**3GPP TSG-CT WG1 Meeting #136-eC1-223565v1**

**E-Meeting, 12th – 20th May 2022**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **24.501** | **CR** | **4313** | **rev** | **1** | **Current version:** | **17.6.1** |  |
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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 |  |

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| ***Title:***  | Editorial corrections |
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| ***Source to WG:*** | ZTE, SHARP |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5GProtoc17 |  | ***Date:*** | 2022-05-05 |
|  |  |  |  |  |
| ***Category:*** | **D** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)...Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | 1. In TS 24.501 v17.6.1, the subclause 4.6.3.4 should be 4.6.3.3 since there is no 4.6.3.3 and the subclause title format should be fixed.
2. The subclause title format of Annex C.2 should be fixed.
3. There are several typos in TS 24.501 that need to be fixed.
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| ***Summary of change:*** | Fix typos and subclause title format in TS 24.501. |
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| ***Consequences if not approved:*** | The typos and incorrect title format remain in the specification. |
|  |  |
| ***Clauses affected:*** | 4.6.2.1, 4.6.2.2, 4.6.3.4 (changed to 4.6.3.3), 5.5.1.2.2, 5.5.1.3.4, 6.2.12, 6.3.2.3, A.3, C.1, C.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\* \* \* First Change \* \* \* \*

#### 4.6.2.1 General

Upon registration to a PLMN or SNPN (except for the registration procedure for periodic registration update, the initial registration for onboarding services in SNPN, and the registration procedure for mobility registration update when registered for onboarding services in SNPN), the UE shall send to the AMF the requested NSSAI which includes one or more S-NSSAIs of the allowed NSSAI for the PLMN or SNPN or the configured NSSAI and corresponds to the network slice(s) to which the UE intends to register with, if:

a) the UE has a configured NSSAI for the current PLMN or SNPN;

b) the UE has an allowed NSSAI for the current PLMN or SNPN; or

c) the UE has neither allowed NSSAI for the current PLMN nor configured NSSAI for the current PLMN or SNPN and has a default configured NSSAI. In this case the UE indicates to the AMF that the requested NSSAI is created from the default configured NSSAI.

Other than S-NSSAIs contained in the NSSAIs described above, the requested NSSAI can be formed based on the S-NSSAI(s) available in the UE (see subclause 5.5.1.3.2 for further details). In roaming scenarios, the UE shall also provide the mapped S-NSSAI(s) for the requested NSSAI, if available. The AMF verifies if the requested NSSAI is permitted based on the subscribed S-NSSAIs in the UE subscription and optionally the mapped S-NSSAI(s) provided by the UE, and if so then the AMF shall provide the UE with the allowed NSSAI for the PLMN or SNPN, and shall also provide the UE with the mapped S-NSSAI(s) for the allowed NSSAI for the PLMN if available. The AMF shall ensure that there are not two or more S-NSSAIs of the allowed NSSAI which are mapped to the same S-NSSAI of the HPLMN or SNPN. In case all the S-NSSAIs included in the requested NSSAI are either rejected for the current PLMN or rejected for the current registration area or rejected for the failed or revoked NSSAA or rejected for the maximum number of UEs reached, or the requested NSSAI was not included by the UE, there is no subscribed S-NSSAI(s) marked as default and the UE is neither registering nor registered for onboarding services in SNPN, the AMF may reject the registration request (see subclauses 5.5.1.2.5 and 5.5.1.3.5 for further details).

The set of network slice(s) for a UE can be changed at any time while the UE is registered to a PLMN or SNPN, and the change may be initiated by the network or the UE. In this case, the allowed NSSAI and associated registration area may be changed during the registration procedure or the generic UE configuration update procedure. The configured NSSAI and the rejected NSSAI may be changed during the registration procedure or the generic UE configuration update procedure. The default configured NSSAI may be changed by sending a UE parameters update transparent container to the UE during the NAS transport procedure. The pending NSSAI may be changed during the registration procedure. In addition, using the generic UE configuration update procedure, the network may trigger the registration procedure in order to update the allowed NSSAI.

The UE in NB-N1 mode does not include the requested NSSAI during the registration procedure if the 5GS registration type IE indicates "mobility registration updating", procedure is not initiated to change the slice(s) that the UE is currently registered to, and the UE is still in the current registration area. The UE does not include the requested NSSAI during the registration procedure if the 5GS registration type IE indicates "SNPN onboarding registration" or the UE is registered for onboarding services in SNPN.

