the EMM parameters EMM state and EPS update status as specified in 3GPP TS 24.301 [15] for the case when the service request procedure is rejected with the EMM cause with the same value.

 If received over non-3GPP access the cause shall be considered as an abnormal case and the behaviour of the UE for this case is specified in subclause 5.6.1.7.

#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 5.6.1.7.

 If the rejected request was not for initiating an emergency PDU session, the UE shall abort the service request procedure and enter state 5GMM-REGISTERED and stop timer T3517 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 [12].

 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 the message was received via 3GPP access and the UE is operating in the single-registration mode, the UE shall handle the EMM parameters EMM state and EPS update status as specified in 3GPP TS 24.301 [15] for the case when the service request procedure is rejected with the EMM cause with the same value.

 If the service request procedure was initiated 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 was not accepted due to congestion shall be provided to the upper layers.

 If the UE is using 5GS services with control plane CIoT 5GS 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:

a) stop timer T3448 if it is running;

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

c) start timer T3448:

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

2) with a random value from the default range specified in 3GPP TS 24.301 [15] table 10.2.1 if the SERVICE REJECT message is not integrity protected.

 If the UE is using 5GS services with control plane CIoT 5GS optimization, 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 ignore the T3448 value IE and:

a) stop timer T3448 if it is running; and

b) consider the transport of user data via the control plane as unsuccessful.

 If the UE is using 5GS services with control plane CIoT 5GS optimization and if the T3448 value IE is not present in the SERVICE REJECT message, it shall be considered as an abnormal case and the behaviour of UE for this case is specified in subclause 5.6.1.7.

#27 (N1 mode not allowed).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall enter the state 5GMM-REGISTERED.LIMITED-SERVICE. If the message has been successfully integrity checked by the NAS, the UE shall set:

1) the PLMN-specific N1 mode attempt counter for 3GPP access and the PLMN-specific N1 mode attempt counter for non-3GPP access for that PLMN in case of PLMN; or

2) the SNPN-specific attempt counter for 3GPP access for the current SNPN and the SNPN-specific attempt counter for non-3GPP access for the current SNPN in case of SNPN

 to the UE implementation-specific maximum value.

 The UE shall disable the N1 mode capability for the specific access type for which the message was received (see subclause 4.9).

 If the message has been successfully integrity checked by the NAS, the UE shall disable the N1 mode capability also for the other access type (see subclause 4.9).

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition set the EPS update status to EU3 ROAMING NOT ALLOWED and enter the state EMM-REGISTERED.

#28 (Restricted service area).

 The UE shall enter the state 5GMM-REGISTERED.NON-ALLOWED-SERVICE, wait for the release of the N1 NAS signalling connection and perform the registration procedure for mobility and periodic registration update if the service type IE in the SERVICE REQUEST message was not set to "elevated signalling" and the SERVICE REJECT message is received over 3GPP access (see subclause 5.3.5 and 5.5.1.3).

 If the service type IE in the SERVICE REQUEST message was set to "elevated signalling", the UE shall not re-initiate service request procedure until the UE enters an allowed area or leaves a non-allowed area, except for emergency services, high priority access or responding to paging or notification.

#31 (Redirection to EPC required).

 5GMM cause #31 received by a UE that has not indicated support for CIoT optimizations or received by a UE over non-3GPP access is considered an abnormal case and the behaviour of the UE is specified in subclause 5.6.1.7.

 This cause value received from a cell belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.6.1.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2). The UE shall reset the service request attempt counter and enter the state 5GMM-REGISTERED.LIMITED-SERVICE.

 The UE shall enable the E-UTRA capability if it was disabled and disable the N1 mode capability for 3GPP access (see subclause 4.9.2).

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall handle the EMM parameters, EMM state, and EPS update status as specified in 3GPP TS 24.301 [15] for the case when the service request procedure is rejected with the EMM cause with the same value.

#72 (Non-3GPP access to 5GCN not allowed).

 If the UE initiated the service request procedure over non-3GPP access, the UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI for non-3GPP access. Additionally, the UE shall enter the state 5GMM-DEREGISTERED for non-3GPP access. If the message has been successfully integrity checked by the NAS, the UE shall set:

1) the PLMN-specific N1 mode attempt counter for non-3GPP access for that PLMN in case of PLMN; or

2) the SNPN-specific attempt counter for non-3GPP access for that SNPN in case of SNPN;

 to the UE implementation-specific maximum value.

NOTE 7: The 5GMM sublayer states, the 5GMM parameters and the registration status are managed per access type independently, i.e. 3GPP access or non-3GPP access (see subclauses 4.7.2 and 5.1.3).

 The UE shall disable the N1 mode capability for non-3GPP access (see subclause 4.9.3).

 As an implementation option, if the UE is not currently registered over 3GPP access, the UE may enter the state 5GMM-DEREGISTERED.PLMN-SEARCH in order to perform a PLMN selection according to 3GPP TS 23.122 [5].

 If received over 3GPP access the cause shall be considered as an abnormal case and the behaviour of the UE for this case is specified in subclause 5.6.1.7.

#73 (Serving network not authorized).

