**3GPP TSG-CT WG1 Meeting #141eC1-23xxxx**

**Online 17– 21 April 2023**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **24.501** | **CR** | **5213** | **rev** | **1** | **Current version:** | **18.2.1** |  |
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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 |  | Radio Access Network |  | Core Network | **x** |

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| ***Title:*** | AMF enforcement for LADN per DNN & S-NSSAI | | | | | | | | | |
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| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | GMEC | | | | |  | ***Date:*** | | | 2023-04-10 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | Under GMEC work, the LADN per DNN and S-NSSAI is supported at the both the UE and the network sides. However, about the AMF enforcement on such LADN per DNN and S-NSSAI, current it was FFS as per below EN:  "*Editor’s note [CR#5012, 5GMEC]: In case of the UE supports LADN per DNN and S-NSSAI, how does the AMF determine the UE presence in LADN service area is FFS.*".  From below SA2 text in TS 23.501, one can see that both the UE and the AMF should enforce the LADN restriction based on LADN service area per DNN and S-NSSAI.  "*- The AMF enforces the LADN Service Area per LADN DNN and S-NSSAI in the same way as is described in clause 5.6.5 with the difference that the LADN service area is defined per DNN and S-NSSAI.*  *- The UE enforces the LADN Service Area per LADN DNN and S-NSSAI, if received from the AMF, in the same way as is described in clause 5.6.5 with the difference that the LADN service area is defined per DNN and S-NSSAI.*".  Actually, CT1 has already specified the UE enforcement for such LADN per DNN and S-NSSAI in TS 24.501 as below:  "*The UE shall not request a PDU session establishment:*  *a) for an LADN:*   1. *when the UE is located outside the LADN service area; or* 2. *if the extended LADN information for that LADN is available:*   *i) when the UE is located outside the LADN service area; or*  *ii) when the S-NSSAI used for PDU session establishment is not associated with that LADN in the LADN service area;*".  If all UE strictly follow the above enforcement, then there is no need to do any enforcement at the network side. However, as a robust NAS protocol design, the network cannot fully turst the UE and hence, similar enforcement needs to be specified at the network side as well.  In case of LADN per DNN and S-NSSAI is applied at both the network and the UE, the UE located in an LADN service area is to establish a PDU session for an LADN but the S-NSSAI used by the UE for PDU session establishment is not associated with that LADN in the LADN service area, the AMF should treat this as the UE is out of the LADN service area and indicate this to the SMF to reject such PDU session establishment. This ensures the UE cannot mis-use the group resources configured by the network. | | | | | | | | |
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| ***Summary of change:*** | | It proposes to resolve the ENs by specifying the AMF enforcement that the AMF should treat the UE is out of the LADN service area in case of the S-NSSAI used by the UE for PDU session establishment is not associated with an LADN in the LADN service area. | | | | | | | | |
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| ***Consequences if not approved:*** | | The AMF enforcement on LADN per DNN and S-NSSAI is unspecified. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.4.4.4, 5.4.5.2.3, 5.4.5.2.5, 5.5.1.3.4, 5.6.1.4.1, 6.4.1.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 \* \* \* \*

#### 5.4.4.4 Generic UE configuration update completion by the network

Upon receipt of the CONFIGURATION UPDATE COMPLETE message, the AMF shall stop the timer T3555.

If a new 5G-GUTI was included in the CONFIGURATION UPDATE COMMAND message, the AMF shall consider the new 5G-GUTI as valid and the old 5G-GUTI as invalid.

If a new TAI list was included in the CONFIGURATION UPDATE COMMAND message, the AMF shall consider the new TAI list as valid and the old TAI list as invalid.

If a new truncated 5G-S-TMSI configuration was included in the CONFIGURATION UPDATE COMMAND message, the AMF shall consider the new truncated 5G-S-TMSI configuration as valid and the old truncated 5G-S-TMSI configuration as invalid.

If a new service area list was included in the CONFIGURATION UPDATE COMMAND message, the AMF shall consider the new service area list as valid and the old service area list as invalid.

If new allowed NSSAI information was included in the CONFIGURATION UPDATE COMMAND message, the AMF shall consider the new allowed NSSAI information as valid and the old allowed NSSAI information as invalid. If new configured NSSAI information was included in the CONFIGURATION UPDATE COMMAND message, the AMF shall consider the new configured NSSAI information as valid and the old configured information as invalid. If there are active PDU sessions associated with S-NSSAI(s) not included in the new allowed NSSAI, the AMF shall notify the SMF(s) associated with these PDU sessions to initiate the network-requested PDU session release procedure according to subclause 6.3.3 in the present specification and subclause 5.15.5.2.2 in 3GPP TS 23.501 [8].

If "registration requested" was indicated in the Registration requested bit of the Configuration update indication IE in the CONFIGURATION UPDATE COMMAND message and:

a) the CONFIGURATION UPDATE COMMAND message contained:

1) an allowed NSSAI, a configured NSSAI or both;

2) the Network slicing indication IE with the Network slicing subscription change indication set to "Network slicing subscription changed"; or

3) no other parameters; and

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

then the AMF shall initiate the release of the N1 NAS signalling connection.

If an LADN information IE was included in the CONFIGURATION UPDATE COMMAND message, the AMF shall consider the old LADN information as invalid and the new LADN information as valid, if any. If an Extended LADN information IE was included in the CONFIGURATION UPDATE COMMAND message, the AMF shall consider the old extended LADN information as invalid and the new extended LADN information as valid, In this case, if the tracking area identity list in the new LADN information and in the new extended LADN information does not include the current TA, the AMF shall indicate UE presence in LADN service area (i.e. out of the LADN service area) to the SMF (see 3GPP TS 23.501 [8] and 3GPP TS 23.502 [9]). If the extended LADN information for an LADN is available for the UE, the DNN selected by the network is associated with that LADN but the S-NSSAI used for PDU session establishment is not associated with that LADN in the LADN service area, the AMF shall indicate UE presence in LADN service area (i.e. out of the LADN service area) to the SMF (see 3GPP TS 23.501 [8] and 3GPP TS 23.502 [9]).

If a T3447 value was included in the CONFIGURATION UPDATE COMMAND message, the AMF shall consider the T3447 value as valid and if neither zero nor deactivated use the T3447 value with the timer T3447 next time it is started. If the T3447 value included in the CONFIGURATION UPDATE COMMAND message contained an indication that the timer is deactivated or timer value zero, then the AMF shall stop the timer T3447 if running.

If a CAG information IE or an Extended CAG information IE was included in the CONFIGURATION UPDATE COMMAND message, the AMF shall consider the new "CAG information list" as valid and the old "CAG information list" as invalid.

If a UE radio capability ID IE was included in the CONFIGURATION UPDATE COMMAND message, the AMF shall consider the new UE radio capability ID as valid and the old UE radio capability ID as invalid.

If an Updated PEIPS assistance information IE was included in the CONFIGURATION UPDATE COMMAND message, the AMF shall consider the new PEIPS assistance information as valid and the old PEIPS assistance information, if any, as invalid.

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

##### 5.4.5.2.3 UE-initiated NAS transport of messages accepted by the network

Upon reception of a UL NAS TRANSPORT message, if the Payload container type IE is set to:

a) "N1 SM information", the AMF looks up a PDU session routing context for:

1) the UE and the PDU session ID IE in case the Old PDU session ID IE is not included, and:

NOTE 1: If the Old PDU session ID IE is not included in the UL NAS TRANSPORT message and the AMF has received a reallocation requested indication from the SMF, the AMF needs to ignore the reallocation requested indication.

i) if the AMF has a PDU session routing context for the PDU session ID and the UE, and the Request type IE is either not included or is included but set to other value than "initial request", "existing PDU session", "initial emergency request", "existing emergency PDU session" or "MA PDU request", the AMF shall send the 5GSM message, and the PDU session ID IE towards the SMF identified by the SMF ID of the PDU session routing context;

ii) if the AMF has a PDU session routing context for the PDU session ID and the UE, the PDU session routing context indicates that the PDU session is not an emergency PDU session, the Request type IE is included and is set to "existing PDU session" or "MA PDU request", and the S-NSSAI associated with the PDU session identified by the PDU session ID is allowed for the target access type, the AMF shall send the 5GSM message, the PDU session ID, the S-NSSAI, the mapped S-NSSAI (in roaming scenarios), the DNN (if received) and the request type towards the SMF identified by the SMF ID of the PDU session routing context;

iii) if the AMF does not have a PDU session routing context for the PDU session ID and the UE, and the Request type IE is included and is set to "initial request" or "MA PDU request":

A) the AMF shall select an SMF with following handlings in case the UE is not registered for onboarding services in SNPN:

If the S-NSSAI IE is not included and the allowed NSSAI contains:

- one S-NSSAI, the AMF shall use the S-NSSAI in the allowed NSSAI as the S-NSSAI;

- two or more S-NSSAIs and the user's subscription context obtained from UDM contains only one default S-NSSAI that is included in the allowed NSSAI, the AMF shall use the S-NSSAI in the allowed NSSAI that matches the default S-NSSAI as the S-NSSAI; or

- two or more S-NSSAIs and the user's subscription context obtained from UDM contains two or more default S-NSSAI(s) included in the allowed NSSAI, the AMF shall use an S-NSSAI in the allowed NSSAI selected based on operator policy as the S-NSSAI.

If the DNN IE is included, the AMF shall use the UE requested DNN as the DNN determined by the AMF; and

If the DNN IE is not included, and the user's subscription context obtained from UDM:

- contains the default DNN for the S-NSSAI, the AMF shall use the default DNN as the DNN determined by the AMF; and

- does not contain the default DNN for the S-NSSAI, the AMF shall use a locally configured DNN as the DNN determined by the AMF;

A1) the AMF shall select an SMF with following handlings in case the UE is registered for onboarding services in SNPN:

- if the AMF onboarding configuration data does not contain a configured SMF used for onboarding services in SNPN and contains the S-NSSAI used for onboarding services in SNPN, the AMF shall use the S-NSSAI used for onboarding services in SNPN as the S-NSSAI;

- if the AMF onboarding configuration data does not contain a configured SMF used for onboarding services in SNPN and contains the DNN used for onboarding services in SNPN, the AMF shall use the DNN used for onboarding services in SNPN as the DNN;

- if the AMF onboarding configuration data does not contain the S-NSSAI used for onboarding services in SNPN, does not contain the DNN used for onboarding services in SNPN, and contains a configured SMF used for onboarding services in SNPN, the AMF shall select the configured SMF used for onboarding services in SNPN;

- if the AMF onboarding configuration data contains the S-NSSAI used for onboarding services in SNPN, the DNN used for onboarding services in SNPN, or both, and contains a configured SMF used for onboarding services in SNPN, the AMF shall use the S-NSSAI used for onboarding services in SNPN, if any, as the S-NSSAI, and use the DNN used for onboarding services in SNPN, if any, as the DNN or shall select the configured SMF used for onboarding services in SNPN, according to local policy; and

- if the AMF onboarding configuration data contains none of the S-NSSAI used for onboarding services in SNPN, the DNN used for onboarding services in SNPN and a configured SMF used for onboarding services in SNPN, the AMF handling is implementation specific; and

NOTE 2: The AMF can e.g. use a locally configured DNN used for onboarding services in SNPN as the DNN determined by the AMF.

NOTE 3: SMF selection is outside the scope of the present document.

NOTE 4: As part of SMF selection, the PCF can provide the AMF with a DNN selected by the network different from the DNN determined by the AMF.

B) if the SMF selection is successful:

- if the DNN selected by the network is an LADN DNN, the AMF shall determine the UE presence in LADN service area (see subclause 5.4.4.4);

- the AMF shall store a PDU session routing context for the PDU session ID and the UE, shall set the SMF ID in the stored PDU session routing context to the SMF ID corresponding to the DNN in the user's subscription context obtained from the UDM; and

- the AMF shall send the 5GSM message, the PDU session ID, the S-NSSAI, the mapped S-NSSAI (in roaming scenarios), the DNN determined by the AMF, DNN selected by the network (if different from DNN determined by the AMF), the request type, the MA PDU session information, UE presence in LADN service area (if DNN received corresponds to an LADN DNN), and the onboarding indication (if the UE is registered for onboarding services in SNPN) towards the SMF identified by the SMF ID of the PDU session routing context;

NOTE 5: The MA PDU session information is not sent towards the SMF if the DNN received corresponds to an LADN DNN.

iv) if the AMF does not have a PDU session routing context for the PDU session ID and the UE, the Request type IE is included and is set to "existing PDU session" or "MA PDU request", and the AMF retrieves an SMF ID associated with:

A) the PDU session ID matching the PDU session ID received from the UE, if any; or

B) the DNN matching the DNN received from the UE, otherwise;

such that the SMF ID includes a PLMN identity corresponding to the UE's HPLMN or the current PLMN, then:

A) the AMF shall store a PDU session routing context for the PDU session ID and the UE, shall set the SMF ID in the stored PDU session routing context to the retrieved SMF ID; and

B) the AMF shall send the 5GSM message, the PDU session ID, the S-NSSAI, the mapped S-NSSAI (in roaming scenarios), the DNN (if received) and the request type towards the SMF identified by the SMF ID of the PDU session routing context;

v) if the AMF does not have a PDU session routing context for the PDU session ID and the UE, the Request type IE is included and is set to "initial emergency request", and the AMF does not have a PDU session routing context for another PDU session ID of the UE indicating that the PDU session is an emergency PDU session:

A) the AMF shall select an SMF. The AMF shall use the emergency DNN from the AMF emergency configuration data as the DNN, if configured. The AMF shall derive the SMF from the emergency DNN or use the statically configured SMF from the AMF emergency configuration data, if configured; and

B) if the SMF selection is successful:

- the AMF shall store a PDU session routing context for the PDU session ID and the UE, shall set the SMF ID in the stored PDU session routing context to the SMF ID of the selected SMF, and shall store an indication that the PDU session is an emergency PDU session in the stored PDU session routing context; and

- the AMF shall send the 5GSM message, the PDU session ID, the S-NSSAI (if configured in the AMF emergency configuration data), the DNN (if configured in the AMF emergency configuration data), and the request type towards the SMF identified by the SMF ID of the PDU session routing context; and

vi) if the AMF does not have a PDU session routing context for the PDU session ID and the UE, the Request type IE is included and is set to "initial emergency request", and the AMF has a PDU session routing context indicating that the PDU session is an emergency PDU session for another PDU session ID of the UE:

A) the AMF shall store a PDU session routing context for the PDU session ID and the UE and shall set the SMF ID in the stored PDU session routing context to the SMF ID of the PDU session routing context for the other PDU session ID of the UE; and

B) the AMF shall send the 5GSM message, the PDU session ID, the S-NSSAI (if configured in the AMF emergency configuration data), the DNN (if configured in the AMF emergency configuration data) and the request type towards the SMF identified by the SMF ID of the PDU session routing context; or

vii) if the AMF has a PDU session routing context for the PDU session ID and the UE, the PDU session routing context indicates that the PDU session is an emergency PDU session, and the Request type IE is included and is set to "existing emergency PDU session", the AMF shall send the 5GSM message, the PDU session ID, the S-NSSAI (if configured in the AMF emergency configuration data), the DNN (if configured in the AMF emergency configuration data), and the request type towards the SMF identified by the SMF ID of the PDU session routing context; and

viii) if the AMF does not have a PDU session routing context for the PDU session ID and the UE, the Request type IE is included and is set to "existing emergency PDU session", and the AMF retrieves an SMF ID associated with emergency services such that the SMF ID includes a PLMN identity corresponding to the current PLMN, then:

A) the AMF shall store a PDU session routing context for the PDU session ID and the UE, shall set the SMF ID in the stored PDU session routing context to the retrieved SMF ID; and

B) the AMF shall send the 5GSM message, the PDU session ID, the S-NSSAI (if configured in the AMF emergency configuration data), the DNN (if configured in the AMF emergency configuration data), and the request type towards the SMF identified by the SMF ID of the PDU session routing context; or

2) the UE and the Old PDU session ID IE in case the Old PDU session ID IE is included, and:

i) the AMF has a PDU session routing context for the old PDU session ID and the UE and does not have a PDU session routing context for the PDU session ID and the UE, the Request type IE is included and is set to "initial request", and the AMF received a reallocation requested indication from the SMF indicating that the SMF is to be reused, the AMF shall store a PDU session routing context for the PDU session ID and the UE, set the SMF ID in the stored PDU session routing context to the SMF ID of the PDU session routing context for the old PDU session ID and the UE. If the DNN is an LADN DNN, the AMF shall determine the UE presence in LADN service area (see subclause 5.4.4.4). The AMF shall send the 5GSM message, the PDU session ID, the old PDU session ID, the S-NSSAI (if received), the mapped S-NSSAI (in roaming scenarios), the DNN, the request type and UE presence in LADN service area (if DNN received corresponds to an LADN DNN) towards the SMF identified by the SMF ID of the PDU session routing context;

ii) the AMF has a PDU session routing context for the old PDU session ID and the UE and does not have a PDU session routing context for the PDU session ID and the UE, the Request type IE is included and is set to "initial request", and the AMF received a reallocation requested indication from the SMF indicating that the SMF is to be reallocated:

A) the AMF shall select an SMF with the following handling;

If the S-NSSAI IE is not included and the allowed NSSAI contains:

- one S-NSSAI, the AMF shall use the S-NSSAI in the allowed NSSAI as the S-NSSAI;

- two or more S-NSSAIs and the user's subscription context obtained from UDM contains only one default S-NSSAI that is included in the allowed NSSAI, the AMF shall use the S-NSSAI in the allowed NSSAI that matches the default S-NSSAI; or

- two or more S-NSSAIs and the user's subscription context obtained from UDM contains two or more default S-NSSAI(s) included in the allowed NSSAI, the AMF shall use an S-NSSAI in the allowed NSSAI selected based on operator policy as the S-NSSAI.

If the DNN is an LADN DNN, the AMF shall determine the UE presence in LADN service area (see subclause 5.4.4.4).