The AMF does not include the allowed NSSAI during a registration procedure with the 5GS registration type IE indicating "mobility registration updating" except if the allowed NSSAI has changed for the UE. The UE considers the last received allowed NSSAI as valid until the UE receives a new allowed NSSAI. The AMF does not include the allowed NSSAI during a registration procedure with the 5GS registration type IE indicating "SNPN onboarding registration" or during a registration procedure when the UE is registered for onboarding services in SNPN.

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

#### 4.6.2.2 NSSAI storage

If available, the configured NSSAI(s) shall be stored in a non-volatile memory in the ME as specified in annex C. For a configured NSSAI, if there is associated NSSRG information, the NSSRG information shall also be stored in a non-volatile memory in the ME as specified in annex C. The support for NSSRG information by a UE or an AMF is optional.

The allowed NSSAI(s) should be stored in a non-volatile memory in the ME as specified in annex C.

Each of the configured NSSAI stored in the UE is a set composed of at most 16 S-NSSAIs. Each of the allowed NSSAI stored in the UE is a set composed of at most 8 S-NSSAIs and is associated with a PLMN identity or SNPN identity, an access type and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription. Each of the configured NSSAI except the default configured NSSAI, and the rejected NSSAI is associated with a PLMN identity or SNPN identity and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription. Each of the pending NSSAI stored in the UE is a set composed of at most 16 S-NSSAIs and is associated with a PLMN identity or SNPN identity and, if the UE supports access to an SNPN using credentials from a credentials holder, the selected entry of the "list of subscriber data" or the selected PLMN subscription. The S-NSSAI(s) in the rejected NSSAI for the current registration area are further associated with one or more tracking areas where the rejected S-NSSAI(s) is not available. The S-NSSAI(s) in the rejected NSSAI for the current PLMN or SNPN shall be considered rejected for the current PLMN or SNPN regardless of the access type. The S-NSSAI(s) in the rejected NSSAI for the failed or revoked NSSAA shall be considered rejected for the current PLMN regardless of the access type. The S-NSSAI(s) in the rejected NSSAI for the maximum number of UEs reached are further associated with the access type over which the rejected NSSAI was received. There shall be no duplicated PLMN identities or SNPN identities associated with each of the list of configured NSSAI(s), pending NSSAI(s), rejected NSSAI(s) for the current PLMN or SNPN, rejected NSSAI(s) for the current registration area, rejected NSSAI(s) for the failed or revoked NSSAA, and rejected NSSAI for the maximum number of UEs reached.

The UE stores NSSAIs as follows:

a) The configured NSSAI shall be stored until a new configured NSSAI is received for a given PLMN or SNPN. The network may provide to the UE the mapped S-NSSAI(s) for the new configured NSSAI which shall also be stored in the UE. When the UE is provisioned with a new configured NSSAI for a PLMN or SNPN, the UE shall:

1) replace any stored configured NSSAI for this PLMN or SNPN with the new configured NSSAI for this PLMN or SNPN;

2) delete any stored mapped S-NSSAI(s) for the configured NSSAI and, if available, store the mapped S-NSSAI(s) for the new configured NSSAI;

3) delete any stored allowed NSSAI for this PLMN or SNPN and, if available, the stored mapped S-NSSAI(s) for the allowed NSSAI, if the UE received the new configured NSSAI for this PLMN or SNPN and the Configuration update indication IE with the Registration requested bit set to "registration requested", in the same CONFIGURATION UPDATE COMMAND message but without any new allowed NSSAI for this PLMN or SNPN included;

4) delete any stored rejected NSSAI;

4A) remove from the stored mapped S-NSSAI(s) for the rejected NSSAI for the current PLMN or SNPN and the stored mapped S-NSSAI(s) for the rejected NSSAI for the current registration area and the stored rejected NSSAI for the maximum number of UEs reached, the S-NSSAI(s), if any, included in the mapped S-NSSAI(s) for the new configured NSSAI for the current PLMN or SNPN (if the UE is roaming); and