 This cause value received from a cell belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.6.1.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall delete the list of equivalent PLMNs, store the PLMN identity in the forbidden PLMN list as specified in subclause 5.3.13A. For 3GPP access the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH in order to perform a PLMN selection according to 3GPP TS 23.122 [5], and for non-3GPP access the UE shall enter state 5GMM-DEREGISTERED.LIMITED-SERVICE in order to perform network selection as defined in 3GPP TS 24.502 [18]. If the message has been successfully integrity checked by the NAS, the UE shall set the PLMN-specific attempt counter and the PLMN-specific attempt counter for non-3GPP access for that PLMN to the UE implementation-specific maximum value.

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition set the EPS update status to EU3 ROAMING NOT ALLOWED, enter the state EMM-DEREGISTERED and shall delete any 4G-GUTI, last visited registered TAI, TAI list and eKSI.

#74 (Temporarily not authorized for this SNPN).

 5GMM cause #74 is only applicable when received from a cell belonging to an SNPN. 5GMM cause #74 received from a cell not belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.6.1.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall store the SNPN identity in the "temporarily forbidden SNPNs" list for the specific access type for which the message was received and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription. If the UE is not registered for onboarding services in SNPN, the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform an SNPN selection according to 3GPP TS 23.122 [5]. If the UE is registered for onboarding services in SNPN, the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform an SNPN selection for onboarding services according to 3GPP TS 23.122 [5]. If the message has been successfully integrity checked by the NAS, the UE shall set the SNPN-specific attempt counter for 3GPP access and the SNPN-specific attempt counter for non-3GPP access for the current SNPN to the UE implementation-specific maximum value.

 If the message has been successfully integrity checked by the NAS and the UE also supports the registration procedure over the other access to the same SNPN, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

NOTE 8: When 5GMM cause #74 is received over 3GPP access, the term "other access" in "the UE also supports the registration procedure over the other access to the same SNPN" is used to express access to SNPN services via a PLMN.

#75 (Permanently not authorized for this SNPN).

 5GMM cause #75 is only applicable when received from a cell belonging to an SNPN with a globally-unique SNPN identity. 5GMM cause #75 received from a cell not belonging to an SNPN or a cell belonging to an SNPN with a non-globally-unique SNPN identity is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.6.1.7.

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete any 5G-GUTI, last visited registered TAI, TAI list and ngKSI. The UE shall store the SNPN identity in the "permanently forbidden SNPNs" list for the specific access type for which the message was received and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription. If the UE is not registered for onboarding services in SNPN, the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform an SNPN selection according to 3GPP TS 23.122 [5]. If the UE is registered for onboarding services in SNPN, the UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform an SNPN selection for onboarding services according to 3GPP TS 23.122 [5]. If the message has been successfully integrity checked by the NAS, the UE shall set the SNPN-specific attempt counter for 3GPP access and the SNPN-specific attempt counter for non-3GPP access for the current SNPN to the UE implementation-specific maximum value.

 If the message has been successfully integrity checked by the NAS and the UE also supports the registration procedure over the other access to the same SNPN, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

NOTE 9: When 5GMM cause #75 is received over 3GPP access, the term "other access" in "the UE also supports the registration procedure over the other access to the same SNPN" is used to express access to SNPN services via a PLMN.

#76 (Not authorized for this CAG or authorized for CAG cells only).

 This cause value received via non-3GPP access or from a cell belonging to an SNPN is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.6.1.7.

 The UE shall set the 5GS update status to 5U3.ROAMING NOT ALLOWED, store the 5GS update status according to clause 5.1.3.2.2.

 If 5GMM cause #76 is received from:

1) a CAG cell, and if the UE receives a "CAG information list" in the CAG information list IE included in the SERVICE REJECT message, the UE shall:

i) replace the "CAG information list" stored in the UE with the received "CAG information list" when received in the HPLMN or EHPLMN;

ii) replace the serving VPLMN's entry of the "CAG information list" stored in the UE with the serving VPLMN's entry of the received CAG information list IE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN; or

NOTE 10: When the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN, entries of a PLMN other than the serving VPLMN, if any, in the received CAG information list IE are ignored.

iii) remove the serving VPLMN's entry of the "CAG information list" stored in the UE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN and the CAG information list IE does not contain the serving VPLMN's entry.

 Otherwise, the UE shall delete the CAG-ID from the "allowed CAG list" for the current PLMN. In the case the "allowed CAG list" for the current PLMN only contains a range of CAG-IDs, how the UE deletes the CAG-ID(s) of the cell from the "allowed CAG list" for the current PLMN is up to UE implementation. In addition:

i) if the entry in the "CAG information list" for the current PLMN does not include an "indication that the UE is only allowed to access 5GS via CAG cells" or if the entry in the "CAG information list" for the current PLMN includes an "indication that the UE is only allowed to access 5GS via CAG cells" and the updated "allowed CAG list" for the current PLMN includes one or more CAG-IDs, then the UE shall enter the state 5GMM-REGISTERED.LIMITED-SERVICE and shall search for a suitable cell according to 3GPP TS 38.304 [28] or 3GPP TS 36.304 [25C] with the updated "CAG information list";

ii) if the entry in the "CAG information list" for the current PLMN includes an "indication that the UE is only allowed to access 5GS via CAG cells" and the updated "allowed CAG list" for the current PLMN does not include any CAG-ID, then the UE shall enter the state 5GMM-DEREGISTERED.PLMN-SEARCH and shall apply the PLMN selection process defined in 3GPP TS 23.122 [6] with the updated "CAG information list"; or

iii) if the "CAG information list" does not include an entry for the current PLMN, then the UE shall enter the state 5GMM-REGISTERED.LIMITED-SERVICE and shall search for a suitable cell according to 3GPP TS 38.304 [28] or 3GPP TS 36.304 [25C] with the updated "CAG information list".