B) if the SMF selection is successful:

- the AMF shall store a PDU session routing context for the PDU session ID and the UE and set the SMF ID of the PDU session routing context to the SMF ID of the selected SMF; and

- the AMF shall send the 5GSM message, the PDU session ID, the old PDU session ID, the S-NSSAI, the mapped S-NSSAI (in roaming scenarios), the DNN, the request type, the MA PDU session information and UE presence in LADN service area (if DNN received corresponds to an LADN DNN) towards the SMF identified by the SMF ID of the PDU session routing context for the PDU session ID and the UE;

NOTE 6: The MA PDU session information is not sent towards the SMF if the DNN received corresponds to an LADN DNN.

b) "SMS", the AMF shall send the content of the Payload container IE to the SMSF associated with the UE;

c) "LTE Positioning Protocol (LPP) message container", the AMF shall send the Payload container type and the content of the Payload container IE to the LMF associated with the routing information included in the Additional information IE of the UL NAS TRANSPORT message;

d) "SOR transparent container", the AMF shall send the content of the Payload container IE to the UDM (see 3GPP TS 29.503 [20AB]);

e) "UE policy container", the AMF shall send the content of the Payload container IE to the PCF.

f) "UE parameters update transparent container", the AMF shall send the content of the Payload container IE to the UDM.

g) "Location services message container":

1) if the Additional information IE is not included in the UL NAS TRANSPORT message, the AMF shall provide the Payload container type and the content of the Payload container IE to the location services application; and

2) if the Additional information IE is included in the UL NAS TRANSPORT message, the AMF shall send the Payload container type and the content of the Payload container IE to an LMF associated with routing information included in the Additional information IE of the UL NAS TRANSPORT message.

h) "CIoT user data container", the AMF shall look up a PDU session routing context for the UE and the PDU session ID, and

1) send the content of the Payload container IE towards the SMF identified by the SMF ID of the PDU session routing context; and

2) initiate the release of the N1 NAS signalling connection:

i) if the Release assistance indication IE is included in the UL NAS TRANSPORT message and the DDX field of the Release assistance indication IE indicates "No further uplink and no further downlink data transmission subsequent to the uplink data transmission is expected" and if there is no downlink signalling or downlink data for the UE; or

ii) upon subsequent delivery of the next received downlink data transmission to the UE if the Release assistance indication IE is included in the UL NAS TRANSPORT message and the DDX field of the Release assistance indication IE indicates "Only a single downlink data transmission and no further uplink data transmission subsequent to the uplink data transmission is expected" and if there is no additional downlink signalling or downlink data for the UE.

i) "Service-level-AA container" and the Service-level-AA container is included in the Payload container IE of the UL NAS TRANSPORT message, and the Service-level device ID included in the Service-level-AA container is set to a CAA-level UAV ID, the AMF shall send the content of the Payload container IE to the UAS-NF corresponding to the CAA-level UAV ID. If the Service-level device ID is not included in the Service-level-AA container and a CAA-level UAV ID is included in the 5GMM context of the UE, then the AMF shall send the content of the Payload container IE to the UAS-NF corresponding to the CAA-level UAV ID included in the 5GMM context of the UE.

j) "Multiple payloads", the AMF shall first decode the content of the Payload container IE (see subclause 9.11.3.39) to obtain the number of payload container entries and for each payload container entry, the AMF shall:

i) decode the payload container type field;

ii) decode the optional IE fields and the payload container contents field in the payload container entry; and

iii) handle the content of each payload container entry the same as the content of the Payload container IE and the associated optional IEs as specified in bullets a) to i) above according to the payload container type field.

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

##### 5.4.5.2.5 Abnormal cases on the network side

The following abnormal cases in AMF are identified:

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

1) if the Old PDU session ID IE is not included in the UL NAS TRANSPORT message, the AMF does not have a PDU session routing context for the PDU session ID and the UE, the Request type IE is set to "initial request" or "MA PDU request", and the SMF selection fails, then the AMF shall send back to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case e) or case f);

2) if the Old PDU session ID IE is included in the UL NAS TRANSPORT message, the AMF has a PDU session routing context for the old PDU session ID and the UE and does not have a PDU session routing context for the PDU session ID and the UE, the Request type IE is set to "initial request", the AMF received a reallocation requested indication from the SMF indicating that the SMF is to be reallocated, and the SMF selection fails, then the AMF shall send back to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case e) or case f);

3) if the AMF does not have a PDU session routing context for the PDU session ID and the UE, the Request type IE is set to "existing PDU session" or "MA PDU request", and the user's subscription context obtained from the UDM does not contain an SMF ID for the PDU session ID matching the PDU session ID received from the UE or for the DNN matching the DNN received from the UE such that the SMF ID includes a PLMN identity corresponding to the UE's HPLMN or the current PLMN or the PLMN ID part of the current SNPN, then the AMF may send back to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case e) or case f).

4) if the Old PDU session ID IE is included in the UL NAS TRANSPORT message, and the AMF has a PDU session routing context for the old PDU session ID and the UE and does not have a PDU session routing context for the PDU session ID and the UE, the Request type IE is set to "initial request" and the AMF has not received a reallocation requested indication, the AMF should select an SMF with following handlings:

i) if the S-NSSAI IE is not included and the allowed NSSAI contains:

A) one S-NSSAI, the AMF shall use the S-NSSAI in the allowed NSSAI as the S-NSSAI;

B) two or more S-NSSAIs and the user's subscription context obtained from UDM contains only one default S-NSSAI that is included in the allowed NSSAI, the AMF shall use the S-NSSAI in the allowed NSSAI as the S-NSSAI; or

C) two or more S-NSSAIs and the user's subscription context obtained from UDM contains two or more default S-NSSAI(s) included in the allowed NSSAI, the AMF shall use an S-NSSAI in the allowed NSSAI selected based on operator policy as the S-NSSAI;

ii) if the DNN IE is not included, and the user's subscription context obtained from UDM:

A) contains the default DNN for the S-NSSAI, the AMF shall use the default DNN as the DNN; and

B) does not contain the default DNN for the S-NSSAI, the AMF shall use a locally configured DNN as the DNN;

iii) if the DNN selected by the network is an LADN DNN, the AMF shall determine the UE presence in LADN service area (see subclause 5.4.4.4);

iv) if the SMF selection is successful, the AMF should store a PDU session routing context for the PDU session ID and the UE, set the SMF ID in the stored PDU session routing context to the selected SMF ID, and forward the 5GSM message, the PDU session ID, the old PDU session ID, the S-NSSAI, the mapped S-NSSAI (in roaming scenarios), the DNN determined by the AMF, DNN selected by the network (if different from DNN determined by the AMF), the request type and UE presence in LADN service area (if DNN selected by the network corresponds to an LADN DNN) towards the SMF ID of the PDU session routing context; and

v) if the SMF selection fails, then the AMF shall send back to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case e) or case f);

5) if the AMF has a PDU session routing context for the PDU session ID and the UE, the PDU session routing context indicates that the PDU session is an emergency PDU session, the Request type IE is set to "initial emergency request", the AMF should forward the 5GSM message, the PDU session ID, the S-NSSAI (if configured in the AMF emergency configuration data), the DNN (if configured in the AMF emergency configuration data) and the request type towards the SMF ID of the PDU session routing context;

6) if the Request type IE is set to "initial emergency request" and the S-NSSAI or the DNN is received, the AMF ignores the received S-NSSAI or the DNN and uses the emergency DNN from the AMF emergency configuration data, if any;

7) if the AMF does not have a PDU session routing context for the PDU session ID and the UE, and the Request type IE of the UL NAS TRANSPORT message is either not provided or is provided but set to other value than "initial request", "existing PDU session", "initial emergency request", "existing emergency PDU session" and "MA PDU request", then the AMF may send back to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case e) or case f);

8) if the AMF unsuccessfully attempted to forward the 5GSM message, the PDU session ID, the S-NSSAI, the mapped S-NSSAI (in roaming scenarios), the DNN and the request type (if received) towards a SMF ID, then the AMF may send back to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case e) or case f).

9) if the Old PDU session ID IE is included in the UL NAS TRANSPORT message, the AMF does not have a PDU session routing context for the old PDU session ID and the UE, the AMF does not have a PDU session routing context for the PDU session ID and the UE, the Request type IE is set to "initial request", the AMF should select an SMF with following handlings:

i) if the S-NSSAI IE is not included and the allowed NSSAI contains:

A) one S-NSSAI, the AMF shall use the S-NSSAI in the allowed NSSAI as the S-NSSAI;

B) two or more S-NSSAIs and the user's subscription context obtained from UDM contains only one default S-NSSAI that is included in the allowed NSSAI, the AMF shall use the default S-NSSAI in the allowed NSSAI as the S-NSSAI; or

C) two or more S-NSSAIs and the user's subscription context obtained from UDM contains two or more default S-NSSAI(s) included in the allowed NSSAI, the AMF shall use an S-NSSAI in the allowed NSSAI selected based on operator policy as the S-NSSAI.

ii) if the DNN IE is not included, and the user's subscription context obtained from UDM:

A) contains the default DNN for the S-NSSAI, the AMF shall use the default DNN as the DNN; and

B) does not contain the default DNN for the S-NSSAI, the AMF shall use a locally configured DNN as the DNN;

iii) if the DNN selected by the network is an LADN DNN, the AMF shall determine the UE presence in LADN service area (see subclause 5.4.4.4);

iv) if the SMF selection is successful, the AMF should store a PDU session routing context for the PDU session ID and the UE, set the SMF ID in the stored PDU session routing context to the selected SMF ID, and forward the 5GSM message, the PDU session ID, the old PDU session ID, the S-NSSAI, the mapped S-NSSAI (in roaming scenarios), the DNN determined by the AMF, DNN selected by the network (if different from DNN determined by the AMF), the request type and UE presence in LADN service area (if DNN selected by the network corresponds to an LADN DNN) towards the SMF ID of the PDU session routing context; and

v) if the SMF selection fails, then the AMF shall send back to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case e) or case f);

10) if the AMF has a PDU session routing context for the PDU session ID and the UE, the PDU session routing context indicates that the PDU session is not an emergency PDU session, and the Request type IE is included and is set to "existing emergency PDU session", the AMF may send back to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case e) or case f);

11) if the AMF has a PDU session routing context for the PDU session ID and the UE, the PDU session routing context indicates that the PDU session is an emergency PDU session, and the Request type IE is included and is set to "existing PDU session", the AMF may forward the 5GSM message, the PDU session ID, the S-NSSAI (if configured in the AMF emergency configuration data), the DNN (if configured in the AMF emergency configuration data), and the request type towards the SMF identified by the SMF ID of the PDU session routing context;

12) if the AMF has a PDU session routing context for the PDU session ID and the UE, the Request type IE is set to "initial request", then the AMF shall perform a local release of the PDU session identified by the PDU session ID and shall request the SMF to perform a local release of the PDU session, and proceed as specified in subclause 5.4.5.2.3;

13) if the Request type IE is set to "initial request" or "modification request", and the S-NSSAI IE contains an S-NSSAI that is not allowed by the network, then the AMF shall send back to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case e), case f) or h4);

14) if the Request type IE is set to "existing PDU session", the AMF has a PDU session routing context for the PDU session ID and the UE, the PDU session routing context indicates that the PDU session is not an emergency PDU session, and the S-NSSAI associated with the PDU session identified by the PDU session ID is not allowed for the target access type, the AMF shall send back to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case e), case f) or h4);

15) if the Request type IE is set to "initial request", "existing PDU session", "modification request" or "MA PDU request", the UE is not configured for high priority access in selected PLMN or SNPN, and the UE is in non-allowed area or is not in allowed area, the AMF shall send back to the UE the 5GSM message which was not forwarded, and 5GMM cause #28 "Restricted service area" as specified in subclause 5.4.5.3.1 case i);

15a) if the Request type IE is set to "initial request" or "initial emergency request" and the AMF determines that the UE has registered to a PLMN via a satellite NG-RAN cell that is not allowed to operate at the present UE location, then the AMF may send back to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case i1); and

16) if the Request type IE is set to "initial request" or "MA PDU request", the AMF is pending the receipt of a REGISTRATION REQUEST message indicating "mobility registration updating" in the 5GS registration type IE, and an emergency PDU session exists for the UE (see subclause 5.4.4.3), the AMF shall send back to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case e) or case f);

17) if the timer T3447 is running and the UE supports service gap control and:

i) the Request type IE:

A) is set to "initial request";

B) is set to "existing PDU session"; or

C is set to "modification request" and the PDU session being modified is a non-emergency PDU session;

ii) the UE is not configured for high priority access in selected PLMN;

iii) the current NAS signalling connection was not triggered by paging; and

iv) mobile terminated signalling has not been sent or no user-plane resources have been established for any PDU session after the establishment of the current NAS signalling connection,

then the AMF shall send back to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case e) or case f);

18) if the AMF has a PDU session routing context for the PDU session ID and the UE, the Request type IE is not included, the UE is not configured for high priority access in selected PLMN or SNPN, and the PDU session is not an emergency PDU session, then the AMF shall forward the 5GSM message, and the PDU session ID IE towards the SMF identified by the SMF ID of the PDU session routing context with:

i) an exemptionInd attribute indicating "message was exempted from the DNN based congestion activated in the AMF" as specified in 3GPP TS 29.502 [20A], if DNN based congestion control is activated for the selected DNN;

ii) an exemptionInd attribute indicating "message was exempted from the S-NSSAI and DNN based congestion activated in the AMF" as specified in 3GPP TS 29.502 [20A], if S-NSSAI and DNN based congestion control is activated for the selected S-NSSAI and the selected DNN; or

iii) an exemptionInd attribute indicating "message was exempted from the S-NSSAI only based congestion activated in the AMF" as specified in 3GPP TS 29.502 [20A], if S-NSSAI only based congestion control is activated for the selected S-NSSAI;

19) if the Request type IE is set to "MA PDU request" and the S-NSSAI IE contains an S-NSSAI that is not allowed by the network on neither access, then the AMF shall send to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case e) or case f);

20) if the Request type IE is set to "initial request" and the UE is registered for emergency services over the current access, then the AMF may send back to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case e) or case f); and

21) if the Request type IE is set to "existing PDU session", the UE is attempting to transfer a PDU session from 3GPP access to non-3GPP access, and the PDU session is associated with control plane only indication then the AMF shall send back to the UE the 5GSM message which was not forwarded as specified in subclause 5.4.5.3.1 case e).

22) if the Request type IE is set to "MA PDU request" and the UE requested DNN corresponds to an LADN DNN, the AMF shall send back to the UE the 5GSM message which was not forwarded and 5GMM cause #90 "payload was not forwarded" as specified in subclause 5.4.5.3.1 case hx).

23) if the Request type IE is set to "initial request", the UE requested DNN corresponds to an LADN DNN, and the MA PDU session information IE is included, the AMF shall not forward the MA PDU session information towards the SMF.

24) if the Request type IE is set to "modification request", the DNN associated with the PDU session corresponds to an LADN DNN, and MA PDU session information IE is included, the AMF shall not forward the MA PDU session information towards the SMF.

b) If the Payload container type IE is set to "SMS" and:

1) the AMF does not have an SMSF address associated with the UE;

2) the AMF cannot forward the content of the Payload container IE to the SMSF associated with the SMSF address available in the AMF; or

3) the AMF determines that the UE has registered to a PLMN via a satellite NG-RAN cell that is not allowed to operate at the present UE location;

then the AMF shall abort the procedure.

c) If the Payload container type IE is set to "LTE Positioning Protocol (LPP) message container" and:

1) if the Additional information IE is not included in the UL NAS TRANSPORT message;

2) the AMF cannot forward the content of the Payload container IE to the LMF associated with the routing information included in the Additional information IE; or

3) the AMF determines that the UE has registered to a PLMN via a satellite NG-RAN cell that is not allowed to operate at the present UE location;

then the AMF shall abort the procedure.

d) If the Payload container type IE is set to "UE policy container" and:

1) the AMF does not have a PCF address associated with the UE;

2) the AMF cannot forward the content of the Payload container IE to the PCF associated with the PCF address available in the AMF; or

3) the AMF determines that the UE has registered to a PLMN via a satellite NG-RAN cell that is not allowed to operate at the present UE location;

then the AMF shall abort the procedure.

e) If the Payload container type IE is set to "Location services message container" and:

1) if the Additional information IE is included in the UL NAS TRANSPORT message and the AMF cannot forward the content of the Payload container IE to an LMF associated with the routing information included in the Additional information IE;or

2) the AMF determines that the UE has registered to a PLMN via a satellite NG-RAN cell that is not allowed to operate at the present UE location;

then the AMF shall abort the procedure.

f) If the Payload container type IE is set to "SMS" or "LTE Positioning Protocol (LPP) message container":

1) the timer T3447 is running and the UE supports service gap control;

2) the UE is not configured for high priority access in selected PLMN;

3) the current NAS signalling connection was not triggered by paging; and

4) mobile terminated signalling has not been sent or no user-plane resources have been established for any PDU session after the establishment of the current NAS signalling connection,

the AMF shall abort the procedure.

NOTE: In this state the N1 NAS signalling connection can be released by the network.

g) If the Payload container type IE is set to "CIoT user data container" and:

1) if the AMF does not have a PDU session routing context for the PDU session ID and the UE; or

2) if the AMF unsuccessfully attempted to forward the user data container and the PDU session ID,

then the AMF may send back to the UE the CIoT user data container which was not forwarded as specified in subclause 5.4.5.3.1 case l1).

h) If the Payload container type IE is set to "CIoT user data container":

1) if the timer T3447 is running and the UE supports service gap control;

2) the UE is not configured for high priority access in selected PLMN;

3) the current N1 NAS signalling connection was not triggered by paging; and

4) mobile terminated signalling has not been sent or no user-plane resources have been established for any PDU session after the establishment of the current NAS signalling connection,

then the AMF shall send back to the UE the CIoT user data container which was not forwarded as specified in subclause 5.4.5.3.1 case l1).

i) If the Payload container type IE is set to "SOR transparent container", "UE prameters update transparent container", or "Service-level-AA container", and the AMF determines that the UE has registered to a PLMN via a satellite NG-RAN cell that is not allowed to operate at the present UE location, then the AMF shall abort the procedure.

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

##### 5.5.1.3.4 Mobility and periodic registration update accepted by the network

If the registration update request has been accepted by the network, the AMF shall send a REGISTRATION ACCEPT message to the UE.

If timer T3513 is running in the AMF, the AMF shall stop timer T3513 if a paging request was sent with the access type indicating non-3GPP and the REGISTRATION REQUEST message includes the Allowed PDU session status IE.

If timer T3565 is running in the AMF, the AMF shall stop timer T3565 when a REGISTRATION REQUEST message is received.

For each of the information elements: 5GMM capability, S1 UE network capability, and UE security capability, the AMF shall store all octets received from the UE in the REGISTRATION REQUEST message, up to the maximum length defined for the respective information element.

NOTE 1: This information is forwarded to the new AMF during inter-AMF handover or to the new MME during inter-system handover to S1 mode.

The 5G-GUTI reallocation shall be part of the registration procedure for mobility registration update. The 5G-GUTI reallocation should be part of the registration procedure for periodic registration update. During the registration procedure for mobility registration update, if the AMF has not allocated a new 5G-GUTI by the generic UE configuration update procedure, the AMF shall include in the REGISTRATION ACCEPT message the new assigned 5G-GUTI.

If the UE has set the CAG bit to "CAG supported" in the 5GMM capability IE of the REGISTRATION REQUEST message and the AMF needs to update the "CAG information list" stored in the UE, the AMF shall include the CAG information list IE or the Extended CAG information list IE in the REGISTRATION ACCEPT message.

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.

NOTE 2A: If the UE supports extended CAG information list, the CAG information list can be included either in the CAG information list IE or Extended CAG information list IE.

If the UE does not support extended CAG information list, the CAG information list shall not be included in the Extended CAG information list IE.

If a 5G-GUTI or the SOR transparent container IE is included in the REGISTRATION ACCEPT message, the AMF shall start timer T3550 and enter state 5GMM-COMMON-PROCEDURE-INITIATED as described in subclause 5.1.3.2.3.3.

If the Operator-defined access category definitions IE or the Extended emergency number list IE ,the CAG information list IE or the Extended CAG information list IE are included in the REGISTRATION ACCEPT message, the AMF shall start timer T3550 and enter state 5GMM-COMMON-PROCEDURE-INITIATED as described in subclause 5.1.3.2.3.3.

If the UE is not in NB-N1 mode and the UE has set the RACS bit to "RACS supported" in the 5GMM Capability IE of the REGISTRATION REQUEST message, the AMF may include either a UE radio capability ID IE or a UE radio capability ID deletion indication IE in the REGISTRATION ACCEPT message. If the UE radio capability ID IE or the UE radio capability ID deletion indication IE is included in the REGISTRATION ACCEPT message, the AMF shall start timer T3550 and enter state 5GMM-COMMON-PROCEDURE-INITIATED as described in subclause 5.1.3.2.3.3.