5) delete any S-NSSAI(s) stored in the pending NSSAI that are not included in the new configured NSSAI for the current PLMN or SNPN or any mapped S-NSSAI(s), if any, stored in the pending NSSAI that are not included in the mapped S-NSSAI(s) for the configured NSSAI (if the UE is roaming);

 If the UE receives an S-NSSAI associated with a PLMN ID from the network during the PDN connection establishment procedure in EPS as specified in 3GPP TS 24.301 [15] or via ePDG as specified in 3GPP TS 24.302 [16], the UE may store the received S-NSSAI in the configured NSSAI for the PLMN identified by the PLMN ID associated with the S-NSSAI, if not already included in the configured NSSAI;

 The UE may continue storing a received configured NSSAI for a PLMN and associated mapped S-NSSAI(s), if available, when the UE registers in another PLMN.

NOTE 1: The maximum number of configured NSSAIs and associated mapped S-NSSAIs for PLMNs other than the HPLMN that need to be stored in the UE, and how to handle the stored entries, are up to UE implementation.

b) The allowed NSSAI shall be stored until:

1) a new allowed NSSAI is received for a given PLMN or SNPN;

2) the CONFIGURATION UPDATE COMMAND message with the Registration requested bit of the Configuration update indication IE set to "registration requested" is received and contains no other parameters (see subclauses 5.4.4.2 and 5.4.4.3); or

3) the REGISTRATION ACCEPT message is received with the "NSSAA to be performed" indicator of the 5GS registration result IE set to "Network slice-specific authentication and authorization is to be performed", and the REGISTRATION ACCEPT message contains a pending NSSAI and no new allowed NSSAI as described in subclause 5.5.1.2.4 and subclause 5.5.1.3.4.

 The network may provide to the UE the mapped S-NSSAI(s) for the new allowed NSSAI (see subclauses 5.5.1.2 and 5.5.1.3) which shall also be stored in the UE. When a new allowed NSSAI for a PLMN or SNPN is received, the UE shall:

1) replace any stored allowed NSSAI for this PLMN or SNPN and its equivalent PLMN(s) with the new allowed NSSAI for this PLMN or SNPN;

2) delete any stored mapped S-NSSAI(s) for the allowed NSSAI for this PLMN or SNPN and its equivalent PLMN(s) and, if available, store the mapped S-NSSAI(s) for the new allowed NSSAI;

3) remove from the stored rejected NSSAI for the current PLMN or SNPN, the rejected NSSAI for the current registration area and rejected NSSAI for the maximum number of UEs reached, the S-NSSAI(s), if any, included in the new allowed NSSAI for the current PLMN or SNPN, unless the S-NSSAI in the rejected NSSAI is associated with one or more S-NSSAI(s) in the stored mapped rejected NSSAI and these mapped S-NSSAI(s) are not included in the mapped S-NSSAI(s) for the new allowed NSSAI;

4) remove from the stored rejected NSSAI for the failed or revoked NSSAA, the S-NSSAI(s), if any, included in the new allowed NSSAI for the current PLMN or SNPN (if the UE is not roaming) or the mapped S-NSSAI(s) for the new allowed NSSAI for the current PLMN or SNPN (if the UE is roaming);

5) remove from the stored mapped S-NSSAI(s) for the rejected NSSAI for the current PLMN or SNPN, the stored mapped S-NSSAI(s) for the rejected NSSAI for the current registration area and rejected NSSAI for the maximum number of UEs reached, the S-NSSAI(s), if any, included in the mapped S-NSSAI(s) for the new allowed NSSAI for the current PLMN or SNPN (if the UE is roaming); and

6) remove from the stored pending NSSAI for this PLMN or SNPN and its equivalent PLMN(s), one or more S-NSSAIs, if any, included in the new allowed NSSAI for the current PLMN or SNPN and its equivalent PLMN(s) (if the UE is not roaming) or the mapped S-NSSAI(s) for the new allowed NSSAI for the current PLMN or SNPN and its equivalent PLMN(s) (if the UE is roaming).