2) a non-CAG cell, and if the UE receives a "CAG information list" in the CAG information list IE included in the SERVICE REJECT message, the UE shall:

i) replace the "CAG information list" stored in the UE with the received "CAG information list" when received in the HPLMN or EHPLMN;

ii) replace the serving VPLMN's entry of the "CAG information list" stored in the UE with the serving VPLMN's entry of the received CAG information list IE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN; or

NOTE 11: When the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN, entries of a PLMN other than the serving VPLMN, if any, in the received CAG information list IE are ignored.

iii) remove the serving VPLMN's entry of the "CAG information list" stored in the UE when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN and the CAG information list IE does not contain the serving VPLMN's entry.

 Otherwise, the UE shall store an "indication that the UE is only allowed to access 5GS via CAG cells" in the entry of the "CAG information list" for the current PLMN, if any. If the "CAG information list" stored in the UE does not include the current PLMN's entry, the UE shall add an entry for the current PLMN to the "CAG information list" and store an "indication that the UE is only allowed to access 5GS via CAG cells" in the entry of the "CAG information list" for the current PLMN. If the UE does not have a stored "CAG information list", the UE shall create a new "CAG information list" and add an entry with an "indication that the UE is only allowed to access 5GS via CAG cells" for the current PLMN.

In addition:

i) if the "allowed CAG list" for the current PLMN includes one or more CAG-IDs, then the UE shall enter the state 5GMM-REGISTERED.LIMITED-SERVICE and shall search for a suitable cell according to 3GPP TS 38.304 [28] with the updated CAG information; or

ii) if the "allowed CAG list" for the current PLMN does not include any CAG-ID, then the UE shall enter the state 5GMM-DEREGISTERED.PLMN-SEARCH and shall apply the PLMN selection process defined in 3GPP TS 23.122 [6] with the updated "CAG information list".

 If the message was received via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition set the EPS update status to EU3 ROAMING NOT ALLOWED, reset the attach attempt counter and enter the state EMM-REGISTERED.

#77 (Wireline access area not allowed).

 5GMM cause #77 is only applicable when received from a wireline access network by the 5G-RG or the W-AGF acting on behalf of the FN-CRG (or on behalf of the N5GC device). 5GMM cause #77 received from a 5G access network other than a wireline access network and 5GMM cause #77 received by the W-AGF acting on behalf of the FN-BRG are considered as abnormal cases and the behaviour of the UE is specified in subclause 5.6.1.7.

 When received over wireline access network, the 5G-RG and the W-AGF acting on behalf of the FN-CRG (or on behalf of the N5GC device) shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2), shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI, shall enter the state 5GMM-DEREGISTERED and shall act as specified in subclause 5.3.23.

NOTE 12: The 5GMM sublayer states, the 5GMM parameters and the registration status are managed per access type independently, i.e. 3GPP access or non-3GPP access (see subclauses 4.7.2 and 5.1.3).

#78 (PLMN not allowed to operate at the present UE location).

 This cause value received from a non-satellite NG-RAN cell is considered as an abnormal case and the behaviour of the UE is specified in subclause 5.6.1.7.

 If the UE Access restriction IE is received, the UE shall apply the indicated values of Access restriction time and Access restriction distance as the minimum values for the timer T3578 value and the minimum value for the distance of the UE from the current UE location (see subclause 5.3.x).

 The UE shall set the 5GS update status to 5U3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.2.2) and shall delete 5G-GUTI, last visited registered TAI, TAI list and ngKSI. Additionally, the UE shall delete the list of equivalent PLMNs (if available) and reset the registration attempt counter. The UE shall store the PLMN ID and, if it is known, the current UE location in the list of "PLMNs not allowed to operate at the present UE location" and shall start a corresponding T3578 timer instance. The UE shall enter state 5GMM-DEREGISTERED.PLMN-SEARCH and perform a PLMN selection according to 3GPP TS 23.122 [5].

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

### 8.2.9 Registration reject

#### 8.2.9.1 Message definition

The REGISTRATION REJECT message is sent by the AMF to the UE. See table 8.2.9.1.1.