The AMF may include a new TAI list for the UE in the REGISTRATION ACCEPT message. The new TAI list shall not contain both tracking areas in NB-N1 mode and tracking areas not in NB-N1 mode. The UE, upon receiving a REGISTRATION ACCEPT message, shall delete its old TAI list and store the received TAI list. If there is no TAI list received, the UE shall consider the old TAI list as valid. If the registration area contains TAIs belonging to different PLMNs, which are equivalent PLMNs, and

a) the UE already has stored allowed NSSAI for the current registration area, the UE shall store the allowed NSSAI for the current registration area in each of the allowed NSSAIs which are associated with each of the PLMNs in the registration area;

b) the UE already has stored rejected NSSAI for the current registration area, the UE shall store the rejected NSSAI for the current registration area in each of the rejected NSSAIs which are associated with each of the PLMNs in the registration area;

c) the UE already has stored rejected NSSAI for the failed or revoked NSSAA, the UE shall store the rejected NSSAI for the failed or revoked NSSAA in each of the rejected NSSAIs which are associated with each of the PLMNs in the registration area;

d) the UE already has stored rejected NSSAI for the maximum number of UEs reached, the UE shall store the rejected NSSAI for the maximum number of UEs reached in each of the rejected NSSAIs which are associated with each of the PLMNs in the registration area; and

e) the UE already has stored pending NSSAI, the UE shall store the pending NSSAI in each of the pending NSSAIs which are associated with each of the PLMNs in the registration area.

NOTE 3: When assigning the TAI list, the AMF can take into account the eNodeB's capability of support of CIoT 5GS optimization.

The AMF may also include a list of equivalent PLMNs in the REGISTRATION ACCEPT message. Each entry in the list contains a PLMN code (MCC+MNC). The UE shall store the list as provided by the network, and if there is no emergency PDU session established, the UE shall remove from the list any PLMN code that is already in the forbidden PLMN list as specified in subclause 5.3.13A. If the UE is not registered for emergency services and there is an emergency PDU session established, the UE shall remove from the list of equivalent PLMNs any PLMN code present in the forbidden PLMN list as specified in subclause 5.3.13A, when the emergency PDU session is released. In addition, the UE shall add to the stored list the PLMN code of the registered PLMN that sent the list. The UE shall replace the stored list on each receipt of the REGISTRATION ACCEPT message. If the REGISTRATION ACCEPT message does not contain a list, then the UE shall delete the stored list. The AMF of a PLMN shall not include a list of equivalent SNPNs.

If the ESI bit of the 5GMM capability IE of the REGISTRATION REQUEST message is set to "equivalent SNPNs supported", the AMF of a SNPN may include a list of equivalent SNPNs in the REGISTRATION ACCEPT message. Each entry in the list contains an SNPN identity. The UE shall store the list as provided by the network. If there is no emergency PDU session established and the UE is not registered for onboarding services in SNPN, the UE shall remove from the list any SNPN identity that is already in the "permanently forbidden SNPNs" list or the "temporarily forbidden SNPNs" list. If the UE is not registered for emergency services and there is an emergency PDU session established, the UE shall remove from the list of equivalent SNPNs any SNPN identity present in the "permanently forbidden SNPNs" list or the "temporarily forbidden SNPNs" list, when the emergency PDU session is released. The UE shall add to the stored list the SNPN identity of the registered SNPN that sent the list. The UE shall replace the stored list on each receipt of the REGISTRATION ACCEPT message. If the REGISTRATION ACCEPT message does not contain a list, then the UE shall delete the stored list. The AMF of an SNPN shall not include a list of equivalent PLMNs.

If the UE is not registered for emergency services, and if the PLMN identity of the registered PLMN is a member of the forbidden PLMN list as specified in subclause 5.3.13A, any such PLMN identity shall be deleted from the corresponding list(s).

The AMF may include new service area restrictions in the Service area list IE in the REGISTRATION ACCEPT message. The UE, upon receiving a REGISTRATION ACCEPT message with new service area restrictions shall act as described in subclause 5.3.5.

If the Service area list IE is not included in the REGISTRATION ACCEPT message, any tracking area in the registered PLMN and its equivalent PLMN(s) in the registration area, or in the registered SNPN, is considered as an allowed tracking area as described in subclause 5.3.5.

The AMF shall include the MICO indication IE in the REGISTRATION ACCEPT message only if the MICO indication IE was included in the REGISTRATION REQUEST message, the AMF supports and accepts the use of MICO mode. If the AMF supports and accepts the use of MICO mode, the AMF may indicate "all PLMN registration area allocated" in the MICO indication IE in the REGISTRATION ACCEPT message. If "all PLMN registration area allocated" is indicated in the MICO indication IE, the AMF shall not assign and include the TAI list in the REGISTRATION ACCEPT message. If the REGISTRATION ACCEPT message includes an MICO indication IE indicating "all PLMN registration area allocated", the UE shall treat all TAIs in the current PLMN as a registration area and delete its old TAI list. If "strictly periodic registration timer supported" is indicated in the MICO indication IE in the REGISTRATION REQUEST message, the AMF may indicate "strictly periodic registration timer supported" in the MICO indication IE and may include the T3512 value IE in the REGISTRATION ACCEPT message. If the timer value received in T3512 IE is different from the already stored value of the timer T3512 and the timer T3512 is running, the UE shall restart T3512 with the new value received in the T3512 value IE.

The AMF shall include an active time value in the T3324 IE in the REGISTRATION ACCEPT message if the UE requested an active time value in the REGISTRATION REQUEST message and the AMF accepts the use of MICO mode and the use of active time.

If the UE does not include MICO indication IE in the REGISTRATION REQUEST message, then the AMF shall disable MICO mode if it was already enabled.

If the AMF supports and accepts the use of MICO, and the UE included the Requested T3512 value IE in the REGISTRATION REQUEST message, then the AMF shall take into account the T3512 value requested when providing the T3512 value IE in the REGISTRATION ACCEPT message.

NOTE 3A: The T3512 value assigned to the UE by AMF can be different from the T3512 value requested by the UE. AMF can take several factors into account when assigning the T3512 value, e.g. local configuration, expected UE behaviour, UE requested T3512 value, UE subscription data, network policies.

The AMF may include the T3512 value IE in the REGISTRATION ACCEPT message only if the REGISTRATION REQUEST message was sent over the 3GPP access.

The AMF may include the non-3GPP de-registration timer value IE in the REGISTRATION ACCEPT message only if the REGISTRATION REQUEST message was sent for the non-3GPP access.

If the UE indicates support of the N1 NAS signalling connection release in the REGISTRATION REQUEST message and the network decides to accept the N1 NAS signalling connection release, then the AMF shall set the N1 NAS signalling connection release bit to "N1 NAS signalling connection release supported" in the 5GS network feature support IE of the REGISTRATION ACCEPT message.

If the UE indicates support of the paging indication for voice services in the REGISTRATION REQUEST message and the network decides to accept the paging indication for voice services, then the AMF shall set the paging indication for voice services bit to "paging indication for voice services supported" in the 5GS network feature support IE of the REGISTRATION ACCEPT message. If the UE receives the REGISTRATION ACCEPT message with the paging indication for voice services bit set to "paging indication for voice services supported", the UE NAS layer informs the lower layers that paging indication for voice services is supported. Otherwise, the UE NAS layer informs the lower layers that paging indication for voice services is not supported.

If the UE indicates support of the reject paging request in the REGISTRATION REQUEST message and the network decides to accept the reject paging request, then the AMF shall set the reject paging request bit to "reject paging request supported" in the 5GS network feature support IE of the REGISTRATION ACCEPT message.

If the UE indicates support of the paging restriction in the REGISTRATION REQUEST message, and the AMF sets:

- the reject paging request bit to "reject paging request supported";

- the N1 NAS signalling connection release bit to "N1 NAS signalling connection release supported"; or

- both of them;

in the 5GS network feature support IE of the REGISTRATION ACCEPT message, and the network decides to accept the paging restriction, then the AMF shall set the paging restriction bit to "paging restriction supported" in the 5GS network feature support IE of the REGISTRATION ACCEPT message.

If the MUSIM UE does not include the Paging restriction IE in the REGISTRATION REQUEST message, the AMF shall delete any stored paging restriction for the UE and stop restricting paging.

If the MUSIM UE requests the release of the NAS signalling connection, by setting Request type to "NAS signalling connection release" in the UE request type IE included in the REGISTRATION REQUEST message, and the AMF supports the N1 NAS signalling connection release, the AMF shall initiate the release of the NAS signalling connection after the completion of the registration procedure for mobility and periodic registration update. If the UE requests restriction of paging by including the Paging restriction IE and the AMF supports the paging restriction, the AMF:

- if accepts the paging restriction, shall include the 5GS additional request result IE in the REGISTRATION ACCEPT message and set the Paging restriction decision to "paging restriction is accepted". The AMF shall store the paging restriction of the UE and enforce these restrictions in the paging procedure as described in clause 5.6.2; or

- if rejects the paging restriction, shall include the 5GS additional request result IE in the REGISTRATION ACCEPT message and set the Paging restriction decision to "paging restriction is rejected", and shall discard the received paging restriction. The AMF shall delete any stored paging restriction for the UE and stop restricting paging.

If the UE requests "control plane CIoT 5GS optimization" in the 5GS update type IE, indicates support of control plane CIoT 5GS optimization in the 5GMM capability IE and the AMF decides to accept the requested CIoT 5GS optimization and the registration request, the AMF shall indicate "control plane CIoT 5GS optimization supported" in the 5GS network feature support IE of the REGISTRATION ACCEPT message.

If the UE has indicated support for the control plane CIoT 5GS optimizations, and the AMF decides to activate the congestion control for transport of user data via the control plane, then the AMF shall include the T3448 value IE in the REGISTRATION ACCEPT message.

If the AMF decides to deactivate the congestion control for transport of user data via the control plane, then the AMF shall delete the stored control plane data back-off time for the UE and the AMF shall not include timer T3448 value IE in the REGISTRATION ACCEPT message.

If:

- the UE in NB-N1 mode is using control plane CIoT 5GS optimization; and

- the network is configured to provide the truncated 5G-S-TMSI configuration for control plane CIoT 5GS optimizations;

the AMF shall include the Truncated 5G-S-TMSI configuration IE in the REGISTRATION ACCEPT message and set the "Truncated AMF Set ID value" and the "Truncated AMF Pointer value" in the Truncated 5G-S-TMSI configuration IE based on network policies. The AMF shall start timer T3550 and enter state 5GMM-COMMON-PROCEDURE-INITIATED as described in subclause 5.1.3.2.3.3.

For inter-system change from S1 mode to N1 mode in 5GMM-IDLE mode, if the UE has included a ngKSI indicating a current 5G NAS security context in the REGISTRATION REQUEST message by which the REGISTRATION REQUEST message is integrity protected, the AMF shall take one of the following actions:

a) if the AMF retrieves the current 5G NAS security context as indicated by the ngKSI and 5G-GUTI sent by the UE, the AMF shall integrity check the REGISTRATION REQUEST message using the current 5G NAS security context and integrity protect the REGISTRATION ACCEPT message using the current 5G NAS security context;

b) if the AMF cannot retrieve the current 5G NAS security context as indicated by the ngKSI and 5G-GUTI sent by the UE, the AMF shall treat the REGISTRATION REQUEST message fails the integrity check and take actions as specified in subclause 4.4.4.3; or

c) if the UE has not included an Additional GUTI IE, the AMF may treat the REGISTRATION REQUEST message as in the previous item, i.e. as if it cannot retrieve the current 5G NAS security context.

NOTE 4: The handling described above at failure to retrieve the current 5G NAS security context or if no Additional GUTI IE was provided does not preclude the option for the AMF to perform a primary authentication and key agreement procedure and create a new native 5G NAS security context.

For inter-system change from S1 mode to N1 mode in 5GMM-CONNECTED mode, the AMF shall integrity check REGISTRATION REQUEST message using the current K'AMF as derived when triggering the handover to N1 mode (see subclause 4.4.2.2). The AMF shall verify the received UE security capabilities in the REGISTRATION REQUEST message. The AMF shall then take one of the following actions:

a) if the REGISTRATION REQUEST does not contain a valid KSIAMF in the Non-current native NAS key set identifier IE, the AMF shall remove the non-current native 5G NAS security context, if any, for any 5G-GUTI for this UE. The AMF shall then integrity protect and cipher the REGISTRATION ACCEPT message using the security context based on K'AMF and take the mapped 5G NAS security context into use; or

b) if the REGISTRATION REQUEST contains a valid KSIAMF in the Non-current native NAS key set identifier IE and:

1) the AMF decides to take the native 5G NAS security context into use, the AMF shall initiate a security mode control procedure to take the corresponding native 5G NAS security context into use and then integrity protect and cipher the REGISTRATION ACCEPT message using the corresponding native 5G NAS security context; and

2) otherwise, the AMF shall then integrity protect and cipher the REGISTRATION ACCEPT message using the security context based on K'AMF and take the mapped 5G NAS security context into use.

NOTE 5: In above bullet b), it is recommended for the AMF to initiate a security mode control procedure to take the corresponding native 5G NAS security context into use.

If the UE has included the service-level device ID set to the CAA-level UAV ID in the Service-level-AA container IE of the REGISTRATION REQUEST message, and if:

- the UE has a valid aerial UE subscription information; and

- the UUAA procedure is to be performed during the registration procedure according to operator policy; and

- there is no valid successful UUAA result for the UE in the UE 5GMM context,

then the AMF shall initiate the UUAA-MM procedure with the UAS-NF as specified in 3GPP TS 23.256 [6AB] and shall include a service-level-AA pending indication in the Service-level-AA container IE of the REGISTRATION ACCEPT message. The AMF shall store in the UE 5GMM context that a UUAA procedure is pending. The AMF shall start timer T3550 and enter state 5GMM-COMMON-PROCEDURE-INITIATED as described in subclause 5.1.3.2.3.3.

If the UE has included the service-level device ID set to the CAA-level UAV ID in the Service-level-AA container IE of the REGISTRATION REQUEST message, and if:

- the UE has a valid aerial UE subscription information;

- the UUAA procedure is to be performed during the registration procedure according to operator policy; and

- there is a valid successful UUAA result for the UE in the UE 5GMM context,

then the AMF shall include a service-level-AA response in the Service-level-AA container IE of the REGISTRATION ACCEPT message and set the SLAR field in the service-level-AA response to "Service level authentication and authorization was successful".

If the AMF determines that the UUAA-MM procedure needs to be performed for a UE, the AMF has not received the service -level device ID set to the CAA-level UAV ID in the Service-level-AA container IE of the REGISTRATION REQUEST message from the UE and the AMF decides to accept the UE to be registered for other services than UAS services based on the user's subscription data and the operator policy, the AMF shall accept the registration update request and shall mark in the UE's 5GMM context that the UE is not allowed to request UAS services.

If the UE supports MINT, the AMF may include the List of PLMNs to be used in disaster condition IE in the REGISTRATION ACCEPT message.

If the UE supports MINT, the AMF may include the Disaster roaming wait range IE in the REGISTRATION ACCEPT message.

If the UE supports MINT, the AMF may include the Disaster return wait range IE in the REGISTRATION ACCEPT message.

NOTE 6: The AMF can determine the content of the "list of PLMN(s) to be used in disaster condition", the value of the disaster roaming wait range and the value of the disaster return wait range based on the network local configuration.

If the AMF received the list of TAIs from the satellite NG-RAN as described in 3GPP TS 23.501 [8], and determines that, by UE subscription and operator's preferences, any but not all TAIs in the received list of TAIs is forbidden for roaming or for regional provision of service, the AMF shall include the TAI(s) in:

a) the Forbidden TAI(s) for the list of "5GS forbidden tracking areas for roaming" IE; or

b) the Forbidden TAI(s) for the list of "5GS forbidden tracking areas for regional provision of service" IE; or

c) both;

in the REGISTRATION ACCEPT message.

NOTE 7a: Void.

If the Reconnection to the network due to RAN timing synchronization status change (RANtiming) bit of the 5GMM capability IE in the REGISTRATION REQUEST message is set to "Reconnection to the network due to RAN timing synchronization status change supported", the AMF shall operate as specified in annex D of 3GPP TS 23.502 [9].

If requested by the TSCTSF (see 3GPP TS 23.501 [8]) and the UE has set the Reconnection to the network due to RAN timing synchronization status change (RANtiming) bit to "Reconnection to the network due to RAN timing synchronization status change supported" in the 5GMM capability IE of the REGISTRATION REQUEST message, the AMF may include the RAN timing synchronization IE with the RecReq bit set to "Reconnection requested" in the REGISTRATION ACCEPT message.

Upon receipt of the REGISTRATION ACCEPT message, the UE shall reset the registration attempt counter and service request attempt counter, enter state 5GMM-REGISTERED and set the 5GS update status to 5U1 UPDATED.

If the UE receives the REGISTRATION ACCEPT message from a PLMN, then the UE shall reset the PLMN-specific attempt counter for that PLMN for the specific access type for which the message was received. The UE shall also reset the PLMN-specific N1 mode attempt counter for that PLMN for the specific access type for which the message was received. If the message was received via 3GPP access, the UE shall reset the counter for "SIM/USIM considered invalid for GPRS services" events and the counter for "SIM/USIM considered invalid for non-GPRS services", if any. If the message was received via non-3GPP access, the UE shall reset the counter for "USIM considered invalid for 5GS services over non-3GPP" events.

If the UE receives the REGISTRATION ACCEPT message from an SNPN, then the UE shall reset the SNPN-specific attempt counter for the current SNPN for the specific access type for which the message was received. If the message was received via 3GPP access, the UE shall reset the counter for "the entry for the current SNPN considered invalid for 3GPP access" events. If the message was received via non-3GPP access, the UE shall reset the counter for "the entry for the current SNPN considered invalid for non-3GPP access" events.

If the REGISTRATION ACCEPT message included a T3512 value IE, the UE shall use the value in T3512 value IE as periodic registration update timer (T3512). If the T3512 value IE is not included, the UE shall use the value currently stored, e.g. from a prior REGISTRATION ACCEPT message.

If the REGISTRATION ACCEPT message include a T3324 value IE, the UE shall use the value in the T3324 value IE as active time timer (T3324). If the REGISTRATION ACCEPT message does not include a T3324 value IE, UE shall not start the timer T3324 until a new value is received from the network.

If the REGISTRATION ACCEPT message included a non-3GPP de-registration timer value IE, the UE shall use the value in non-3GPP de-registration timer value IE as non-3GPP de-registration timer. If non-3GPP de-registration timer value IE is not included, the UE shall use the value currently stored, e.g. from a prior REGISTRATION ACCEPT message. If non-3GPP de-registration timer value IE is not included and there is no stored non-3GPP de-registration timer value in the UE, the UE shall use the default value of the non-3GPP de-registration timer.

If the REGISTRATION ACCEPT message contains a 5G-GUTI, the UE shall return a REGISTRATION COMPLETE message to the AMF to acknowledge the received 5G-GUTI, stop timer T3519 if running, and delete any stored SUCI. The UE shall provide the 5G-GUTI to the lower layer of 3GPP access if the REGISTRATION ACCEPT message is sent over the non-3GPP access, and the UE is in 5GMM-REGISTERED in both 3GPP access and non-3GPP access in the same PLMN.