 If the UE receives the CONFIGURATION UPDATE COMMAND message with the Registration requested bit of the Configuration update indication IE set to "registration requested" and contains no other parameters (see subclauses 5.4.4.2 and 5.4.4.3), the UE shall delete any stored allowed NSSAI for this PLMN or SNPN, and delete any stored mapped S-NSSAI(s) for the allowed NSSAI, if available;

NOTE 2: Whether the UE stores the allowed NSSAI and the mapped S-NSSAI(s) for the allowed NSSAI also when the UE is switched off is implementation specific.

c) When the UE receives the S-NSSAI(s) included in the rejected NSSAI in the REGISTRATION ACCEPT message, the REGISTRATION REJECT message, the DEREGISTRATION REQUEST message or in the CONFIGURATION UPDATE COMMAND message, the UE shall:

1) store the S-NSSAI(s) into the rejected NSSAI and the mapped S-NSSAI(s) for the rejected NSSAI based on the associated rejection cause(s);

2) if the UE receives the S-NSSAI(s) included in the Rejected NSSAI IE, or if the UE receives the S-NSSAI(s) included in the Extended rejected NSSAI IE in non-roaming case, remove from the stored allowed NSSAI for the current PLMN or SNPN and its equivalent PLMN(s), the S-NSSAI(s), if any, included in the:

i) rejected NSSAI for the current PLMN or SNPN, for each and every access type;

ii) rejected NSSAI for the current registration area, associated with the same access type; or

iii) rejected NSSAI for the maximum number of UEs reached, associated with the same access type;

3) if the UE receives the S-NSSAI(s) included in the Extended rejected NSSAI IE in roaming case, remove from the stored allowed NSSAI for the current PLMN or SNPN and its equivalent PLMN(s), the S-NSSAI(s), if any, included in the:

i) rejected NSSAI for the current PLMN or SNPN, for each and every access type;

ii) rejected NSSAI for the current registration area, associated with the same access type; or

iii) rejected NSSAI for the maximum number of UEs reached, associated with the same access type;

 if the mapped S-NSSAI(s) for the S-NSSAI in the stored allowed NSSAI for the current PLMN or SNPN are stored in the UE, and all of the mapped S-NSSAIs are included in the Extended rejected NSSAI IE;

4) remove from the stored allowed NSSAI for the current PLMN or SNPN and its equivalent PLMN(s) (if the UE is not roaming) or the stored mapped S-NSSAI(s) for the allowed NSSAI (if available and if the UE is roaming), the S-NSSAI(s), if any, included in the:

i) rejected NSSAI for the failed or revoked NSSAA, for each and every access type;

ii) mapped S-NSSAI(s) for the rejected NSSAI for the current PLMN, for each and every access type;

iii) mapped S-NSSAI(s) for the rejected NSSAI for the current registration area, associated with the same access type; or

iv) mapped S-NSSAI(s) for the rejected NSSAI for the maximum number of UEs reached, associated with the same access type;

5) if the UE receives the S-NSSAI(s) included in the Rejected NSSAI IE, or if the UE receives the S-NSSAI(s) included in the Extended rejected NSSAI IE in non-roaming case, remove from the stored pending NSSAI for the current PLMN or SNPN and its equivalent PLMN(s), the S-NSSAI(s), if any, included in the:

i) rejected NSSAI for the current PLMN or SNPN, for each and every access type;

ii) rejected NSSAI for the current registration area, associated with the same access type; or

iii) rejected NSSAI for the maximum number of UEs reached, associated with the same access type;

6) if the UE receives the S-NSSAI(s) included in the Extended rejected NSSAI IE, remove from the stored pending NSSAI for the current PLMN or SNPN and its equivalent PLMN(s), the S-NSSAI(s), if any, included in the:

i) rejected NSSAI for the current PLMN or SNPN, for each and every access type; or

ii) rejected NSSAI for the current registration area, associated with the same access type,

 if the mapped S-NSSAI(s) for the S-NSSAI in the stored pending NSSAI are stored in the UE, and the all of the mapped S-NSSAI(s) are included in the Extended rejected NSSAI IE; and

7) remove from the stored pending NSSAI for the current PLMN and its equivalent PLMN(s) or SNPN (if the UE is not roaming) or the stored mapped S-NSSAI(s) for the pending NSSAI, the S-NSSAI(s) (if available and if the UE is roaming) included in the:

i) rejected NSSAI for the failed or revoked NSSAA, for each and every access type;

ii) mapped S-NSSAI(s) for the rejected NSSAI for the current PLMN, for each and every access type; or

iii) mapped S-NSSAI(s) for the rejected NSSAI for the current registration area, associated with the same access type.