Message type: REGISTRATION REJECT

Significance: dual

Direction: network to UE

Table 8.2.9.1.1: REGISTRATION REJECT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Extended protocol discriminator | Extended protocol discriminator9.2 | M | V | 1 |
|  | Security header type | Security header type9.3 | M | V | 1/2 |
|  | Spare half octet | Spare half octet9.5 | M | V | 1/2 |
|  | Registration reject message identity | Message type9.7 | M | V | 1 |
|  | 5GMM cause | 5GMM cause9.11.3.2 | M | V | 1 |
| 5F | T3346 value | GPRS timer 29.11.2.4 | O | TLV | 3 |
| 16 | T3502 value | GPRS timer 29.11.2.4 | O | TLV | 3 |
| 78 | EAP message | EAP message9.11.2.2 | O | TLV-E | 7-1503 |
| 69 | Rejected NSSAI | Rejected NSSAI9.11.3.46 | O | TLV | 4-42 |
| 75 | CAG information list | CAG information list9.11.3.18A | O | TLV-E | 3-n |
| 68 | Extended rejected NSSAI | Extended rejected NSSAI9.11.3.75 | O | TLV | 5-90 |
| X1 | Access re-attempt restriction | Access re-attempt restriction9.11.3.x2 | O | TV | 4 |

\* \* \* Next Change \* \* \* \*

#### 8.2.9.x Access re-attempt restriction

The network may include this IE if 5GMM cause value #78 is indicated if the network wants to indicate a minimum time or UE travelled distance before a registration re-attempt is allowed to this PLMN.

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

### 8.2.14 De-registration request (UE terminated de-registration)

#### 8.2.14.1 Message definition

The DEREGISTRATION REQUEST message is sent by the AMF to the UE. See table 8.2.14.1.1.

Message type: DEREGISTRATION REQUEST

Significance: dual

Direction: network to UE

Table 8.2.14.1.1: DEREGISTRATION REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Extended protocol discriminator | Extended protocol discriminator9.2 | M | V | 1 |
|  | Security header type | Security header type9.3 | M | V | 1/2 |
|  | Spare half octet | Spare half octet9.5 | M | V | 1/2 |
|  | De-registration request message identity | Message type9.7 | M | V | 1 |
|  | De-registration type | De-registration type9.11.3.20 | M | V | 1/2 |
|  | Spare half octet | Spare half octet9.5 | M | V | 1/2 |
| 58 | 5GMM cause | 5GMM cause9.11.3.2 | O | TV | 2 |
| 5F | T3346 value | GPRS timer 29.11.2.4 | O | TLV | 3 |
| 6D | Rejected NSSAI | Rejected NSSAI9.11.3.46 | O | TLV | 4-42 |
| 75 | CAG information list | CAG information list9.11.3.18A | O | TLV-E | 3-n |
| 68 | Extended rejected NSSAI | Extended rejected NSSAI9.11.3.75 | O | TLV | 5-90 |
| X1 | Access re-attempt restriction | Access re-attempt restriction9.11.3.x2 | O | TV | 4 |

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

#### 8.2.14.x Access re-attempt restriction

The network may include this IE if 5GMM cause value #78 is indicated if the network wants to indicate a minimum time or UE travelled distance before a registration re-attempt is allowed to this PLMN.

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

### 8.2.18 Service reject

#### 8.2.18.1 Message definition

The SERVICE REJECT message is sent by the AMF to the UE in order to reject the service request procedure. See table 8.2.18.1.1.

Message type: SERVICE REJECT

Significance: dual

Direction: network to UE

Table 8.2.18.1.1: SERVICE REJECT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Extended protocol discriminator | Extended protocol discriminator9.2 | M | V | 1 |
|  | Security header type | Security header type9.3 | M | V | 1/2 |
|  | Spare half octet | Spare half octet9.5 | M | V | 1/2 |
|  | Service reject message identity | Message type9.7 | M | V | 1 |
|  | 5GMM cause | 5GMM cause9.11.3.2 | M | V | 1 |
| 50 | PDU session status | PDU session status9.11.3.44 | O | TLV | 4-34 |
| 5F | T3346 value | GPRS timer 29.11.2.4 | O | TLV | 3 |
| 78 | EAP message | EAP message9.11.2.2 | O | TLV-E | 7-1503 |
| 6B | T3448 value | GPRS timer 29.11.2.4 | O | TLV | 3 |
| 75 | CAG information list | CAG information list9.11.3.18A | O | TLV-E | 3-n |
| X1 | Access re-attempt restriction | Access re-attempt restriction9.11.3.x2 | O | TV | 4 |

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

#### 8.2.18.x Access re-attempt restriction

The network may include this IE if 5GMM cause value #78 is indicated if the network wants to indicate a minimum time or UE travelled distance before a registration re-attempt is allowed to this PLMN.

\* \* \* Next Change \* \* \* \*

#### 9.11.3.x2 Access re-attempt restriction

The purpose of the Access re-attempt restriction information element is to indicate.

The Access re-attempt restriction is a type 4 information element with a length of 4 octets.