If the REGISTRATION ACCEPT message contains the Network slicing indication IE with the Network slicing subscription change indication set to "Network slicing subscription changed", or contains a Configured NSSAI IE with a new configured NSSAI for the current PLMN or SNPN and optionally the mapped S-NSSAI(s) for the configured NSSAI for the current PLMN or SNPN, or contains an NSSRG information IE with a new NSSRG information, the UE shall return a REGISTRATION COMPLETE message to the AMF to acknowledge the successful update of the network slicing information.

NOTE 7b: When the UE receives the NSSRG information IE, the UE may provide the NSSRG information to lower layers for the purpose of NSAG-aware cell reselection.

If the REGISTRATION ACCEPT message contains the CAG information list IE or the Extended CAG information list IE and the UE had set the CAG bit to "CAG supported" in the 5GMM capability IE of the REGISTRATION REQUEST message, the UE shall:

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

b) 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 or the Extended CAG information list IE when the UE receives the CAG information list IE or the Extended 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 or the Extended 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 or the Extended CAG information list IE are ignored.

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

The UE shall store the "CAG information list" received in the CAG information list IE or the Extended CAG information list IE as specified in annex C.

If the received "CAG information list" includes an entry containing the identity of the registered PLMN, the UE shall operate as follows.

a) if the UE receives the REGISTRATION ACCEPT message via a CAG cell,none of the CAG-ID(s) supported by the current CAG cell is authorized based on the "Allowed CAG list" of the entry for the registered PLMN in the received "CAG information list", and:

1) the entry for the registered PLMN in the received "CAG information list" does not include an "indication that the UE is only allowed to access 5GS via CAG cells", 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"; or

2) the entry for the registered PLMN in the received "CAG information list" includes an "indication that the UE is only allowed to access 5GS via CAG cells" and:

i) if one or more CAG-ID(s) are authorized based on the "Allowed CAG list" of the entry for the registered PLMN in the received "CAG information list" , 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 list"; or

ii) if no CAG-ID is authorized based on the "Allowed CAG list" of the entry for the registered PLMN in the received "CAG information list" and:

A) the UE does not have an emergency PDU session, then the UE shall enter the state 5GMM-REGISTERED.PLMN-SEARCH and shall apply the PLMN selection process defined in 3GPP TS 23.122 [5] with the updated "CAG information list"; or

B) the UE has an emergency PDU session, then the UE shall perform a local release of all PDU sessions associated with 3GPP access except for the emergency PDU session and enter the state 5GMM-REGISTERED.LIMITED-SERVICE; or

b) if the UE receives the REGISTRATION ACCEPT message via a non-CAG cell and the entry for the registered PLMN in the received "CAG information list" includes an "indication that the UE is only allowed to access 5GS via CAG cells" and:

1) if one or more CAG-ID(s) are authorized based on the "allowed CAG list" for the registered PLMN in the received "CAG information list" , 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 list"; or

2) if no CAG-ID is authorized based on the "Allowed CAG list" of the entry for the registered PLMN in the received "CAG information list" and:

i) the UE does not have an emergency PDU session, then the UE shall enter the state 5GMM-REGISTERED.PLMN-SEARCH and shall apply the PLMN selection process defined in 3GPP TS 23.122 [5] with the updated "CAG information list"; or

ii) the UE has an emergency PDU session, then the UE shall perform a local release of all PDU sessions associated with 3GPP access except for the emergency PDU session and enter the state 5GMM-REGISTERED.LIMITED-SERVICE.

If the received "CAG information list" does not include an entry containing the identity of the registered PLMN and the UE receives the REGISTRATION ACCEPT message via a CAG cell, 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".

If the REGISTRATION ACCEPT message contains the Operator-defined access category definitions IE, the Extended emergency number list IE, the CAG information list IE or the Extended CAG information list IE, the UE shall return a REGISTRATION COMPLETE message to the AMF to acknowledge reception of the operator-defined access category definitions or the extended local emergency numbers list or the CAG information list.

If the REGISTRATION ACCEPT message contains the UE radio capability ID IE or the UE radio capability ID deletion indication IE, the UE shall return a REGISTRATION COMPLETE message to the AMF to acknowledge reception of the UE radio capability ID IE or the UE radio capability ID deletion indication IE.

If the T3448 value IE is present in the received REGISTRATION ACCEPT message and the value indicates that this timer is neither zero nor deactivated, the UE shall:

a) stop timer T3448 if it is running; and

b) start timer T3448 with the value provided in the T3448 value IE.

If the UE is using 5GS services with control plane CIoT 5GS optimization, the T3448 value IE is present in the REGISTRATION ACCEPT message and the value indicates that this timer is either zero or deactivated, the UE shall ignore the T3448 value IE and proceed as if the T3448 value IE was not present.

If the UE in 5GMM-IDLE mode initiated the registration procedure for mobility and periodic registration update and the REGISTRATION ACCEPT message does not include the T3448 value IE and if timer T3448 is running, then the UE shall stop timer T3448.

Upon receiving a REGISTRATION COMPLETE message, the AMF shall stop timer T3550 and change to state 5GMM-REGISTERED. The 5G-GUTI, if sent in the REGISTRATION ACCEPT message, shall be considered as valid, and the UE radio capability ID, if sent in the REGISTRATION ACCEPT message, shall be considered as valid.

If the 5GS update type IE was included in the REGISTRATION REQUEST message with the SMS requested bit set to "SMS over NAS supported" and:

a) the SMSF address is stored in the UE 5GMM context and:

1) the UE is considered available for SMS over NAS; or

2) the UE is considered not available for SMS over NAS and the SMSF has confirmed that the activation of the SMS service is successful; or

b) the SMSF address is not stored in the UE 5GMM context, the SMSF selection is successful and the SMSF has confirmed that the activation of the SMS service is successful;

then the AMF shall set the SMS allowed bit of the 5GS registration result IE in the REGISTRATION ACCEPT message as specified in subclause 5.5.1.2.4. If the UE 5GMM context does not contain an SMSF address or the UE is not considered available for SMS over NAS, then the AMF shall:

a) store the SMSF address in the UE 5GMM context if not stored already; and

b) store the value of the SMS allowed bit of the 5GS registration result IE in the UE 5GMM context and consider the UE available for SMS over NAS.

If SMSF selection in the AMF or SMS activation via the SMSF is not successful, or the AMF does not allow the use of SMS over NAS, then the AMF shall set the SMS allowed bit of the 5GS registration result IE to "SMS over NAS not allowed" in the REGISTRATION ACCEPT message.

If the 5GS update type IE was included in the REGISTRATION REQUEST message with the SMS requested bit set to "SMS over NAS not supported" or the 5GS update type IE was not included in the REGISTRATION REQUEST message, then the AMF shall:

a) mark the 5GMM context to indicate that the UE is not available for SMS over NAS; and

NOTE 8: The AMF can notify the SMSF that the UE is deregistered from SMS over NAS based on local configuration.

b) set the SMS allowed bit of the 5GS registration result IE to "SMS over NAS not allowed" in the REGISTRATION ACCEPT message.

When the UE receives the REGISTRATION ACCEPT message, if the UE is also registered over another access to the same PLMN, the UE considers the value indicated by the SMS allowed bit of the 5GS registration result IE as applicable for both accesses over which the UE is registered.

If the 5GS update type IE was included in the REGISTRATION REQUEST message with the NG-RAN-RCU bit set to "UE radio capability update needed", the AMF shall delete the stored UE radio capability information or the UE radio capability ID, if any.

The AMF shall include the 5GS registration result IE in the REGISTRATION ACCEPT message. If the 5GS registration result value in the 5GS registration result IE indicates:

a) "3GPP access", the UE:

- shall consider itself as being registered to 3GPP access; and

- if in 5GMM-REGISTERED state over non-3GPP access and on the same PLMN or SNPN as 3GPP access, shall enter state 5GMM-DEREGISTERED.ATTEMPTING-REGISTRATION over non-3GPP access and set the 5GS update status to 5U2 NOT UPDATED over non-3GPP access; or

b) "Non-3GPP access", the UE:

- shall consider itself as being registered to non-3GPP access; and

- if in the 5GMM-REGISTERED state over 3GPP access and is on the same PLMN or SNPN as non-3GPP access, shall enter the state 5GMM-DEREGISTERED.ATTEMPTING-REGISTRATION over 3GPP access and set the 5GS update status to 5U2 NOT UPDATED over 3GPP access; or

c) "3GPP access and non-3GPP access", the UE shall consider itself as being registered to both 3GPP access and non-3GPP access.

If the UE is not currently registered for emergency services and the emergency registered bit of the 5GS registration result IE in the REGISTRATION ACCEPT message is set to "Registered for emergency services", the UE shall consider itself registered for emergency services and shall locally release all non-emergency PDU sessions, if any.

In roaming scenarios, the AMF shall provide mapped S-NSSAI(s) for the configured NSSAI, the allowed NSSAI, the rejected NSSAI (if Extended rejected NSSAI IE is used), the pending NSSAI or NSSRG information when included in the REGISTRATION ACCEPT message.

The AMF shall include the allowed NSSAI for the current PLMN or SNPN, in roaming scenarios, and shall include the mapped S-NSSAI(s) for the allowed NSSAI contained in the requested NSSAI (i.e. Requested NSSAI IE or Requested mapped NSSAI IE) from the UE, in the REGISTRATION ACCEPT message if the UE included the requested NSSAI in the REGISTRATION REQUEST message and the AMF allows one or more S-NSSAIs for the current PLMN or SNPN in the Requested NSSAI IE or one or more mapped S-NSSAIs in the Requested NSSAI IE or Requested mapped NSSAI IE. The S-NSSAI associated with each of the active PDN connections for which interworking to 5GS is supported, shall be included in the allowed NSSAI if the UE included the UE status IE with the EMM registration status set to "UE is in EMM-REGISTERED state" in the REGISTRATION REQUEST message and the AMF supports N26 interface.

The AMF may also include rejected NSSAI in the REGISTRATION ACCEPT message if the UE is not registered for onboarding services in SNPN. 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 NSSAI shall be included in the Extended rejected NSSAI IE in the REGISTRATION ACCEPT message; otherwise the rejected NSSAI shall be included in the Rejected NSSAI IE in the REGISTRATION ACCEPT message. If the UE is registered for onboarding services in SNPN, the AMF shall not include rejected NSSAI in the REGISTRATION ACCEPT 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 NSSAI contains S-NSSAI(s) which was included in the requested NSSAI but rejected by the network associated with rejection cause(s); otherwise the rejected NSSAI contains S-NSSAI(s) which was included in the requested NSSAI but rejected by the network associated with rejection cause(s) with the following restrictions:

a) rejected NSSAI for the current PLMN or SNPN shall not include an S-NSSAI for the current PLMN or SNPN which is associated to multiple mapped S-NSSAIs and some of these but not all mapped S-NSSAIs are not allowed; and

b) rejected NSSAI for the current registration area shall not include an S-NSSAI for the current PLMN or SNPN which is associated to multiple mapped S-NSSAIs and some of these but not all mapped S-NSSAIs are not allowed.

NOTE 9: The UE that does not support extended rejected NSSAI can avoid requesting an S-NSSAI associated with a mapped S-NSSAI, which was included in the previous requested NSSAI but neither in the allowed NSSAI nor in the rejected NSSAI in the consequent registration procedures.

If the UE indicated the support for network slice-specific authentication and authorization, and if the requested NSSAI (i.e. the Requested NSSAI IE or the Requested mapped NSSAI IE) includes one or more S-NSSAIs subject to network slice-specific authentication and authorization, the AMF shall in the REGISTRATION ACCEPT message include:

a) the allowed NSSAI containing the S-NSSAI(s) or the mapped S-NSSAI(s), if any:

i) which are not subject to network slice-specific authentication and authorization and are allowed by the AMF; or

ii) for which the network slice-specific authentication and authorization has been successfully performed;

b) optionally, the rejected NSSAI;

c) pending NSSAI containing one or more S-NSSAIs for which network slice-specific authentication and authorization (except for re-NSSAA) will be performed or is ongoing, and one or more S-NSSAIs from the pending NSSAI which the AMF provided to the UE during the previous registration procedure for which network slice-specific authentication and authorization will be performed or is ongoing, if any; and

d) the "NSSAA to be performed" indicator in the 5GS registration result IE set to indicate that the network slice-specific authentication and authorization procedure will be performed by the network, if the allowed NSSAI is not included in the REGISTRATION ACCEPT message.

If the UE is not registered for onboarding services in SNPN, the UE indicated the support for network slice-specific authentication and authorization, and:

a) the UE did not include the requested NSSAI in the REGISTRATION REQUEST message or none of the S-NSSAIs in the requested NSSAI in the REGISTRATION REQUEST message are allowed;

b) all default S-NSSAIs are subject to network slice-specific authentication and authorization; and

c) the network slice-specific authentication and authorization procedure has not been successfully performed for any of the default S-NSSAIs,

the AMF shall in the REGISTRATION ACCEPT message include:

a) the "NSSAA to be performed" indicator in the 5GS registration result IE to indicate that the network slice-specific authentication and authorization procedure will be performed by the network; and

b) pending NSSAI containing one or more default S-NSSAIs for which network slice-specific authentication and authorization will be performed or is ongoing and one or more S-NSSAIs from the pending NSSAI which the AMF provided to the UE during the previous registration procedure for which network slice-specific authentication and authorization will be performed or is ongoing (if any); and

c) optionally, the rejected NSSAI.

If the UE is not registered for onboarding services in SNPN, the UE indicated the support for network slice-specific authentication and authorization, and:

a) the UE did not include the requested NSSAI in the REGISTRATION REQUEST message or none of the S-NSSAIs in the requested NSSAI in the REGISTRATION REQUEST message are allowed; and

b) one or more default S-NSSAIs are not subject to network slice-specific authentication and authorization or the network slice-specific authentication and authorization procedure has been successfully performed for one or more default S-NSSAIs;

the AMF shall in the REGISTRATION ACCEPT message include:

a) pending NSSAI containing one or more default S-NSSAIs for which network slice-specific authentication and authorization will be performed or is ongoing (if any) and one or more S-NSSAIs from the pending NSSAI which the AMF provided to the UE during the previous registration procedure for which network slice-specific authentication and authorization will be performed or is ongoing (if any);

b) allowed NSSAI containing S-NSSAI(s) for the current PLMN or SNPN each of which corresponds to a default S-NSSAI which are not subject to network slice-specific authentication and authorization or for which the network slice-specific authentication and authorization has been successfully performed;

c) allowed NSSAI containing one or more default S-NSSAIs, as the mapped S-NSSAI(s) for the allowed NSSAI in roaming scenarios, which are not subject to network slice-specific authentication and authorization or for which the network slice-specific authentication and authorization has been successfully performed; and

d) optionally, the rejected NSSAI.

If the UE did not include the requested NSSAI in the REGISTRATION REQUEST message or none of the S-NSSAIs in the requested NSSAI in the REGISTRATION REQUEST message are allowed, the allowed NSSAI shall not contain default S-NSSAI(s) that are subject to NSAC. If the subscription information includes the NSSRG information, the S-NSSAIs of the allowed NSSAI shall be associated with at least one common NSSRG value. If the network has pending NSSAI, the S-NSSAIs in the pending NSSAI and allowed NSSAI shall be associated with at least one common NSSRG value.

When the REGISTRATION ACCEPT includes a pending NSSAI, the pending NSSAI shall contain all S-NSSAIs for which network slice-specific authentication and authorization (except for re-NSSAA) will be performed or is ongoing from the requested NSSAI of the REGISTRATION REQUEST message that was received over the 3GPP access, non-3GPP access, or both the 3GPP access and non-3GPP access.

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 ACCEPT 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" included in the Extended rejected NSSAI IE of the REGISTRATION ACCEPT message. To avoid that large numbers of UEs simultaneously initiate deferred requests, the network should select the value for the backoff timer for each S-NSSAI for the informed UEs so that timeouts are not synchronised.

If the UE does not indicate support for extended rejected NSSAI and the maximum number of UEs has been reached, the AMF should include the rejected NSSAI containing one or more S-NSSAIs with the rejection cause "S-NSSAI not available in the current registration area" in the Rejected NSSAI IE and should not include these S-NSSAIs in the allowed NSSAI in the REGISTRATION ACCEPT message.

NOTE 10: Based on network policies, the AMF can include the S-NSSAI(s) for which the maximum number of UEs has been reached in the rejected NSSAI with rejection causes other than "S-NSSAI not available in the current registration area".

The AMF may include a new configured NSSAI for the current PLMN or SNPN in the REGISTRATION ACCEPT message if:

a) the REGISTRATION REQUEST message did not include a requested NSSAI and the UE is not registered for onboarding services in SNPN;

b) the REGISTRATION REQUEST message included a requested NSSAI containing an S-NSSAI that is not valid in the serving PLMN or SNPN;

c) the REGISTRATION REQUEST message included a requested NSSAI containing an S-NSSAI with incorrect mapped S-NSSAI(s);

d) the REGISTRATION REQUEST message included the Network slicing indication IE with the Default configured NSSAI indication bit set to "Requested NSSAI created from default configured NSSAI";

e) the REGISTRATION REQUEST message included the requested mapped NSSAI;

f) the S-NSSAIs of the requested NSSAI in the REGISTRATION REQUEST message are not associated with any common NSSRG value, except for the case that the AMF, based on the indication received from the UDM as specified in 3GPP TS 23.501 [8], has provided all subscribed S-NSSAIs in the configured NSSAI to a UE who does not support NSSRG; or

NOTE 11: If the S-NSSAIs of the requested NSSAI in the REGISTRATION REQUEST message are not associated with any common NSSRG value, it is possible that at least one of the S-NSSAIs is not included in any of new allowed NSSAI, new (extended) rejected NSSAI (if applicable), and new pending NSSAI (if applicable).

g) the UE is in 5GMM-REGISTERED state over the other access and the S-NSSAIs of the requested NSSAI in the REGISTRATION REQUEST message over the current access and the allowed NSSAI over the other access are not associated with any common NSSRG value.

If a new configured NSSAI for the current PLMN or SNPN is included and the UE is roaming, the AMF shall also include the mapped S-NSSAI(s) for the configured NSSAI for the current PLMN or SNPN in the REGISTRATION ACCEPT message. In this case the AMF shall start timer T3550 and enter state 5GMM-COMMON-PROCEDURE-INITIATED as described in subclause 5.1.3.2.3.3.

If a new configured NSSAI for the current PLMN or SNPN is included, the subscription information includes the NSSRG information, and the NSSRG bit in the 5GMM capability IE of the REGISTRATION REQUEST message is set to:

a) "NSSRG supported", then the AMF shall include the NSSRG information in the REGISTRATION ACCEPT message; or

b) "NSSRG not supported", then the configured NSSAI shall include S-NSSAIs each of which is associated with all the NSSRG value(s) of the default S-NSSAI(s), or the configured NSSAI shall include, based on the indication received from the UDM as specified in 3GPP TS 23.501 [8], all subscribed S-NSSAIs even if these S-NSSAIs do not share any common NSSRG value.