The Access re-attempt restriction information element is coded as shown in figure 9.11.3.x2.1 and table 9.11.3.x2.1.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
|  | Access re-attempt restriction IEI | octet 1 |
|  | Length of Access re-attempt restriction contents | octet2 |
|  | Time unit | Timer value | octet 3 |
|  | Distance unit | Distance value | octet 4 |

Figure 10.5.146/3GPP TS 24.008: Access re-attempt restrictioninformation element

Table 9.11.3.2A.1: Access re-attempt restriction information element

|  |
| --- |
| Timer value (octet 3)Bits 5 to 1 represent the binary coded timer value.Bits 6 to 8 defines the timer value unit for Access re-attempt restriction timer as follows:Bits **8 7 6**0 0 0 value is incremented in multiples of 2 seconds0 0 1 value is incremented in multiples of 10 seconds0 1 0 value is incremented in multiples of 1 minute0 1 1 value is incremented in multiples of decihours1 1 1 value indicates that the timer is deactivated.Other values shall be interpreted as multiples of 2 seconds in this version of the protocol.Distance value (octet 4)Bits 5 to 1 represent the binary coded distance value.Bits 6 to 8 defines the distance value unit for Access re-attempt restriction distance as follows:Bits **8 7 6**0 0 0 value is incremented in multiples of 1 meter0 0 1 value is incremented in multiples of 10 meters 0 1 0 value is incremented in multiples of 100 meters0 1 1 value is incremented in multiples of 1 kilometers1 0 0 value is incremented in multiples of 10 kilometers1 0 1 value is incremented in multiples of 100 kilometers1 1 1 value indicates that no distance value shall be applied.Other values shall be interpreted as multiples of 1 kilometer in this version of the protocol. |

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

## 10.2 Timers of 5GS mobility management

Timers of 5GS mobility management are shown in table 10.2.1 and table 10.2.2.

NOTE: Timers T3324, T3346, T3245 and T3247 are defined in 3GPP TS 24.008 [12]. Timers T3444, T3445, T3447 and T3448 are defined in 3GPP TS 24.301 [15].

Table 10.2.1: Timers of 5GS mobility management – UE side

| TIMER NUM. | TIMER VALUE | STATE | CAUSE OF START | NORMAL STOP | ON EXPIRY |
| --- | --- | --- | --- | --- | --- |
| T3502 | Default 12 min.NOTE 1 | 5GMM-DEREGISTERED 5GMM-REGISTERED | At registration failure and the attempt counter is equal to 5 | Transmission of REGISTRATION REQUEST message | Initiation of the registration procedure, if still required |
| T3510 | 15sNOTE 7NOTE 8In WB-N1/CE mode, 85s | 5GMM-REGISTERED-INITIATED | Transmission of REGISTRATION REQUEST message | REGISTRATION ACCEPT message received or REGISTRATION REJECT message received | Start T3511 or T3502 as specified in subclause 5.5.1.2.7 if T3510 expired during registration procedure for initial registration.Start T3511 or T3502 as specified in subclause 5.5.1.3.7 if T3510 expired during the registration procedure for mobility and periodic registration update |
| T3511 | 10s | 5GMM-DEREGISTERED.ATTEMPTING-REGISTRATION5GMM-REGISTERED.ATTEMPTING-REGISTRATION-UPDATE5GMM-REGISTERED.NORMAL-SERVICE or 5GMM-REGISTERED.NON-ALLOWED-SERVICE | At registration failure due to lower layer failure, T3510 timeout or registration rejected with other 5GMM cause values than those treated in subclause 5.5.1.2.5 for initial registration or subclause 5.5.1.3.5 for mobility and periodic registration | Transmission of REGISTRATION REQUEST message5GMM-CONNECTED mode entered (NOTE 5) | Retransmission of the REGISTRATION REQUEST, if still required |
| T3512 | Default 54 minNOTE 1NOTE 2 | 5GMM-REGISTERED | In 5GMM-REGISTERED, when 5GMM-CONNECTED mode is left and if the NW does not indicate support for strictly periodic registration timer as specified in subclause 5.3.7.If the network indicates support for strictly periodic registration timer, T3512 is started after the successful completion of registration update procedure. T3512 is restarted if it expires in 5GMM-CONNECTED mode as specified in subclause 5.3.7. | When entering state 5GMM-DEREGISTEREDWhen entering 5GMM-CONNECTED mode if the NW does not indicate support for strictly periodic registration timer as specified in subclause 5.3.7. | In 5GMM-IDLE mode, Initiation of the periodic registration procedure if the UE is not registered for emergency services.In 5GMM-CONNECTED mode, restart the timer T3512.Locally deregister if the UE is registered for emergency services |
| T3516 | 30sNOTE 7NOTE 8In WB-N1/CE mode, 48s | 5GMM-REGISTERED-INITIATED5GMM-REGISTERED5GMM-DEREGISTERED-INITIATED5GMM-SERVICE-REQUEST-INITIATED | RAND and RES\* stored as a result of an 5G authentication challenge | SECURITY MODE COMMAND receivedSERVICE REJECT receivedREGISTRATION ACCEPT receivedAUTHENTICATION REJECT receivedAUTHENTICATION FAILURE sent5GMM-DEREGISTERED, 5GMM-NULL or5GMM-IDLE mode entered | Delete the stored RAND and RES\* |
| T3517 | (a) 5s for case h) in subclause 5.6.1.1; or(b) 15s for cases other than h) in subclause 5.6.1.1NOTE 7NOTE 8NOTE 10In WB-N1/CE mode, 61s | 5GMM-SERVICE-REQUEST-INITIATED | Transmission of SERVICE REQUEST message, or CONTROL PLANE SERVICE REQUEST message | (a) Indication from the lower layers that the UE has changed to S1 mode or E-UTRA connected to 5GCN for case h) in subclause 5.6.1.1; or(b) SERVICE ACCEPT message received, orSERVICE REJECT message received for cases other than h) in subclause 5.6.1.1see subclause 5.6.1.4.2 | Abort the procedure |
| T3519 | 60sNOTE 7NOTE 8In WB-N1/CE mode, 90s | 5GMM-REGISTERED-INITIATED5GMM-REGISTERED5GMM-DEREGISTERED-INITIATED5GMM-SERVICE-REQUEST-INITIATED (NOTE 6) | Transmission of IDENTITY RESPONSE message, REGISTRATION REQUEST message, or DEREGISTRATION REQUEST message with freshly generated SUCI | REGISTRATION ACCEPT message with new 5G-GUTI receivedCONFIGURATION UPDATE COMMAND message with new 5G-GUTI received DEREGISTRATION ACCEPT message | Delete stored SUCI |
| T3520 | 15sNOTE 7NOTE 8In WB-N1/CE mode, 33s | 5GMM-REGISTERED-INITIATED5GMM-REGISTERED5GMM-DEREGISTERED-INITIATED5GMM-SERVICE-REQUEST-INITIATED | Transmission of AUTHENTICATION FAILURE message with any of the 5GMM cause #20, #21, #26 or #71Transmission of AUTHENTICATION RESPONSE message with an EAP-response message after detection of an error as described in subclause 5.4.1.2.2.4 | AUTHENTICATION REQUEST message received or AUTHENTICATION REJECT message receivedorSECURITY MODE COMMAND message receivedwhen entering 5GMM-IDLE modeindication of transmission failure of AUTHENTICATION FAILURE message from lower layers | On first expiry during a 5G AKA based primary authentication and key agreement procedure, the UE should consider the network as false and follow item g of subclause 5.4.1.3.7, if the UE is not registered for emergency services.On first expiry during a 5G AKA based primary authentication and key agreement procedure, the UE will follow subclause 5.4.1.3.7 under "For items c, d, e and f:", if the UE is registered for emergency services.On first expiry during an EAP based primary authentication and key agreement procedure, the UE should consider the network as false and follow item e of subclause 5.4.1.2.4.5, if the UE is not registered for emergency services.On first expiry during an EAP based primary authentication and key agreement procedure, the UE will follow subclause 5.4.1.2.4.5 under "For item e:", if the UE is registered for emergency services |
| T3521 | 15sNOTE 7NOTE 8In WB-N1/CE mode, 45s | 5GMM-DEREGISTERED-INITIATED | Transmission of DEREGISTRATION REQUEST message when de-registration procedure is not due to a "switch off" | DEREGISTRATION ACCEPT message received | Retransmission of DEREGISTRATION REQUEST message |