If the AMF needs to update the NSSRG information and the UE has set the NSSRG bit to "NSSRG supported" in the 5GMM capability IE of the REGISTRATION REQUEST message, then the AMF shall include the new NSSRG information in the REGISTRATION ACCEPT message. In addition, the AMF shall start timer T3550 and enter state 5GMM-COMMON-PROCEDURE-INITIATED as described in subclause 5.1.3.2.3.3.

The AMF shall include the Network slicing indication IE with the Network slicing subscription change indication set to "Network slicing subscription changed" in the REGISTRATION ACCEPT message if the UDM has indicated that the subscription data for network slicing has changed. In this case the AMF shall start timer T3550 and enter state 5GMM-COMMON-PROCEDURE-INITIATED as described in subclause 5.1.3.2.3.3.

If the S-NSSAI(s) associated with the existing PDU session(s) of the UE is not included in the requested NSSAI (i.e. Requested NSSAI IE or Requested mapped NSSAI IE) of the REGISTRATION REQUEST message, the AMF shall perform a local release of the PDU session(s) associated with the S-NSSAI(s) except for a PDU session associated with DNN and S-NSSAI in the AMF onboarding configuration data and shall request the SMF to perform a local release of those PDU session(s).

The UE that has indicated the support for network slice-specific authentication and authorization receiving the pending NSSAI in the REGISTRATION ACCEPT message shall store the S-NSSAI(s) in the pending NSSAI as specified in subclause 4.6.2.2. If the registration area contains TAIs belonging to different PLMNs, which are equivalent PLMNs, the UE shall store the received pending NSSAI for each of the equivalent PLMNs as specified in subclause 4.6.2.2. If the pending NSSAI is not included in the REGISTRATION ACCEPT message and the "NSSAA to be performed" indicator is not set to "Network slice-specific authentication and authorization is to be performed" in the 5GS registration result IE of the REGISTRATION ACCEPT message, then the UE shall delete the pending NSSAI for the current PLMN and its equivalent PLMN(s) or SNPN, if existing, as specified in subclause 4.6.2.2.

The UE receiving the rejected NSSAI in the REGISTRATION ACCEPT 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, 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 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, 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 or SNPN 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"

Unless the back-off timer value received along with the S-NSSAI is zero, 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 or SNPN 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 subclauses 4.6.1 and 4.6.2.2.

NOTE 12: If the back-off timer value received along with the S-NSSAI in the rejected NSSAI for the maximum number of UEs reached is zero as specified in subclause 10.5.7.4a of 3GPP TS 24.008 [12], the UE does not consider the S-NSSAI as the rejected S-NSSAI.

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 for each S-NSSAI, the UE shall behave as follows:

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

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 sets the NSSAA bit in the 5GMM capability IE to "Network slice-specific authentication and authorization not supported", and:

a) if the Requested NSSAI IE only includes the S-NSSAI(s) subject to network slice-specific authentication and authorization and one or more default S-NSSAIs (containing one or more S-NSSAIs each of which may be associated with a new S-NSSAI) which are not subject to network slice-specific authentication and authorization are available, the AMF shall in the REGISTRATION ACCEPT message include:

1) the allowed NSSAI containing S-NSSAI(s) for the current PLMN or SNPN each of which corresponds to a default S-NSSAI which are not subject to network slice-specific authentication and authorization;

2) the allowed NSSAI containing the default S-NSSAIs, as the mapped S-NSSAI(s) for the allowed NSSAI in roaming scenarios, which are not subject to network slice-specific authentication and authorization; and

3) the rejected NSSAI containing the S-NSSAI(s) subject to network slice specific authentication and authorization with the rejection cause indicating "S-NSSAI not available in the current PLMN or SNPN", except if the UE has not set the ER-NSSAI bit to "Extended rejected NSSAI supported" in the 5GMM capability IE of the REGISTRATION REQUEST message and the S-NSSAI(s) is associated to multiple mapped S-NSSAIs and some of these but not all mapped S-NSSAIs are subject to NSSAA; or

b) if the Requested NSSAI IE includes one or more S-NSSAIs subject to network slice-specific authentication and authorization, the AMF shall in the REGISTRATION ACCEPT message include:

1) the allowed NSSAI containing the S-NSSAI(s) or the mapped S-NSSAI(s) which are not subject to network slice-specific authentication and authorization; and

2) the rejected NSSAI containing:

i) the S-NSSAI(s) subject to network slice specific authentication and authorization with the rejection cause indicating "S-NSSAI not available in the current PLMN or SNPN", except if the UE has not set the ER-NSSAI bit to "Extended rejected NSSAI supported" in the 5GMM capability IE of the REGISTRATION REQUEST message and the S-NSSAI(s) is associated to multiple mapped S-NSSAIs and some of these but not all mapped S-NSSAIs are subject to NSSAA; and

ii) the S-NSSAI(s) which was included in the requested NSSAI but rejected by the network associated with the rejection cause indicating "S-NSSAI not available in the current PLMN or SNPN" or the rejection cause indicating "S-NSSAI not available in the current registration area", if any.

For a REGISTRATION REQUEST message with a 5GS registration type IE indicating "mobility registration updating", if the UE does not indicate support for network slice-specific authentication and authorization, the UE is not registered for onboarding services in SNPN, and:

a) the UE is not in NB-N1 mode; and

b) if:

1) the UE did not include the requested NSSAI in the REGISTRATION REQUEST message; or

2) none of the S-NSSAIs in the requested NSSAI in the REGISTRATION REQUEST message are allowed;

and one or more default S-NSSAIs which are not subject to network slice-specific authentication and authorization are available, the AMF shall:

a) put the allowed S-NSSAI(s) for the current PLMN or SNPN each of which corresponds to a default S-NSSAI and not subject to network slice-specific authentication and authorization in the allowed NSSAI of the REGISTRATION ACCEPT message;

b) put the default S-NSSAIs and not subject to network slice-specific authentication and authorization, as the mapped S-NSSAI(s) for the allowed NSSAI in roaming scenarios, in the allowed NSSAI of the REGISTRATION ACCEPT message; and

c) determine a registration area such that all S-NSSAIs of the allowed NSSAI are available in the registration area.

During a registration procedure for mobility and periodic registration update for which the 5GS registration type IE indicates:

a) "periodic registration updating"; or

b) "mobility registration updating" and the UE is in NB-N1 mode;

and the UE is not registered for onboarding services in SNPN, the AMF:

a) may provide a new allowed NSSAI to the UE;

b) shall provide a pending NSSAI to the UE if the UE has indicated the support for network slice-specific authentication and authorization and there are S-NSSAIs for which network slice-specific authentication and authorization (except for re-NSSAA) will be performed or is ongoing for the current PLMN or SNPN; or

c) may provide both a new allowed NSSAI and a pending NSSAI to the UE;

in the REGISTRATION ACCEPT message. Additionally, if a pending NSSAI is provided without an allowed NSSAI and no S-NSSAI is currently allowed for the UE, the REGISTRATION ACCEPT message shall include the 5GS registration result IE with the "NSSAA to be performed" indicator set to "Network slice-specific authentication and authorization is to be performed".

If the REGISTRATION ACCEPT message contains the Network slicing indication IE with the Network slicing subscription change indication set to "Network slicing subscription changed", the UE shall delete the network slicing information for each and every PLMN or SNPN except for the current PLMN or SNPN as specified in subclause 4.6.2.2 and remove all tracking areas from the list of "5GS forbidden tracking areas for roaming" which were added due to rejection of S-NSSAI due to "S-NSSAI not available in the current registration area"..

If the REGISTRATION ACCEPT message contains the allowed NSSAI, then the UE shall store the included allowed NSSAI together with the PLMN identity of the registered PLMN or the SNPN identity of the registered SNPN and the registration area as specified in subclause 4.6.2.2. If the registration area contains TAIs belonging to different PLMNs, which are equivalent PLMNs, the UE shall store the received allowed NSSAI in each of allowed NSSAIs which are associated with each of the PLMNs.

For each of the PDU session(s) active in the UE:

- if the allowed NSSAI contains an HPLMN S-NSSAI (e.g. mapped S-NSSAI, in roaming scenarios) matching to the HPLMN S-NSSAI of the PDU session, the UE shall locally update the S-NSSAI associated with the PDU session to the corresponding S-NSSAI received in the allowed NSSAI; and

- if the allowed NSSAI does not contain an HPLMN S-NSSAI (e.g. mapped S-NSSAI, in roaming scenarios) matching to the HPLMN S-NSSAI of the PDU session, the UE may perform a local release of the PDU session except for an emergency PDU session, if any, and except for a PDU session established when the UE is registered for onboarding services in SNPN, if any.

NOTE 13: According to 3GPP TS 23.501 [8], also the AMF will determine which PDU sessions can no longer be supported based on the new allowed NSSAI, and it will cause a release on the UE side either by indicating in the PDU session status IE which PDU sessions are inactive on the network side or by triggering the SMF to initiate a release via 5GSM signalling.

If the REGISTRATION ACCEPT message contains a configured NSSAI IE with a new configured NSSAI for the current PLMN or SNPN and optionally the mapped S-NSSAI(s) for the configured NSSAI for the current PLMN or SNPN, the UE shall store the contents of the configured NSSAI IE as specified in subclause 4.6.2.2. In addition, if the REGISTRATION ACCEPT message contains an NSSRG information IE, the UE shall store the contents of the NSSRG information IE as specified in subclause 4.6.2.2. If the UE receives a new configured NSSAI in the REGISTRATION ACCEPT message and no NSSRG information IE, the UE shall delete any stored NSSRG information, if any, as specified in subclause 4.6.2.2.

If the UE has set the NSAG bit to "NSAG supported" in the 5GMM capability IE of the REGISTRATION REQUEST message over 3GPP access, the AMF may include the NSAG information IE in the REGISTRATION ACCEPT message. Up to 4 NSAG entries are allowed to be associated with a TAI list in the NSAG information IE.

NOTE 13a: How the AMF selects NSAG entries to be included in the NSAG information IE is implementation specific, e.g. take the NSAG priority and the current registration area into account.

NOTE 13b: If the NSAG for the PLMN and its equivalent PLMN(s) have different associations with S-NSSAIs, then the AMF includes a TAI list for the NSAG entry in the NSAG information IE.

NOTE 13b: If the NSAG for the PLMN and its equivalent PLMN(s) have different associations with S-NSSAIs, then the AMF includes a TAI list for the NSAG entry in the NSAG information IE.

If the UE receives the NSAG information IE in the REGISTRATION ACCEPT message, the UE shall store the NSAG information as specified in subclause 4.6.2.2.

If the REGISTRATION ACCEPT message:

a) includes the 5GS registration result IE with the "NSSAA to be performed" indicator set to "Network slice-specific authentication and authorization is to be performed";

b) includes a pending NSSAI; and

c) does not include an allowed NSSAI;

the UE:

a) shall not perform the registration procedure for mobility and periodic registration update with the Uplink data status IE except for emergency services;

b) shall not initiate a service request procedure except for emergency services, for responding to paging or notification over non-3GPP access, for cases f), i), m) and o) in subclause 5.6.1.1;

c) shall not initiate a 5GSM procedure except for emergency services, indicating a change of 3GPP PS data off UE status, or to request the release of a PDU session; and

d) shall not initiate the NAS transport procedure except for sending a CIoT user data container, SMS, an LPP message, a location services message, an SOR transparent container, a UE policy container or a UE parameters update transparent container;

until the UE receives an allowed NSSAI.

During a registration procedure for mobility and periodic registration update for which the 5GS registration type IE indicates:

a) "mobility registration updating" and the UE is in NB-N1 mode; or

b) "periodic registration updating";

if the REGISTRATION ACCEPT message includes the 5GS registration result IE with the "NSSAA to be performed" indicator not set to "Network slice-specific authentication and authorization is to be performed" and the message does not contain an allowed NSSAI and no new allowed NSSAI, the UE shall consider the previously received allowed NSSAI as valid.

During a registration procedure for mobility and periodic registration update for which the 5GS registration type IE indicates:

a) "mobility registration updating"; or

b) "periodic registration updating";

if the REGISTRATION ACCEPT message includes the 5GS registration result IE with the "NSSAA to be performed" indicator set to "Network slice-specific authentication and authorization is to be performed" and the message contains a pending NSSAI, the UE shall delete any stored allowed NSSAI as specified in subclause 4.6.2.2.

If the Uplink data status IE is included in the REGISTRATION REQUEST message:

a) if the AMF determines that the UE is in non-allowed area or is not in allowed area, and the PDU session(s) indicated by the Uplink data status IE is non-emergency PDU session(s) or the UE is not configured for high priority access in selected PLMN or SNPN, the AMF shall include the PDU session reactivation result IE in the REGISTRATION ACCEPT message indicating that user-plane resources for the corresponding PDU session(s) cannot be re-established, and shall include the PDU session reactivation result error cause IE with the 5GMM cause set to #28 "Restricted service area";

b) otherwise, the AMF shall:

1) indicate the SMF to re-establish the user-plane resources for the corresponding PDU session;

2) include PDU session reactivation result IE in the REGISTRATION ACCEPT message to indicate the user-plane resources re-establishment result of the PDU sessions for which the UE requested to re-establish the user-plane resources; and

3) determine the UE presence in LADN service area (see subclause 5.4.4.4) and forward the UE presence in LADN service area towards the SMF, if the corresponding PDU session is a PDU session for LADN.

If the Uplink data status IE is not included in the REGISTRATION REQUEST message and the REGISTRATION REQUEST message is sent for the trigger d) in subclause 5.5.1.3.2, the AMF may indicate the SMF to re-establish the user-plane resources for the PDU sessions.

If a PDU session status IE is included in the REGISTRATION REQUEST message:

a) for single access PDU sessions, the AMF shall:

1) perform a local release of all those PDU sessions which are not in 5GSM state PDU SESSION INACTIVE on the AMF side associated with the access type the REGISTRATION REQUEST message is sent over, but are indicated by the UE as being in 5GSM state PDU SESSION INACTIVE. If any of those PDU sessions is associated with one or more MBS multicast sessions, the SMF shall consider the UE as removed from the associated multicast MBS sessions; and

2) include a PDU session status IE in the REGISTRATION ACCEPT message to indicate which PDU sessions associated with the access type the REGISTRATION ACCEPT message is sent over are not in 5GSM state PDU SESSION INACTIVE in the AMF; and

b) for MA PDU sessions:

1) for all those PDU sessions which are not in 5GSM state PDU SESSION INACTIVE and have user plane resources being established or established on the access the REGISTRATION REQUEST message is sent over on the AMF side, but are indicated by the UE as no user plane resources are being established or established:

i) for PDU sessions having user plane resources being established or established only on the access the REGISTRATION REQUEST message is sent over, the AMF shall perform a local release of all those PDU sessions. If the MA PDU session is associated with one or more multicast MBS sessions, the SMF shall consider the UE as removed from the associated multicast MBS sessions; and

ii) for PDU sessions having user plane resources being established or established on both accesses, the AMF shall perform a local release on the user plane resources associated with the access type the REGISTRATION REQUEST message is sent over. If the REGISTRATION REQUEST message is sent over 3GPP access and the MA PDU session is associated with one or more multicast MBS sessions, the SMF shall consider the UE as removed from the associated multicast MBS sessions; and

2) the AMF shall include a PDU session status IE in the REGISTRATION ACCEPT message to indicate which MA PDU sessions having the corresponding user plane resources are being established or established on the AMF side on the access the REGISTRATION ACCEPT message is sent over.

If the Allowed PDU session status IE is included in the REGISTRATION REQUEST message, the AMF shall:

a) for a 5GSM message from each SMF that has indicated pending downlink signalling only, forward the received 5GSM message via 3GPP access to the UE after the REGISTRATION ACCEPT message is sent;

b) for each SMF that has indicated pending downlink data only:

1) notify the SMF that reactivation of the user-plane resources for the corresponding PDU session(s) associated with non-3GPP access cannot be performed if the corresponding PDU session ID(s) are not indicated in the Allowed PDU session status IE; and

2) notify the SMF that reactivation of the user-plane resources for the corresponding PDU session(s) associated with non-3GPP access can be performed if the corresponding PDU session ID(s) are indicated in the Allowed PDU session status IE.

c) for each SMF that have indicated pending downlink signalling and data:

1) notify the SMF that reactivation of the user-plane resources for the corresponding PDU session(s) associated with non-3GPP access cannot be performed if the corresponding PDU session ID(s) are not indicated in the Allowed PDU session status IE;

2) notify the SMF that reactivation of the user-plane resources for the corresponding PDU session(s) associated with non-3GPP access can be performed if the corresponding PDU session ID(s) are indicated in the Allowed PDU session status IE; and

3) discard the received 5GSM message for PDU session(s) associated with non-3GPP access; and

d) include the PDU session reactivation result IE in the REGISTRATION ACCEPT message to indicate the successfully re-established user-plane resources for the corresponding PDU sessions, if any.

If the PDU session reactivation result IE is included in the REGISTRATION ACCEPT message indicating that the user-plane resources have been successfully reactivated for a PDU session that was requested by the UE in the Allowed PDU session status IE, the UE considers the corresponding PDU session to be associated with the 3GPP access. If the user-plane resources of a PDU session have been successfully reactivated over the 3GPP access, the AMF and SMF update the associated access type of the corresponding PDU session.

If the PDU session reactivation result IE is included in the REGISTRATION ACCEPT message indicating that the user-plane resources cannot be established for a PDU session that was requested by the UE in the Allowed PDU session status IE, the UE considers the corresponding PDU session to be associated with the non-3GPP access.

If an EPS bearer context status IE is included in the REGISTRATION REQUEST message, the AMF handles the received EPS bearer context status IE as specified in 3GPP TS 23.502 [9].

If the EPS bearer context status information is generated for the UE during the inter-system change from S1 mode to N1 mode as specified in 3GPP TS 23.502 [9] and the AMF supports N26 interface, the AMF shall include an EPS bearer context status IE in the REGISTRATION ACCEPT message to indicate the UE which mapped EPS bearer contexts are active in the network.

If the user-plane resources cannot be established for a PDU session, the AMF shall include the PDU session reactivation result IE in the REGISTRATION ACCEPT message indicating that user-plane resources for the corresponding PDU session cannot be re-established, and:

a) if the user-plane resources cannot be established because the SMF indicated to the AMF that the UE is located out of the LADN service area (see 3GPP TS 29.502 [20A]), the AMF shall include the PDU session reactivation result error cause IE with the 5GMM cause set to #43 "LADN not available";

b) if the user-plane resources cannot be established because the SMF indicated to the AMF that only prioritized services are allowed (see 3GPP TS 29.502 [20A]), the AMF shall include the PDU session reactivation result error cause IE with the 5GMM cause set to #28 "restricted service area";

c) if the user-plane resources cannot be established because the SMF indicated to the AMF that the resource is not available in the UPF (see 3GPP TS 29.502 [20A]), the AMF shall include the PDU session reactivation result error cause IE with the 5GMM cause set to #92 "insufficient user-plane resources for the PDU session";

d) if the user-plane resources cannot be established because the SMF indicated to the AMF that the S-NSSAI associated with the PDU session is unavailable due to NSAC (see 3GPP TS 29.502 [20A]), the AMF shall include the PDU session reactivation result error cause IE with the 5GMM cause set to #69 "insufficient resources for specific slice"; or

e) otherwise, the AMF may include the PDU session reactivation result error cause IE to indicate the cause of failure to re-establish the user-plane resources.