| T3525 | Default 60sNOTE 3NOTE 7NOTE 8In WB-N1/CE mode, default 120s | 5GMM-REGISTERED.NORMAL-SERVICE or 5GMM-REGISTERED.NON-ALLOWED-SERVICE | T3517 expires and service request attempt counter is greater than or equal to 5 | When entering state other than 5GMM-REGISTERED.NORMAL-SERVICE state or 5GMM-REGISTERED.NON-ALLOWED-SERVICE,orUE camped on a new PLMN other than the PLMN on which timer started,orUser-plane resources established with the network | The UE may initiate service request procedure |
|  |  |  |  |  |  |
| T3540 | 10sNOTE 7 (applicable to case f) in subclause 5.3.1.3)NOTE 8In WB-N1/CE mode, 34s (applicable to case f) in subclause 5.3.1.3)NOTE 11 | 5GMM-DEREGISTERED5GMM-REGISTERED | REGISTRATION REJECT message or DEREGISTRATION REQUEST message received with any of the 5GMM cause #3, #6, #7, #11, #12, #13, #15, #27, #31, #62, #72, #73, #74, #75 or #76SERVICE REJECT message received with any of the 5GMM cause #3, #6, #7, #11, #12, #13, #15, #27, #72, #73, #74, #75 or #76.REGISTRATION ACCEPT message received as described in subclause 5.3.1.3 case b) and case h)SERVICE ACCEPT message received as described in subclause 5.3.1.3 case f)AUTHENTICATION REJECT message received | N1 NAS signalling connection releasedPDU sessions have been set up except for the case the UE has set Request type to "NAS signalling connection release" in the UE request type IE in the REGISTRATION REQUEST message as described in subclause 5.3.1.3 case b)Other use cases see subclause 5.3.1.3 | Release the NAS signalling connection for the cases a), b), f) and g) as described in subclause 5.3.1.3 |
| 5GMM-REGISTERED | CONFIGURATION UPDATE COMMAND message received as described in subclause 5.3.1.3 case e) and h)SERVICE ACCEPT message received as described in subclause 5.3.1.3 case i) | N1 NAS signalling connection released Other use cases see subclause 5.3.1.3 | Release the NAS signalling connection for the case e) and perform a new registration procedure as described in subclause 5.5.1.3.2Release the NAS signalling connection for the case h) and i) as described in subclause 5.3.1.3 |
| 5GMM-DEREGISTERED5GMM-DEREGISTERED.NORMAL-SERVICE5GMM-REGISTERED.NON-ALLOWED-SERVICE | REGISTRATION REJECT message received with the 5GMM cause #9 or #10SERVICE REJECT message received with the 5GMM cause #9, #10 or #28 | Release the NAS signalling connection for the cases c) and d) as described in subclause 5.3.1.3 and initiation of the registration procedure as specified in subclause 5.5.1.2.2 or 5.5.1.3.2 |
| T3578 | NOTE x | All 5GMM states over 3GPP access while camped on a satellite NG-RAN cell | Any 5GMM message with 5GMM cause value #78 received on a satellite NG-RAN cell | Successful registration to the PLMN stored in the list entry, if conditions as specified in subclause 5.3.x are fulfilled. | See subclause 5.3.x |
| Non-3GPP de-registration timer | Default 54 min.NOTE 1NOTE 2NOTE 4 | All 5GMM states over non-3GPP access except 5GMM-DEREGISTERED over non-3GPP access | Entering 5GMM-IDLE mode over non-3GPP access | N1 NAS signalling connection over non-3GPP access established or when entering state 5GMM-DEREGISTERED over non-3GPP access | Implicitly de-register the UE for non-3GPP access on 1st expiry |
|  |  |  |  |  |  |
| NOTE 1: The value of this timer is provided by the network operator during the registration procedure.NOTE 2: The default value of this timer is used if the network does not indicate a value in the REGISTRATION ACCEPT message and the UE does not have a stored value for this timer.NOTE 3: The value of this timer is UE implementation specific, with a minimum value of 60 seconds if not in NB-N1 mode and if not in WB-N1/CE mode.NOTE 4: If the T3346 value received in the mobility management messages is greater than the value of the non-3GPP de-registration timer, the UE sets the non-3GPP de-registration timer value to be 4 minutes greater than the value of timer T3346.NOTE 5: The conditions for which this applies are described in subclause 5.5.1.3.7.NOTE 6: The conditions for which this applies to the 5GMM-SERVICE-REQUEST-INITIATED state are described in subclause 5.4.1.3.7 case c) and case d).NOTE 7: In NB-N1 mode, the timer value shall be calculated as described in subclause 4.17.NOTE 8: In WB-N1 mode, if the UE supports CE mode B and operates in either CE mode A or CE mode B, then the timer value is as described in this table for the case of WB-N1/CE mode (see subclause 4.19).NOTE 9: The value of this timer is provided by the network operator during the registration procedure or the generic UE configuration update procedure along with the rejected S-NSSAI with rejection cause "maximum number of UEs per network slice reached". The default value of this timer is implementation specific with a minimum value of 12 minutes and used if the network does not provide a value in the REGISTRATION ACCEPT message, the REGISTRATION REJECT message, or the CONFIGURATION UPDATE COMMAND message along with the rejected S-NSSAI with rejection cause "maximum number of UEs per network slice reached".NOTE 10: Based on implementation, the timer may be set to a value between 250ms and 15s when the MUSIM-capable UE indicates "NAS signalling connection release" in the UE request type IE of the SERVICE REQUEST message or CONTROL PLANE SERVICE REQUEST message.NOTE 11: Based on implementation, the timer may be set to a value between 250ms and 10s when the MUSIM capable UE not in NB-N1 mode or WB-N1 mode indicated "NAS signalling connection release" or "Rejection of paging" in the UE request type IE of the SERVICE REQUEST message or CONTROL PLANE SERVICE REQUEST message; or indicated "NAS signalling connection release" in the UE request type IE of the REGISTRATION REQUEST message.NOTE x: See subclause 5.3.x. |

Table 10.2.2: Timers of 5GS mobility management – AMF side

| TIMER NUM. | TIMER VALUE | STATE | CAUSE OF START | NORMAL STOP | ON EXPIRY |
| --- | --- | --- | --- | --- | --- |
| T3513NOTE 7NOTE 9 | NOTE 4 | 5GMM-REGISTERED | Paging procedure initiated | Paging procedure completed as specified in subclause 5.6.2.2.1 | Network dependent |
| T3522NOTE 6NOTE 8 | 6sIn WB-N1/CE mode, 24s | 5GMM-DEREGISTERED-INITIATED | Transmission of DEREGISTRATION REQUEST message | DEREGISTRATION ACCEPT message received | Retransmission of DEREGISTRATION REQUEST message |
| T3550NOTE 6NOTE 8 | 6sIn WB-N1/CE mode, 18s | 5GMM-COMMON-PROCEDURE-INITIATED | Transmission of REGISTRATION ACCEPT message as specified in subclause 5.5.1.2.4 and 5.5.1.3.4 | REGISTRATION COMPLETE message received | Retransmission of REGISTRATION ACCEPT message |
| T3555NOTE 6NOTE 8 | 6sIn WB-N1/CE mode, 24s | 5GMM-REGISTERED | Transmission of CONFIGURATION UPDATE COMMAND message with "acknowledgement requested" set in the Acknowldgement bit of the Configuration update indication IE | CONFIGURATION UPDATE COMPLETE message received | Retransmission of CONFIGURATION UPDATE COMMAND message |
| T3560NOTE 6NOTE 8 | 6sIn WB-N1/CE mode, 24s | 5GMM-COMMON-PROCEDURE-INITIATED | Transmission of AUTHENTICATION REQUEST messageTransmission of SECURITY MODE COMMAND message | AUTHENTICATION RESPONSE message receivedAUTHENTICATION FAILURE message receivedSECURITY MODE COMPLETE message receivedSECURITY MODE REJECT message received | Retransmission of AUTHENTICATION REQUEST message or SECURITY MODE COMMAND message |
| T3565NOTE 6NOTE 8 | 6sIn WB-N1/CE mode, 24s | 5GMM-REGISTERED | Transmission of NOTIFICATION message | SERVICE REQUEST message receivedCONTROL PLANE SERVICE REQUEST message receivedNOTIFICATION RESPONSE message receivedREGISTRATION REQUESTMessage receivedDEREGISTRATION REQUEST message receivedNGAP UE context resume request message as specified in 3GPP TS 38.413 [31] received | Retransmission of NOTIFICATION message |
| T3570NOTE 6NOTE 8 | 6sIn WB-N1/CE mode, 24s | 5GMM-COMMON-PROCEDURE-INITIATED | Transmission of IDENTITY REQUEST message | IDENTITY RESPONSE message received | Retransmission of IDENTITY REQUEST message |
| T3575NOTE 6NOTE 8 | 15sIn WB-N1/CE mode, 60s | 5GMM-REGISTERED | Transmission of NETWORK SLICE-SPECIFIC AUTHENTICATION COMMAND message | NETWORK SLICE-SPECIFIC AUTHENTICATION COMPLETE message received | Retransmission of NETWORK SLICE-SPECIFIC AUTHENTICATION COMMAND message |
| Active timer | NOTE 10 | All except 5GMM-DEREGISTERED | Entering 5GMM-IDLE mode after indicating MICO mode activation to the UE with an active timer value. | N1 NAS signallingconnection established | Activate MICO mode for the UE. |
| Implicit de-registration timer | NOTE 2 | All except 5GMM-DEREGISTERED | The mobile reachable timer expires while the network is in 5GMM-IDLE modeEntering 5GMM-IDLE mode over 3GPP access if the MICO mode is activated and strictly periodic monitoring timer is not runningThe strictly periodic monitoring timer expires while the network is in 5GMM-IDLE mode | N1 NAS signalling connection established | Implicitly de-register the UE on 1st expiry |
| Mobile reachable timer | NOTE 1  | All except 5GMM-DEREGISTERED | Entering 5GMM-IDLE mode | N1 NAS signalling connection established | Network dependent, but typically paging is halted on 1st expiry, and start implicit de-registration timer, if the UE is not registered for emergency services.Implicitly de-register the UE which is registered for emergency services |
| Non-3GPP implicit de-registration timer | NOTE 3 | All except 5GMM-DEREGISTERED | Entering 5GMM-IDLE mode over non-3GPP access | N1 NAS signalling connection over non-3GPP access established | Implicitly de-register the UE for non-3GPP access on 1s expiry |
| Strictly periodic monitoring timer | NOTE 5 | All except 5GMM-DEREGISTERED | At the successful completion of registration update procedure if strictly periodic registration timer indication is supported as specified in subclause 5.3.7. | Entering 5GMM-DEREGISTERED. | In 5GMM-IDLE mode, start implicit de-registration timer as specified in subclause 5.3.7.In 5GMM-CONNECTED mode, Strictly periodic monitoring timer is started again as specified in subclause 5.3.7. |
| NOTE 1: The default value of this timer is 4 minutes greater than the value of timer T3512. If the UE is registered for emergency services, the value of this timer is set equal to the value of timer T3512. If the T3346 value provided in the mobility management messages is greater than the value of the timer T3512, the AMF sets the mobile reachable timer and the implicit de-registration timer such that the sum of the timer values is greater than the value of timer T3346.NOTE 2: The value of this timer is network dependent. If MICO is activated, the default value of this timer is 4 minutes greater than the value of timer T3512.NOTE 3: The value of this timer is network dependent. The default value of this timer is 4 minutes greater than the non-3GPP de-registration timer. If the T3346 value provided in the mobility management messages is greater than the value of the non-3GPP de-registration timer, the AMF sets the non-3GPP implicit de-registration timer value to be 8 minutes greater than the value of timer T3346.NOTE 4: The value of this timer is network dependent.NOTE 5: The value of this timer is the same as the value of timer T3512.NOTE 6: In NB-N1 mode, the timer value shall be calculated as described in subclause 4.17.NOTE 7: In NB-N1 mode, the timer value shall be calculated by using an NAS timer value which is network dependent.NOTE 8: In WB-N1 mode, if the UE supports CE mode B and operates in either CE mode A or CE mode B, then the timer value is as described in this table for the case of WB-N1/CE mode (see subclause 4.19).NOTE 9: In WB-N1 mode, if the UE supports CE mode B, then the timer value shall be calculated by using an NAS timer value which value is network dependent.NOTE 10: If the AMF includes timer T3324 in the REGISTRATION ACCEPT message and if the UE is not registered for emergency services, the value of this timer is equal to the value of timer T3324. |

*\*\*\* End of changes \*\*\**