NOTE 14: It is up to UE implementation when to re-send a request for user-plane re-establishment for the associated PDU session after receiving a PDU session reactivation result error cause IE with a 5GMM cause set to #92 "insufficient user-plane resources for the PDU session".

NOTE 15: The UE can locally start a back-off timer after receiving a PDU session reactivation result error cause IE with a 5GMM cause set to #69 "insufficient resources for specific slice". The value of the back-off timer is up to UE implementation. Upon expiry of the back-off timer, the UE can re-send a request for user-plane re-establishment for the associated PDU session.

If the AMF needs to initiate PDU session status synchronization the AMF shall include a PDU session status IE in the REGISTRATION ACCEPT message to indicate the UE:

- which single access PDU sessions associated with the access the REGISTRATION ACCEPT message is sent over are not in 5GSM state PDU SESSION INACTIVE in the AMF; and

- which MA PDU sessions are not in 5GSM state PDU SESSION INACTIVE and having user plane resources established in the AMF on the access the REGISTRATION ACCEPT message is sent over.

The AMF may include the LADN information IE in the REGISTRATION ACCEPT message as described in subclause 5.5.1.2.4. The UE, upon receiving the REGISTRATION ACCEPT message with the LADN information IE, shall delete its old LADN information (if any) and store the received new LADN information.

If the UE has set the LADN-DS bit to "LADN per DNN and S-NSSAI supported" in the 5GMM capability IE of the REGISTRATION REQUEST message, the AMF may include the Extended LADN information IE in the REGISTRATION ACCEPT message as described in subclause 5.5.1.2.4. The UE, upon receiving the REGISTRATION ACCEPT message with the Extended LADN information IE, shall delete its old extended LADN information (if any) and store the received new extended LADN information.

If the AMF does not include the LADN information IE or Extended LADN information IE in the REGISTRATION ACCEPT message during registration procedure for mobility and periodic registration update, the UE shall delete its old LADN information or old extended LADN information respectively.

If the PDU session status IE is included in the REGISTRATION ACCEPT message:

a) for single access PDU sessions, the UE shall perform a local release of all those PDU sessions associated with the access type the REGISTRATION ACCEPT message is sent over which are not in 5GSM state PDU SESSION INACTIVE or PDU SESSION ACTIVE PENDING on the UE side, but are indicated by the AMF as being in 5GSM state PDU SESSION INACTIVE. If a locally released PDU session is associated with one or more multicast MBS sessions, the UE shall locally leave the associated multicast MBS sessions; and

b) for MA PDU sessions, for all those PDU sessions which are not in 5GSM state PDU SESSION INACTIVE and have the corresponding user plane resources being established or established in the UE on the access the REGISTRATION ACCEPT message is sent over, but are indicated by the AMF as no user plane resources are being established or established:

1) for MA PDU sessions having the corresponding user plane resources being established or established only on the access the REGISTRATION ACCEPT message is sent over, the UE shall perform a local release of those MA PDU sessions. If a locally released MA PDU session is associated with one or more multicast MBS sessions, the UE shall locally leave the associated multicast MBS sessions; and

2) for MA PDU sessions having user plane resources being established or established on both accesses, the UE shall perform a local release on the user plane resources on the access the REGISTRATION ACCEPT message is sent over. If the user plane resources over 3GPP access are released and the MA PDU session is associated with one or more multicast MBS sessions, the UE shall locally leave the associated multicast MBS sessions.

If:

a) the UE included a PDU session status IE in the REGISTRATION REQUEST message;

b) the UE is operating in the single-registration mode;

c) the UE is performing inter-system change from S1 mode to N1 mode in 5GMM-IDLE mode; and

d) the UE has received the IWK N26 bit set to "interworking without N26 interface supported";

the UE shall ignore the PDU session status IE if received in the REGISTRATION ACCEPT message.

If the EPS bearer context status IE is included in the REGISTRATION ACCEPT message, the UE shall locally delete all those QoS flow descriptions and all associated QoS rules, if any, which are associated with inactive EPS bearer contexts as indicated by the AMF in the EPS bearer context status IE.

If the UE included S1 mode supported indication in the REGISTRATION REQUEST message, the AMF supporting inter-system change with EPS shall set the IWK N26 bit to either:

a) "interworking without N26 interface not supported" if the AMF supports N26 interface; or

b) "interworking without N26 interface supported" if the AMF does not support N26 interface

in the 5GS network feature support IE in the REGISTRATION ACCEPT message.

The UE supporting S1 mode shall operate in the mode for inter-system interworking with EPS as follows:

a) if the IWK N26 bit in the 5GS network feature support IE is set to "interworking without N26 interface not supported", the UE shall operate in single-registration mode;

b) if the IWK N26 bit in the 5GS network feature support IE is set to "interworking without N26 interface supported" and the UE supports dual-registration mode, the UE may operate in dual-registration mode; or

NOTE 16: The registration mode used by the UE is implementation dependent.

c) if the IWK N26 bit in the 5GS network feature support IE is set to "interworking without N26 interface supported" and the UE only supports single-registration mode, the UE shall operate in single-registration mode.

The UE shall treat the received interworking without N26 interface indicator for inter-system change with EPS as valid in the entire PLMN and its equivalent PLMN(s).

The network informs the UE about the support of specific features, such as IMS voice over PS session, location services (5G-LCS), emergency services, emergency services fallback and ATSSS, in the 5GS network feature support information element. In a UE with IMS voice over PS session capability, the IMS voice over PS session indicator, Emergency services support indicator and Emergency services fallback indicator shall be provided to the upper layers. The upper layers take the IMS voice over PS session indicator into account when selecting the access domain for voice sessions or calls. When initiating an emergency call, the upper layers take the IMS voice over PS session indicator, Emergency services support indicator and Emergency services fallback indicator into account for the access domain selection. When the UE determines via the IMS voice over PS session indicator that the network does not support IMS voice over PS sessions in N1 mode, then the UE shall not perform a local release of any persistent PDU session if the AMF does not indicate that the PDU session is in 5GSM state PDU SESSION INACTIVE via the PDU session status IE. When the UE determines via the Emergency services support indicator that the network does not support emergency services in N1 mode, then the UE shall not perform a local release of any emergency PDU session if user-plane resources associated with that emergency PDU session are established if the AMF does not indicate that the PDU session is in 5GSM state PDU SESSION INACTIVE via the PDU session status IE. In a UE with LCS capability, location services indicators (5G-LCS) shall be provided to the upper layers. In a UE with the capability for ATSSS, the network support for ATSSS shall be provided to the upper layers. If the UE receives the 5GS network feature support IE with the ATSSS support indicator set to "ATSSS not supported", the UE shall perform a local release of the MA PDU session, if any. If a locally released MA PDU session is associated with one or more multicast MBS sessions, the UE shall locally leave the associated multicast MBS sessions.

The AMF shall set the EMF bit in the 5GS network feature support IE to:

a) "Emergency services fallback supported in NR connected to 5GCN and E-UTRA connected to 5GCN" if the network supports the emergency services fallback procedure when the UE is in an NR cell connected to 5GCN or an E-UTRA cell connected to 5GCN;

b) "Emergency services fallback supported in NR connected to 5GCN only" if the network supports the emergency services fallback procedure when the UE is in an NR cell connected to 5GCN and does not support the emergency services fallback procedure when the UE is in an E-UTRA cell connected to 5GCN;

c) "Emergency services fallback supported in E-UTRA connected to 5GCN only" if the network supports the emergency services fallback procedure when the UE is in an E-UTRA cell connected to 5GCN and does not support the emergency services fallback procedure when the UE is in an NR cell connected to 5GCN; or

d) "Emergency services fallback not supported" if network does not support the emergency services fallback procedure when the UE is in any cell connected to 5GCN.

NOTE 17: If the emergency services are supported in neither the EPS nor the 5GS homogeneously, based onoperator policy, the AMF will set the EMF bit in the 5GS network feature support IE to "Emergency services fallback not supported".

NOTE 18: Even though the AMF's support of emergency services fallback is indicated per RAT, the UE's support of emergency services fallback is not per RAT, i.e. the UE's support of emergency services fallback is the same for both NR connected to 5GCN and E-UTRA connected to 5GCN.

If the UE indicates support for restriction on use of enhanced coverage in the REGISTRATION REQUEST message and:

a) in WB-N1 mode, the AMF decides to restrict the use of CE mode B for the UE, then the AMF shall set the RestrictEC bit to "CE mode B is restricted";

b) in WB-N1 mode, the AMF decides to restrict the use of both CE mode A and CE mode B for the UE, then the AMF shall set the RestrictEC bit to " Both CE mode A and CE mode B are restricted"; or

c) in NB-N1 mode, the AMF decides to restrict the use of enhanced coverage for the UE, then the AMF shall set the RestrictEC bit to "Use of enhanced coverage is restricted",

in the 5GS network feature support IE in the REGISTRATION ACCEPT message.

Access identity 1 is only applicable while the UE is in N1 mode. Access identity 2 is only applicable while the UE is in N1 mode.

When the UE is registered to the same PLMN or SNPN over 3GPP and non-3GPP access, the UE and the AMF maintain one MPS indicator and one MCS indicator that are common to both 3GPP and non-3GPP access. When the UE is registered to different PLMNs or SNPNs over 3GPP access and non-3GPP access, the UE maintains two MPS indicators and two MCS indicators separately for different accesses i.e., an MPS indicator and an MCS indicator for the 3GPP access and another MPS indicator and an MCS indicator for the non-3GPP access. For both 3GPP and non-3GPP access, the access identity is determined according to subclause 4.5.2:

- if the UE is not operating in SNPN access operation mode:

a) the network informs the UE that the use of access identity 1 is valid in the RPLMN or equivalent PLMN by setting the MPS indicator bit of the 5GS network feature support IE to "Access identity 1 valid", in the REGISTRATION ACCEPT message. Based on operator policy, the AMF sets the MPS indicator bit in the REGISTRATION ACCEPT message based on the MPS priority information in the user's subscription context obtained from the UDM;

b) upon receiving a REGISTRATION ACCEPT message with the MPS indicator bit set to "Access identity 1 valid":

- via 3GPP access; or

- via non-3GPP access if the UE is registered to the same PLMN over 3GPP access and non-3GPP access;

the UE shall act as a UE with access identity 1 configured for MPS, as described in subclause 4.5.2, in all NG-RAN of the registered PLMN and its equivalent PLMNs. The MPS indicator bit in the 5GS network feature support IE provided in the REGISTRATION ACCEPT message is valid in all NG-RAN of the registered PLMN and its equivalent PLMNs until the UE receives a REGISTRATION ACCEPT message or a CONFIGURATION UPDATE COMMAND message with the MPS indicator bit set to "Access identity 1 not valid":

- via 3GPP access; or

- via non-3GPP access if the UE is registered to the same PLMN over 3GPP access and non-3GPP access; or

until the UE selects a non-equivalent PLMN over 3GPP access;

b1) upon receiving a REGISTRATION ACCEPT message with the MPS indicator bit set to "Access identity 1 valid":

- via non-3GPP access; or

- via 3GPP access if the UE is registered to the same PLMN over 3GPP access and non-3GPP access;

the UE shall act as a UE with access identity 1 configured for MPS, as described in subclause 4.5.2, in non-3GPP access of the registered PLMN and its equivalent PLMNs. The MPS indicator bit in the 5GS network feature support IE provided in the REGISTRATION ACCEPT message is valid in non-3GPP access of the registered PLMN and its equivalent PLMNs until the UE receives a REGISTRATION ACCEPT message or a CONFIGURATION UPDATE COMMAND message with the MPS indicator bit set to "Access identity 1 not valid":

- via non-3GPP access; or

- via 3GPP access if the UE is registered to the same PLMN over 3GPP access and non-3GPP access; or

until the UE selects a non-equivalent PLMN over non-3GPP access;

c) during ongoing active PDU sessions that were set up relying on the MPS indicator bit being set to "Access identity 1 valid", if the network indicates in a registration update that the MPS indicator bit is reset to "Access identity 1 not valid", then the UE shall no longer act as a UE with access identity 1 configured for MPS as described in subclause 4.5.2 unless the USIM contains a valid configuration for access identity 1 in RPLMN or equivalent PLMN. In the UE, the ongoing active PDU sessions are not affected by the change of the MPS indicator bit;

d) the network informs the UE that the use of access identity 2 is valid in the RPLMN or equivalent PLMN by setting the MCS indicator bit of the 5GS network feature support IE to "Access identity 2 valid", in the REGISTRATION ACCEPT message. Based on operator policy, the AMF sets the MCS indicator bit in the REGISTRATION ACCEPT message based on the MCS priority information in the user's subscription context obtained from the UDM;

e) upon receiving a REGISTRATION ACCEPT message with the MCS indicator bit set to "Access identity 2 valid":

- via 3GPP access; or

- via non-3GPP access if the UE is registered to the same PLMN over 3GPP access and non-3GPP access;

the UE shall act as a UE with access identity 2 configured for MCS, as described in subclause 4.5.2, in all NG-RAN of the registered PLMN and its equivalent PLMNs. The MCS indicator bit in the 5GS network feature support IE provided in the REGISTRATION ACCEPT message is valid in all NG-RAN of the registered PLMN and its equivalent PLMNs until the UE receives a REGISTRATION ACCEPT message with the MCS indicator bit set to "Access identity 2 not valid":

- via 3GPP access; or

- via non-3GPP access if the UE is registered to the same PLMN over 3GPP access and non-3GPP access; or

until the UE selects a non-equivalent PLMN over 3GPP access;

e1) upon receiving a REGISTRATION ACCEPT message with the MCS indicator bit set to "Access identity 2 valid":

- via non-3GPP access; or

- via 3GPP access if the UE is registered to the same PLMN over 3GPP access and non-3GPP access;

the UE shall act as a UE with access identity 2 configured for MCS, as described in subclause 4.5.2, in non-3GPP access of the registered PLMN and its equivalent PLMNs. The MCS indicator bit in the 5GS network feature support IE provided in the REGISTRATION ACCEPT message is valid in non-3GPP access of the registered PLMN and its equivalent PLMNs until the UE receives a REGISTRATION ACCEPT message with the MCS indicator bit set to "Access identity 2 not valid":

- via non-3GPP access; or

- via 3GPP access if the UE is registered to the same PLMN over 3GPP access and non-3GPP access; or

until the UE selects a non-equivalent PLMN over non-3GPP access; and

f) during ongoing active PDU sessions that were set up relying on the MCS indicator bit being set to "Access identity 2 valid", if the network indicates in a registration update that the MCS indicator bit is reset to "Access identity 2 not valid", then the UE shall no longer act as a UE with access identity 2 configured for MCS as described in subclause 4.5.2 unless the USIM contains a valid configuration for access identity 2 in RPLMN or equivalent PLMN. In the UE, the ongoing active PDU sessions are not affected by the change of the MCS indicator bit; or

- if the UE is operating in SNPN access operation mode:

a) the network informs the UE that the use of access identity 1 is valid in the RSNPN or equivalent SNPN by setting the MPS indicator bit of the 5GS network feature support IE to "Access identity 1 valid", in the REGISTRATION ACCEPT message. Based on operator policy, the AMF sets the MPS indicator bit in the REGISTRATION ACCEPT message based on the MPS priority information in the user's subscription context obtained from the UDM;

b) upon receiving a REGISTRATION ACCEPT message with the MPS indicator bit set to "Access identity 1 valid":

- via 3GPP access; or

- via non-3GPP access if the UE is registered to the same SNPN over 3GPP access and non-3GPP access;

the UE shall act as a UE with access identity 1 configured for MPS, as described in subclause 4.5.2A, in all NG-RAN of the registered SNPN and its equivalent SNPNs. The MPS indicator bit in the 5GS network feature support IE provided in the REGISTRATION ACCEPT message is valid in all NG-RAN of the registered SNPN and its equivalent SNPNs until the UE receives a REGISTRATION ACCEPT message or a CONFIGURATION UPDATE COMMAND message with the MPS indicator bit set to "Access identity 1 not valid":

- via 3GPP access; or

- via non-3GPP access if the UE is registered to the same SNPN over 3GPP access and non-3GPP access; or

until the UE selects a non-equivalent SNPN over 3GPP access;

b1) upon receiving a REGISTRATION ACCEPT message with the MPS indicator bit set to "Access identity 1 valid":

- via non-3GPP access; or

- via 3GPP access if the UE is registered to the same SNPN over 3GPP access and non-3GPP access;

the UE shall act as a UE with access identity 1 configured for MPS, as described in subclause 4.5.2A, in non-3GPP access of the registered SNPN and its equivalent SNPNs. The MPS indicator bit in the 5GS network feature support IE provided in the REGISTRATION ACCEPT message is valid in non-3GPP access of the registered SNPN and its equivalent SNPNs until the UE receives a REGISTRATION ACCEPT message or a CONFIGURATION UPDATE COMMAND message with the MPS indicator bit set to "Access identity 1 not valid":

- via non-3GPP access; or

- via 3GPP access if the UE is registered to the same SNPN over 3GPP access and non-3GPP access; or

until the UE selects a non-equivalent SNPN over non-3GPP access;

c) during ongoing active PDU sessions that were set up relying on the MPS indicator bit being set to "Access identity 1 valid", if the network indicates in a registration update that the MPS indicator bit is reset to "Access identity 1 not valid", then the UE shall no longer act as a UE with access identity 1 configured for MPS as described in subclause 4.5.2A unless the unified access control configuration in the "list of subscriber data" stored in the ME (see 3GPP TS 23.122 [5]) indicates the UE is configured for access identity 1 in the RSNPN or equivalent SNPN. In the UE, the ongoing active PDU sessions are not affected by the change of the MPS indicator bit;

d) the network informs the UE that the use of access identity 2 is valid in the RSNPN or equivalent SNPN by setting the MCS indicator bit of the 5GS network feature support IE to "Access identity 2 valid", in the REGISTRATION ACCEPT message. Based on operator policy, the AMF sets the MCS indicator bit in the REGISTRATION ACCEPT message based on the MCS priority information in the user's subscription context obtained from the UDM;

e) upon receiving a REGISTRATION ACCEPT message with the MCS indicator bit set to "Access identity 2 valid":

- via 3GPP access; or

- via non-3GPP access if the UE is registered to the same SNPN over 3GPP access and non-3GPP access;

the UE shall act as a UE with access identity 2 configured for MCS, as described in subclause 4.5.2A, in all NG-RAN of the registered SNPN and its equivalent SNPNs. The MCS indicator bit in the 5GS network feature support IE provided in the REGISTRATION ACCEPT message is valid in all NG-RAN of the registered SNPN and its equivalent SNPNs until the UE receives a REGISTRATION ACCEPT message with the MCS indicator bit set to "Access identity 2 not valid":

- via 3GPP access; or

- via non-3GPP access if the UE is registered to the same SNPN over 3GPP access and non-3GPP access; or

until the UE selects a non-equivalent SNPN;

e1) upon receiving a REGISTRATION ACCEPT message with the MCS indicator bit set to "Access identity 2 valid":

- via non-3GPP access; or

- via 3GPP access if the UE is registered to the same SNPN over 3GPP access and non-3GPP access;

the UE shall act as a UE with access identity 2 configured for MCS, as described in subclause 4.5.2A, in non-3GPP access of the registered SNPN and its equivalent SNPNs. The MCS indicator bit in the 5GS network feature support IE provided in the REGISTRATION ACCEPT message is valid in non-3GPP access of the registered SNPN and its equivalent SNPNs until the UE receives a REGISTRATION ACCEPT message with the MCS indicator bit set to "Access identity 2 not valid":

- via non-3GPP access; or

- via 3GPP access if the UE is registered to the same SNPN over 3GPP access and non-3GPP access; or

until the UE selects a non-equivalent SNPN over non-3GPP access; and

f) during ongoing active PDU sessions that were set up relying on the MCS indicator bit being set to "Access identity 2 valid", if the network indicates in a registration update that the MCS indicator bit is reset to "Access identity 2 not valid", then the UE shall no longer act as a UE with access identity 2 configured for MCS as described in subclause 4.5.2A unless the unified access control configuration in the "list of subscriber data" stored in the ME (see 3GPP TS 23.122 [5]) indicates the UE is configured for access identity 2 in the RSNPN or equivalent SNPN. In the UE, the ongoing active PDU sessions are not affected by the change of the MCS indicator bit.

NOTE 19: The term "non-3GPP access" in an SNPN refers to the case where the UE is accessing SNPN services via a PLMN.

If the UE has set the Follow-on request indicator to "Follow-on request pending" in the REGISTRATION REQUEST message, or the network has downlink signalling pending, the AMF shall not immediately release the NAS signalling connection after the completion of the registration procedure.

If the UE is authorized to use V2X communication over PC5 reference point based on:

a) at least one of the following bits in the 5GMM capability IE of the REGISTRATION REQUEST message set by the UE, or already stored in the 5GMM context in the AMF during the previous registration procedure as follows:

1) the V2XCEPC5 bit to "V2X communication over E-UTRA-PC5 supported"; or

2) the V2XCNPC5 bit to "V2X communication over NR-PC5 supported"; and

b) the user's subscription context obtained from the UDM as defined in 3GPP TS 23.287 [6C];

the AMF should not immediately release the NAS signalling connection after the completion of the registration procedure.

If the UE is authorized to use 5G ProSe services based on:

a) at least one of the following bits in the 5GMM capability IE of the REGISTRATION REQUEST message set by the UE, or already stored in the 5GMM context in the AMF during the previous registration procedure as follows:

1) the 5G ProSe direct discovery bit to "5G ProSe direct discovery supported"; or

2) the 5G ProSe direct communication bit to "5G ProSe direct communication supported"; and

b) the user's subscription context obtained from the UDM as defined in 3GPP TS 23.304 [6E];

the AMF should not immediately release the NAS signalling connection after the completion of the registration procedure.

If the Requested DRX parameters IE was included in the REGISTRATION REQUEST message, the AMF shall include the Negotiated DRX parameters IE in the REGISTRATION ACCEPT message and replace any stored Negotiated DRX parameter and use it for the downlink transfer of signalling and user data. The AMF may set the Negotiated DRX parameters IE based on the received Requested DRX parameters IE and operator policy if available.

If the Requested NB-N1 mode DRX parameters IE was included in the REGISTRATION REQUEST message and replace any stored Negotiated NB-N1 mode DRX parameters and use it for the downlink transfer of signalling and user data in NB-N1 mode, the AMF shall include the Negotiated NB-N1 mode DRX parameters IE in the REGISTRATION ACCEPT message. The AMF may set the Negotiated NB-N1 mode DRX parameters IE based on the received Requested NB-N1 mode DRX parameters IE and operator policy if available.

The AMF shall include the Negotiated extended DRX parameters IE in the REGISTRATION ACCEPT message only if the Requested extended DRX parameters IE was included in the REGISTRATION REQUEST message, and the AMF supports and accepts the use of eDRX. The AMF may set the Negotiated extended DRX parameters IE based on the received Requested extended DRX parameters IE, operator policy, information from NG-RAN and the user's subscription context obtained from the UDM if available.

If the network cannot derive the UE's identity from the 5G-GUTI because of e.g. no matching identity/context in the network, failure to validate the UE's identity due to integrity check failure of the received message, the AMF may operate as described in subclause 5.5.1.2.4. If the UE included in the REGISTRATION REQUEST message the UE status IE with the EMM registration status set to "UE is in EMM-REGISTERED state" and the AMF does not support N26 interface, the AMF shall operate as described in subclause 5.5.1.2.4.

If the UE has indicated support for service gap control in the REGISTRATION REQUEST message, a service gap time value is available in the 5GMM context, the AMF may include the T3447 value IE set to the service gap time value in the REGISTRATION ACCEPT message.

If the UE requests ciphering keys for ciphered broadcast assistance data in the REGISTRATION REQUEST message and the AMF has valid ciphering key data applicable to the UE's subscription and current tracking area, then the AMF shall include the ciphering key data in the Ciphering key data IE of the REGISTRATION ACCEPT message.

If the UE supports WUS assistance information and the AMF supports and accepts the use of WUS assistance information for the UE, then the AMF shall determine the negotiated UE paging probability information for the UE, store it in the 5GMM context of the UE, and if the UE does not have an active emergency PDU session, the AMF shall include it in the Negotiated WUS assistance information IE in the REGISTRATION ACCEPT message. The AMF may consider the UE paging probability information received in the Requested WUS assistance information IE when determining the negotiated UE paging probability information for the UE.

NOTE 20: Besides the UE paging probability information requested by the UE, the AMF can take local configuration or previous statistical information for the UE into account when determining the negotiated UE paging probability information for the UE.

If the UE sets the NR-PSSI bit to "NR paging subgrouping supported" in the 5GMM capability IE in the REGISTRATION REQUEST message and the AMF supports and accepts the use of PEIPS assistance information for the UE, then the AMF shall determine the Paging subgroup ID for the UE, store it in the 5GMM context of the UE, and include it in the Negotiated PEIPS assistance information IE in the REGISTRATION ACCEPT message or in the Updated PEIPS assistance information IE in the CONFIGURATION UPDATE COMMAND message as part of the registration procedure. The AMF may consider the UE paging probability information received in the Requested PEIPS assistance information IE when determining the Paging subgroup ID for the UE.

NOTE 21: Besides the UE paging probability information when provided by the UE, the AMF can also take local configuration, whether the UE is likely to receive IMS voice over PS session calls, UE mobility pattern or previous statistical information for the UE or information provided by the NG-RAN into account when determining the Paging subgroup ID for the UE.

If the UE set the UN-PER bit to "unavailability period supported" in the 5GMM capability IE in the REGISTRATION REQUEST message and the AMF supports and accepts the use of unavailability period for the UE, then the AMF shall set the UN-PER bit to "unavailability period supported" in the 5GS network feature support IE in the REGISTRATION ACCEPT message.

If the UE provided the Unavailability period duration IE in the REGISTRATION REQUEST message, then the AMF shall:

a) consider the UE as unreachable until the UE registers for normal service again without providing an unavailability period duration;

b) store the received unavailability period duration; and

c) release the signalling connection immediately after the completion of the registration procedure.

The AMF may determine the periodic update timer value based on the stored value of the Unavailability period duration IE.

If due to regional subscription restrictions or access restrictions the UE is not allowed to access the TA or due to CAG restrictions the UE is not allowed to access the cell, but the UE has an emergency PDU session established, the AMF may accept the REGISTRATION REQUEST message and indicate to the SMF to perform a local release of all non-emergency PDU sessions (associated with 3GPP access if it is due to CAG restrictions) and informs the UE via the PDU session status IE in the REGISTRATION ACCEPT message. The AMF shall not indicate to the SMF to release the emergency PDU session. If the AMF indicated to the SMF to perform a local release of all non-emergency PDU sessions (associated with 3GPP access if it is due to CAG restrictions), the network shall behave as if the UE is registered for emergency services and shall set the emergency registered bit of the 5GS registration result IE to "Registered for emergency services" in the REGISTRATION ACCEPT message.

If the REGISTRATION ACCEPT message includes the PDU session reactivation result error cause IE with the 5GMM cause set to #28 "Restricted service area", the UE shall enter the state 5GMM-REGISTERED.NON-ALLOWED-SERVICE and behave as specified in subclause 5.3.5.

If the REGISTRATION ACCEPT message includes the SOR transparent container IE and:

a) the SOR transparent container IE does not successfully pass the integrity check (see 3GPP TS 33.501 [24]); and

b) if the UE attempts obtaining service on another PLMNs or SNPNs as specified in 3GPP TS 23.122 [5] annex C;

then the UE shall release locally the established NAS signalling connection after sending a REGISTRATION COMPLETE message.

If the REGISTRATION ACCEPT message includes the SOR transparent container IE and the SOR transparent container IE successfully passes the integrity check (see 3GPP TS 33.501 [24]), the ME shall store the received SOR counter as specified in annex C and proceed as follows:

a) the UE shall proceed with the behaviour as specified in 3GPP TS 23.122 [5] annex C; and

b) if the registration procedure is performed over 3GPP access and the UE attempts obtaining service on another PLMNs or SNPNs as specified in 3GPP TS 23.122 [5] annex C then the UE may release locally the established NAS signalling connection after sending a REGISTRATION COMPLETE message. Otherwise the UE shall send a REGISTRATION COMPLETE message and not release the current N1 NAS signalling connection locally. If an acknowledgement is requested in the SOR transparent container IE of the REGISTRATION ACCEPT message, the UE acknowledgement is included in the SOR transparent container IE of the REGISTRATION COMPLETE message. In the SOR transparent container IE carrying the acknowledgement, the UE shall set the ME support of SOR-CMCI indicator to "SOR-CMCI supported by the ME".. Additionally, if the UE supports access to an SNPN using credentials from a credentials holder and the UE is not operating in SNPN access operation mode, the UE may set the ME support of SOR-SNPN-SI indicator to "SOR-SNPN-SI supported by the ME".

If the SOR transparent container IE successfully passes the integrity check (see 3GPP TS 33.501 [24]) , and:

a) the SOR transparent container IE indicates a list of preferred PLMN/access technology combinations is provided and the list type indicates "PLMN ID and access technology list", then the ME shall replace the highest priority entries in the "Operator Controlled PLMN Selector with Access Technology" list stored in the ME and shall proceed with the behaviour as specified in 3GPP TS 23.122 [5] annex C.

If the SOR-CMCI is present and the Store SOR-CMCI in ME indicator is set to "Store SOR-CMCI in ME" then the UE shall store or delete the SOR-CMCI in the non-volatile memory of the ME as described in annex C.1;

b) the list type indicates "secured packet", then the ME shall behave as if a SMS is received with protocol identifier set to SIM data download, data coding scheme set to class 2 message and SMS payload as secured packet contents of SOR transparent container IE. The SMS payload is forwarded to UICC as specified in 3GPP TS 23.040 [4A]; or

c) the SOR transparent container IE indicates "HPLMN indication that 'no change of the "Operator Controlled PLMN Selector with Access Technology" list stored in the UE is needed and thus no list of preferred PLMN/access technology combinations is provided'", the UE operates in SNPN access operation mode and the SOR transparent container IE includes SOR-SNPN-SI, the ME shall replace SOR-SNPN-SI of the selected entry of the "list of subscriber data" or associated with the selected PLMN subscription, as specified in 3GPP TS 23.122 [5] with the received SOR-SNPN-SI.

If the SOR-CMCI is present and the Store SOR-CMCI in ME indicator is set to "Store SOR-CMCI in ME" then the UE shall store or delete the SOR-CMCI in the non-volatile memory of the ME as described in annex C.1;

and the UE shall proceed with the behaviour as specified in 3GPP TS 23.122 [5] annex C.

If the SOR transparent container IE does not pass the integrity check successfully, then the UE shall discard the content of the SOR transparent container IE.

If required by operator policy, the AMF shall include the NSSAI inclusion mode IE in the REGISTRATION ACCEPT message (see table 4.6.2.3.1 of subclause 4.6.2.3). Upon receipt of the REGISTRATION ACCEPT message:

a) if the message includes the NSSAI inclusion mode IE, the UE shall operate in the NSSAI inclusion mode indicated in the NSSAI inclusion mode IE over the current access within the current PLMN and its equivalent PLMN(s), if any, or the current SNPN, in the current registration area; or

b) otherwise:

1) if the UE has NSSAI inclusion mode for the current PLMN or SNPN and access type stored in the UE, the UE shall operate in the stored NSSAI inclusion mode;

2) if the UE does not have NSSAI inclusion mode for the current PLMN or SNPN and the access type stored in the UE and if the UE is performing the registration procedure over:

i) 3GPP access, the UE shall operate in NSSAI inclusion mode D in the current PLMN or SNPN and the current access type;

ii) untrusted non-3GPP access, the UE shall operate in NSSAI inclusion mode C in the current PLMN and the current access type; or

iii) trusted non-3GPP access, the UE shall operate in NSSAI inclusion mode D in the current PLMN and the current access type; or

3) if the 5G-RG does not have NSSAI inclusion mode for the current PLMN and wireline access stored in the 5G-RG, and the 5G-RG is performing the registration procedure over wireline access, the 5G-RG shall operate in NSSAI inclusion mode B in the current PLMN and the current access type.

The AMF may include operator-defined access category definitions in the REGISTRATION ACCEPT message.

If there is a running T3447 timer in the AMF and the Uplink data status IE is included or the Follow-on request indicator is set to "Follow-on request pending" in the REGISTRATION REQUEST message, the AMF shall ignore the Uplink data status IE or that the Follow-on request indicator is set to "Follow-on request pending" and proceed as if the Uplink data status IE was not received or the Follow-on request indicator was not set to "Follow-on request pending" except for the following case:

- the PDU session indicated by the Uplink data status IE is emergency PDU session;

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

- the REGISTRATION REQUEST message is as a paging response; or

- the UE is establishing an emergency PDU session or performing emergency services fallback.

If the UE receives Operator-defined access category definitions IE in the REGISTRATION ACCEPT message and the Operator-defined access category definitions IE contains one or more operator-defined access category definitions, the UE shall delete any operator-defined access category definitions stored for the RPLMN and shall store the received operator-defined access category definitions for the RPLMN. If the UE receives the Operator-defined access category definitions IE in the REGISTRATION ACCEPT message and the Operator-defined access category definitions IE contains no operator-defined access category definitions, the UE shall delete any operator-defined access category definitions stored for the RPLMN. If the REGISTRATION ACCEPT message does not contain the Operator-defined access category definitions IE, the UE shall not delete the operator-defined access category definitions stored for the RPLMN.

If the UE has indicated support for service gap control in the REGISTRATION REQUEST message and:

- the REGISTRATION ACCEPT message contains the T3447 value IE, then the UE shall store the new T3447 value, erase any previous stored T3447 value if exists and use the new T3447 value with the timer T3447 next time it is started; or

- the REGISTRATION ACCEPT message does not contain the T3447 value IE, then the UE shall erase any previous stored T3447 value if exists and stop the timer T3447 if running.

If the REGISTRATION ACCEPT message contains the Truncated 5G-S-TMSI configuration IE, then the UE shall store the included truncated 5G-S-TMSI configuration and return a REGISTRATION COMPLETE message to the AMF to acknowledge reception of the truncated 5G-S-TMSI configuration.

NOTE 22: The UE provides the truncated 5G-S-TMSI configuration to the lower layers.

If the UE is not in NB-N1 mode, the UE has set the RACS bit to "RACS supported" in the 5GMM Capability IE of the REGISTRATION REQUEST message, and the REGISTRATION ACCEPT message includes:

a) a UE radio capability ID deletion indication IE set to "Network-assigned UE radio capability IDs deletion requested", the UE shall delete any network-assigned UE radio capability IDs associated with the RPLMN or RSNPN and, if the UE supports access to an SNPN using credentials from a credentials holder, equivalent SNPNs or both, the selected entry of the "list of subscriber data" or the selected PLMN subscription stored at the UE, then the UE shall initiate a registration procedure for mobility and periodic registration update as specified in subclause 5.5.1.3.2 over the existing N1 NAS signalling connection; or

b) a UE radio capability ID IE, the UE shall store the UE radio capability ID as specified in annex C.

If the registration procedure for mobility and periodic registration update was initiated and there is a request from the upper layers to perform "emergency services fallback" pending, the UE shall restart the service request procedure after the successful completion of the mobility and periodic registration update.

When AMF re-allocation occurs in the registration procedure for mobility and periodic registration update, if the new AMF receives in the 5GMM context of the UE the indication that the UE is registered for onboarding services in SNPN, the new AMF may start an implementation specific timer for onboarding services when the registration procedure for mobility and periodic registration update is successfully completed.

If the UE has included the service-level device ID set to the CAA-level UAV ID in the Service-level-AA container IE of the REGISTRATION REQUEST message and the REGISTRATION ACCEPT message contains the service-level-AA pending indication in the Service-level-AA container IE, the UE shall return a REGISTRATION COMPLETE message to the AMF to acknowledge reception of the service-level-AA pending indication, and the UE shall not attempt to perform another registration procedure for UAS services until the UUAA-MM procedure is completed, or to establish a PDU session for USS communication or a PDU session for C2 communication until the UUAA-MM procedure is completed successfully.

If the UE has included the service-level device ID set to the CAA-level UAV ID in the Service-level-AA container IE of the REGISTRATION REQUEST message and the REGISTRATION ACCEPT message does not contain the service-level-AA pending indication in the Service-level-AA container IE, the UE shall consider the UUAA-MM procedure is not triggered.

If the UE is registered for onboarding services in SNPN or the network determines that the UE's subscription only allows for configuration of SNPN subscription parameters in PLMN via the user plane, the AMF may start an implementation specific timer for onboarding services, if not running already, when the network considers that the UE is in 5GMM-REGISTERED (i.e. the network receives the REGISTRATION COMPLETE message from UE).

NOTE 23: If the AMF considers that the UE is in 5GMM-IDLE, when the implementation specific timer for onboarding services expires and the network considers that the UE is still in state 5GMM-REGISTERED, the AMF can locally de-register the UE; or if the UE is in 5GMM-CONNECTED, the AMF can initiate the network-initiated de-registration procedure (see subclause 5.5.2.3).

NOTE 24: The value of the implementation specific timer for onboarding services needs to be large enough to allow a UE to complete the configuration of one or more entries of the "list of subscriber data" taking into consideration that configuration of SNPN subscription parameters in PLMN via the user plane or onboarding services in SNPN involves third party entities outside of the operator's network.

If the UE receives the List of PLMNs to be used in disaster condition IE in the REGISTRATION ACCEPT message and the UE supports MINT, the UE shall delete the "list of PLMN(s) to be used in disaster condition" stored in the ME together with the PLMN ID of the RPLMN, if any, and may store the "list of PLMN(s) to be used in disaster condition" included in the List of PLMNs to be used in disaster condition IE in the ME together with the PLMN ID of the RPLMN.

If the UE receives the Disaster roaming wait range IE in the REGISTRATION ACCEPT message and the UE supports MINT, the UE shall delete the disaster roaming wait range stored in the ME, if any, and store the disaster roaming wait range included in the Disaster roaming wait range IE in the ME.

If the UE receives the Disaster return wait range IE in the REGISTRATION ACCEPT message and the UE supports MINT, the UE shall delete the disaster return wait range stored in the ME, if any, and store the disaster return wait range stored included in the Disaster return wait range IE in the ME.

If the 5GS registration type IE is set to "disaster roaming mobility registration updating" and:

a) the MS determined PLMN with disaster condition IE is included in the REGISTRATION REQUEST message, the AMF shall determine the PLMN with disaster condition in the MS determined PLMN with disaster condition IE;

b) the MS determined PLMN with disaster condition IE is not included in the REGISTRATION REQUEST message and the Additional GUTI IE is included in the REGISTRATION REQUEST message and contains 5G-GUTI of a PLMN of the country of the PLMN providing disaster roaming, the AMF shall determine the PLMN with disaster condition in the PLMN identity of the 5G-GUTI;

c) the MS determined PLMN with disaster condition IE and the Additional GUTI IE are not included in the REGISTRATION REQUEST message and:

1) the 5GS mobile identity IE contains 5G-GUTI of a PLMN of the country of the PLMN providing disaster roaming, the AMF shall determine the PLMN with disaster condition in the PLMN identity of the 5G-GUTI; or

2) the 5GS mobile identity IE contains SUCI of a PLMN of the country of the PLMN providing disaster roaming, the AMF shall determine the PLMN with disaster condition in the PLMN identity of the SUCI; or

d) the MS determined PLMN with disaster condition IE is not included in the REGISTRATION REQUEST message, NG-RAN of the PLMN providing disaster roaming broadcasts disaster roaming indication and:

- the Additional GUTI IE is included in the REGISTRATION REQUEST message and contains 5G-GUTI of a PLMN of a country other than the country of the PLMN providing disaster roaming; or

- the Additional GUTI IE is not included and the 5GS mobile identity IE contains 5G-GUTI or SUCI of a PLMN of a country other than the country of the PLMN providing disaster roaming;

the AMF shall determine the PLMN with disaster condition based on the disaster roaming agreement arrangement between mobile network operators.

NOTE 25: The disaster roaming agreement arrangement between mobile network operators is out scope of 3GPP.

If the AMF determines that a disaster condition applies to the PLMN with disaster condition, and the UE is allowed to be registered for disaster roaming services, the AMF shall set the Disaster roaming registration result value bit in the 5GS registration result IE to "no additional information" in the REGISTRATION ACCEPT message. If the AMF determines that the UE can be registered to the PLMN for normal service, the AMF shall set the Disaster roaming registration result value bit in the 5GS registration result IE to "request for registration for disaster roaming service accepted as registration not for disaster roaming service " in the REGISTRATION ACCEPT message.

If the UE indicates "disaster roaming mobility registration updating" in the 5GS registration type IE in the REGISTRATION REQUEST message and the 5GS registration result IE value in the REGISTRATION ACCEPT message is set to:

- "request for registration for disaster roaming service accepted as registration not for disaster roaming service", the UE shall consider itself registered for normal service. If the PLMN identity of the registered PLMN is a member of the forbidden PLMN list as specified in subclause 5.3.13A, any such PLMN identity shall be deleted from the corresponding list(s). If UE supports S1 mode, the UE shall initiate the registration procedure for mobility and periodic registration update and indicate that S1 mode is supported as described in subclause 5.5.1.3.2; or

- "no additional information", the UE shall consider itself registered for disaster roaming.

If the UE receives the Forbidden TAI(s) for the list of "5GS forbidden tracking areas for roaming" IE in the REGISTRATION ACCEPT message and the TAI(s) included in the IE is not part of the list of "5GS forbidden tracking areas for roaming", the UE shall store the TAI(s) included in the IE into the list of "5GS forbidden tracking areas for roaming" and remove the TAI(s) from the stored TAI list if present.

If the UE receives the Forbidden TAI(s) for the list of "5GS forbidden tracking areas for regional provision of service" IE in the REGISTRATION ACCEPT message and the TAI(s) included in the IE is not part of the list of "5GS forbidden tracking areas for regional provision of service", the UE shall store the TAI(s) included in the IE into the list of "5GS forbidden tracking areas for regional provision of service" and remove the TAI(s) from the stored TAI list if present.

If the ESI bit of the 5GMM capability IE of the REGISTRATION REQUEST message is set to "equivalent SNPNs supported", and the serving SNPN changes, the AMF shall indicate the NID of the serving SNPN in the REGISTRATION ACCEPT message. The UE shall determine the SNPN identity of the RSNPN from the NID received in the REGISTRATION ACCEPT message and the MCC and the MNC of the new 5G-GUTI.

If the UE supporting the reconnection to the network due to RAN timing synchronization status change receives the RAN timing synchronization IE with the RecReq bit set to "Reconnection requested" in the REGISTRATION ACCEPT message, the UE shall operate as specified in subclauses 5.2.3.2.3, 5.3.1.4, and 5.6.1.1.

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

##### 5.6.1.4.1 UE is not using 5GS services with control plane CIoT 5GS optimization

For cases other than h) in subclause 5.6.1.1, the UE shall treat the reception of the SERVICE ACCEPT message as successful completion of the procedure. The UE shall reset the service request attempt counter, stop timer T3517 and enter the state 5GMM-REGISTERED.

For case h) in subclause 5.6.1.1,

a) the UE shall treat the indication from the lower layers when the UE has changed to S1 mode or E-UTRA connected to 5GCN (see 3GPP TS 23.502 [9]) as successful completion of the procedure and stop timer T3517;

b) if a UE operating in single-registration mode has changed to S1 mode, it shall disable the N1 mode capability for 3GPP access (see subclause 4.9.2); and

c) the AMF shall not check for CAG restrictions.

If the PDU session status information element is included in the SERVICE REQUEST message, then:

a) for single access PDU sessions, the AMF shall:

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

2) request the SMF to perform a local release of all those PDU sessions. If any of those PDU sessions is associated with one or more multicast MBS sessions, the SMF shall consider the UE as removed from the associated multicast MBS sessions; and

b) for MA PDU sessions, the AMF shall:

1) for MA PDU sessions having user plane resources established in the AMF only on the access the SERVICE REQUEST message is sent over, but are indicated by the UE as no user plane resources established:

i) for all those MA PDU sessions without a PDN connection established as a user-plane resource, perform a local release of all those MA PDU sessions and request the SMF to perform a local release of all those MA PDU sessions. If the MA PDU session is associated with one or more multicast MBS sessions, the SMF shall consider the UE as removed from the associated multicast MBS sessions; and

ii) for all those MA PDU sessions with a PDN connection established as a user-plane resource, perform a local release of user plane resources of all those PDU sessions on the access the SERVICE REQUEST message is sent over and request the SMF to perform a local release of user plane resources of all those PDU sessions on the access type the SERVICE REQUEST message is sent over; and

2) for MA PDU sessions having user plane resources established on both accesses in the AMF, but are indicated by the UE as no user plane resources established:

i) perform a local release of user plane resources of all those PDU sessions on the access the SERVICE REQUEST message is sent over; and

ii) request the SMF to perform a local release of user plane resources of all those PDU sessions on the access type the SERVICE REQUEST message is sent over. If the SERVICE REQUEST message is sent over 3GPP access and the MA PDU session is associated with one or more multicast MBS sessions, the SMF shall consider the UE as removed from the associated multicast MBS sessions.

If the AMF needs to initiate PDU session status synchronization 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 ACCEPT message to indicate:

- which single access PDU sessions associated with the access type the SERVICE ACCEPT message is sent over are not in 5GSM state PDU SESSION INACTIVE in the AMF; and

- which MA PDU sessions are not in 5GSM state PDU SESSION INACTIVE and having user plane resources established in the AMF on the access the SERVICE ACCEPT message is sent over.

If the PDU session status information element is included in the SERVICE ACCEPT message, 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 ACCEPT message is sent over, but are indicated by the AMF as in 5GSM state PDU SESSION INACTIVE. If a locally released PDU session is associated with one or more multicast MBS sessions, the UE shall locally leave the associated multicast MBS sessions; 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 ACCEPT 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 ACCEPT message is sent over, the UE shall perform a local release of those MA PDU sessions. If a locally released MA PDU session is associated with one or more multicast MBS sessions, the UE shall locally leave the associated multicast MBS 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 ACCEPT message is sent over. If the user plane resources over 3GPP access are released and the MA PDU session is associated with one or more multicast MBS sessions, the UE shall locally leave the associated multicast MBS sessions.

If the Uplink data status IE is included in the SERVICE REQUEST message and the UE is:

a) not in NB-N1 mode; or

b) in NB-N1 mode and the UE does not indicate a request to have user-plane resources established for a number of PDU sessions that exceeds the UE's maximum number of supported user-plane resources;

the AMF shall:

a) indicate the SMF to re-establish the user-plane resources for the corresponding PDU sessions;

b) include the PDU session reactivation result IE in the SERVICE ACCEPT message to indicate the user-plane resources re-establishment result of the PDU sessions for which the UE requested to re-establish the user-plane resources; and

c) determine the UE presence in LADN service area (see subclause 5.4.4.4) and forward the UE presence in LADN service area towards the SMF, if the corresponding PDU session is a PDU session for LADN.

If the Allowed PDU session status IE is included in the SERVICE REQUEST message, the AMF shall:

a) for a 5GSM message from each SMF that has indicated pending downlink signalling only, forward the received 5GSM message via 3GPP access to the UE after the SERVICE ACCEPT message is sent;

b) for each SMF that has indicated pending downlink data only:

1) notify the SMF that reactivation of the user-plane resources for the corresponding PDU session(s) associated with non-3GPP access cannot be performed if the corresponding PDU session ID(s) are not indicated in the Allowed PDU session status IE; and

2) notify the SMF that reactivation of the user-plane resources for the corresponding PDU session(s) associated with non-3GPP access can be performed if:

i) for a UE not in NB-N1 mode, the corresponding PDU session ID(s) are indicated in the Allowed PDU session status IE; or

ii) for a UE in NB-N1 mode, the corresponding PDU session ID(s) are indicated in the Allowed PDU session status IE, and the resulting number of PDU sessions with established user-plane resources does not exceed the UE's maximum number of supported user-plane resources;

c) for each SMF that have indicated pending downlink signalling and data:

1) notify the SMF that reactivation of the user-plane resources for the corresponding PDU session(s) associated with non-3GPP access cannot be performed if the corresponding PDU session ID(s) are not indicated in the Allowed PDU session status IE;

2) notify the SMF that reactivation of the user-plane resources for the corresponding PDU session(s) associated with non-3GPP access can be performed if:

i) for a UE not in NB-N1 mode, the corresponding PDU session ID(s) are indicated in the Allowed PDU session status IE; or

ii) for a UE in NB-N1 mode, the corresponding PDU session ID(s) are indicated in the Allowed PDU session status IE, and the resulting number of PDU sessions with established user-plane resources does not exceed the UE's maximum number of supported user-plane resources; and

3) discard the received 5GSM message for PDU session(s) associated with non-3GPP access; and

d) include the PDU session reactivation result IE in the SERVICE ACCEPT message to indicate the successfully re-established user-plane resources for the corresponding PDU sessions, if any.

If due to regional subscription restrictions or access restrictions the UE is not allowed to access the TA or due to CAG restrictions the UE is not allowed to access the cell, but the UE has an emergency PDU session established, the AMF may accept the SERVICE REQUEST message and indicate to the SMF to perform a local release of all non-emergency PDU sessions (associated with 3GPP access if it is due to CAG restrictions) and informs the UE via the PDU session status IE in the SERVICE ACCEPT message. The AMF shall not indicate to the SMF to release the emergency PDU session. If the AMF indicated to the SMF to perform a local release of all non-emergency PDU sessions (associated with 3GPP access if it is due to CAG restrictions), the network shall behave as if the UE is registered for emergency services.

If the PDU session reactivation result IE is included in the SERVICE ACCEPT message indicating that the user-plane resources have been successfully reactivated for a PDU session that was requested by the UE in the Allowed PDU session status IE, the UE considers the corresponding PDU session to be associated with the 3GPP access. If the user-plane resources of a PDU session have been successfully reactivated over the 3GPP access, the AMF and SMF update the associated access type of the corresponding PDU session.

If the user-plane resources cannot be established for a PDU session, the AMF shall include the PDU session reactivation result IE in the SERVICE ACCEPT message indicating that user-plane resources for the corresponding PDU session cannot be re-established, and:

a) if the user-plane resources cannot be established because the SMF indicated to the AMF that the UE is located out of the LADN service area (see 3GPP TS 29.502 [20A]), the AMF shall include the PDU session reactivation result error cause IE with the 5GMM cause set to #43 "LADN not available";

b) if the user-plane resources cannot be established because the SMF indicated to the AMF that only prioritized services are allowed (see 3GPP TS 29.502 [20A]), the AMF shall include the PDU session reactivation result error cause IE with the 5GMM cause set to #28 "restricted service area";

c) if the user-plane resources cannot be established because the SMF indicated to the AMF that the resource is not available in the UPF (see 3GPP TS 29.502 [20A]), the AMF shall include the PDU session reactivation result error cause IE with the 5GMM cause set to #92 "insufficient user-plane resources for the PDU session";

e) if the user-plane resources cannot be established because the SMF indicated to the AMF that the S-NSSAI associated with the PDU session is unavailable due to NSAC (see 3GPP TS 29.502 [20A]), the AMF shall include the PDU session reactivation result error cause IE with the 5GMM cause set to #69 "insufficient resources for specific slice"; or

d) otherwise, the AMF may include the PDU session reactivation result error cause IE to indicate the cause of failure to re-establish the user-plane resources.

NOTE 1: It is up to UE implementation when to re-send a request for user-plane re-establishment for the associated PDU session after receiving a PDU session reactivation result error cause IE with a 5GMM cause set to #92 "insufficient user-plane resources for the PDU session".

NOTE 2: The UE can locally start a back-off timer after receiving a PDU session reactivation result error cause IE with a 5GMM cause set to #69 "insufficient resources for specific slice". The value of the back-off timer is up to UE implementation. Upon expiry of the back-off timer, the UE can re-send a request for user-plane re-establishment for the associated PDU session.

If the PDU session reactivation result IE is included in the SERVICE ACCEPT message indicating that the user-plane resources cannot be established for a PDU session that was requested by the UE in the Allowed PDU session status IE, the UE considers the corresponding PDU session to be associated with the non-3GPP access.

If the MUSIM UE does not include the Paging restriction IE in the SERVICE REQUEST message, the AMF shall delete any stored paging restriction for the UE and stop restricting paging.

For case m in subclause 5.6.1.1 when the MUSIM UE sets the Request type to "NAS signalling connection release" in the SERVICE REQUEST message, the AMF shall initiate the release of the N1 NAS signalling connection after the completion of the service request procedure.

For cases o and p in subclause 5.6.1.1 when the MUSIM UE sets the Request type to "NAS signalling connection release" or to "Rejection of paging" in the UE request type IE in the SERVICE REQUEST message and if the UE requests restriction of paging by including the Paging restriction IE, the AMF:

- if accepts the paging restriction, shall include the 5GS additional request result IE in the SERVICE ACCEPT message and set the Paging restriction decision to "paging restriction is accepted". The AMF shall store the paging restriction of the UE and enforce these restrictions in the paging procedure as described in clause 5.6.2; or

- if rejects the paging restriction, shall include the 5GS additional request result IE in the SERVICE ACCEPT message and set the Paging restriction decision to "paging restriction is rejected", and shall discard the received paging restriction. The AMF shall delete any stored paging restriction for the UE and stop restricting paging; and

the AMF shall initiate the release of the N1 NAS signalling connection as follows:

- for case o in subclause 5.6.1.1, after the completion of the service request procedure;

- for case p in subclause 5.6.1.1, after the completion of the generic UE configuration update procedure that is triggered after the completion of the service request procedure.

If the SERVICE REQUEST message is for emergency services fallback, the AMF triggers the emergency services fallback procedure as specified in subclause 4.13.4.2 of 3GPP TS 23.502 [9].

If the UE having an emergency PDU session sent the SERVICE REQUEST message via:

a) a CAG cell and none of the CAG-IDs of the CAG cell are authorized based on the "Allowed CAG list" for the current PLMN in the UE's subscription; or

b) a non-CAG cell in a PLMN for which the UE's subscription contains an "indication that the UE is only allowed to access 5GS via CAG cells";

the network shall accept the SERVICE REQUEST message and release all non-emergency PDU sessions locally. The emergency PDU session shall not be released.

If the AMF received the list of TAIs from the satellite NG-RAN as described in 3GPP TS 23.501 [8], and determines that, by UE subscription and operator's preferences, any but not all TAIs in the received list of TAIs is forbidden for roaming or for regional provision of service, the AMF shall include the TAI(s) in:

a) the Forbidden TAI(s) for the list of "5GS forbidden tracking areas for roaming" IE; or

b) the Forbidden TAI(s) for the list of "5GS forbidden tracking areas for regional provision of service" IE; or

c) both;

in the SERVICE ACCEPT message.

NOTE 9: Void.

If the UE receives the Forbidden TAI(s) for the list of "5GS forbidden tracking areas for roaming" IE in the SERVICE ACCEPT message and the TAI(s) included in the IE is not part of the list of "5GS forbidden tracking areas for roaming", the UE shall store the TAI(s) included in the IE into the list of "5GS forbidden tracking areas for roaming" and remove the TAI(s) from the stored TAI list if present.

If the UE receives the Forbidden TAI(s) for the list of "5GS forbidden tracking areas for regional provision of service" IE in the SERVICE ACCEPT message and the TAI(s) included in the IE is not part of the list of "5GS forbidden tracking areas for regional provision of service", the UE shall store the TAI(s) included in the IE into the list of "5GS forbidden tracking areas for regional provision of service" and remove the TAI(s) from the stored TAI list if present.

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

#### 6.4.1.1 General

The purpose of the UE-requested PDU session establishment procedure is to establish a new PDU session with a DN, to perform handover of an existing PDU session between 3GPP access and non-3GPP access, to transfer an existing PDN connection in the EPS to the 5GS, to transfer an existing PDN connection in an untrusted non-3GPP access connected to the EPC to the 5GS, or to establish an MA PDU session to support ATSSS (see 3GPP TS 24.193 [13B]), or to relay the service associated with the RSC for 5G ProSe layer-3 UE-to-network relay (see 3GPP TS 24.554 [19E]). If accepted by the network, the PDU session enables exchange of PDUs between the UE and the DN.

The UE shall not request a PDU session establishment:

a) for an LADN:

1. when the UE is located outside the LADN service area; or
2. if the extended LADN information for that LADN is available:

i) when the UE is located outside the LADN service area; or

ii) when the S-NSSAI used for PDU session establishment is not associated with that LADN in the LADN service area;

b) to transfer a PDU session from non-3GPP access to 3GPP access when the 3GPP PS data off UE status is "activated" and the UE is not using the PDU session to send uplink IP packets for any of the 3GPP PS data off exempt services (see subclause 6.2.10);

c) when the UE is in NB-N1 mode, the UE has indicated preference for user plane CIoT 5GS optimization, the network has accepted the use of user plane CIoT 5GS optimization for the UE, and the number of PDU sessions that currently has user-plane resources established equals to the UE's maximum number of supported user-plane resources;

d) to transfer a PDU session from 3GPP access to non-3GPP access when the UE has indicated preference for control plane CIoT 5GS optimization, the network has accepted the use of control plane CIoT 5GS optimization for the UE, and the Control plane only indication IE was received in the PDU SESSION ESTABLISHMENT ACCEPT message; or

e) to transfer a PDU session from the non-3GPP access to the 3GPP access when the UE is in NB-N1 mode, the UE has indicated preference for user plane CIoT 5GS optimization, the network has accepted the use of user plane CIoT 5GS optimization for the UE, and the number of PDU sessions that currently has user-plane resources established equals to the UE's maximum number of supported user-plane resources.

\* \* \* End of Change \* \* \* \*