8) If the UE receives the CONFIGURATION UPDATE COMMAND message with the Registration requested bit of the Configuration update indication IE set to "registration requested" and contains no other parameters (see subclauses 5.4.4.2 and 5.4.4.3), the UE shall delete any stored rejected NSSAI.

 When the UE:

1) enters state 5GMM-DEREGISTERED following an unsuccessful registration for 5GMM causes other than #62 "No network slices available" for the current PLMN;

2) successfully registers with a new PLMN;

3) enters state 5GMM-DEREGISTERED following an unsuccessful registration with a new PLMN; or

4) performs inter-system change from N1 mode to S1 mode and the UE successfully completes tracking area update procedure;

 and the UE is not registered with the current PLMN over another access, the rejected NSSAI for the current PLMN or SNPN and the rejected NSSAI for the failed or revoked NSSAA shall be deleted.

 When the UE receive ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message provided with S-NSSAI and the PLMN ID in the protocol configuration options IE or extended protocol configuration options IE (see subclause 6.2.2 of 3GPP TS 24.301 [15]), the UE shall remove the S-NSSAI from the rejected NSSAI for the current PLMN. When the UE receive ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message provided with S-NSSAI and the PLMN ID in the protocol configuration options IE or extended protocol configuration options IE (see subclause 6.2.2 of 3GPP TS 24.301 [15]), the UE may remove the S-NSSAI from the rejected NSSAI for the maximum number of UEs reached for each and every access type, if any, and stop the timer T3526 associated with the S-NSSAI if running.

 When the UE:

1) deregisters over an access type;

2) successfully registers in a new registration area over an access type;

3) enters state 5GMM-DEREGISTERED or 5GMM-REGISTERED following an unsuccessful registration in a new registration area over an access type; or

4) performs inter-system change from N1 mode to S1 mode and the UE successfully completes tracking area update procedure;

 the rejected NSSAI for the current registration area corresponding to the access type shall be deleted;

d) When the UE receives the pending NSSAI in the REGISTRATION ACCEPT message, the UE shall replace any stored pending NSSAI for this PLMN or SNPN with the new pending NSSAI received in the REGISTRATION ACCEPT message for this PLMN or SNPN. If the UE does not receive the pending NSSAI 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, the UE shall delete the stored pending NSSAI, if any, for this PLMN or SNPN and its equivalent PLMN(s).

 If the registration area contains TAIs belonging to different PLMNs, which are equivalent PLMNs, then for each of the equivalent PLMNs, the UE shall replace any stored pending NSSAI with the pending NSSAI received in the registered PLMN.

 When the UE:

1) deregisters with the current PLMN using explicit signalling or enters state 5GMM-DEREGISTERED for the current PLMN;

2) successfully registers with a new PLMN;

3) enters state 5GMM-DEREGISTERED following an unsuccessful registration with a new PLMN; or

4) successfully initiates an attach or tracking area update procedure in S1 mode and the UE is operating in single-registration mode;

 and the UE is not registered with the current PLMN over another access, the pending NSSAI for the current PLMN or SNPN and its equivalent PLMN(s) shall be deleted;

e) When the UE receives the Network slicing indication IE with the Network slicing subscription change indication set to "Network slicing subscription changed" in the REGISTRATION ACCEPT message or in the CONFIGURATION UPDATE COMMAND message, the UE shall delete the network slicing information for each of the PLMNs or SNPNs that the UE has slicing information stored for (excluding the current PLMN or SNPN). The UE shall delete any stored rejected NSSAI. The UE shall not delete the default configured NSSAI. Additionally, the UE shall update the network slicing information for the current PLMN or SNPN (if received) as specified above in bullets a), b), c) and d); and

f) When the UE receives the new default configured NSSAI included in the default configured NSSAI update data in the Payload container IE of DL NAS TRANSPORT message, the UE shall replace any stored default configured NSSAI with the new default configured NSSAI. In case of SNPN, the UE shall replace the stored default configured NSSAI associated with the selected entry of the "list of subscriber data" or the PLMN subscription with the new default configured NSSAI.

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

#### 4.6.3.3 Session management based network slice data rate limitation control

A serving PLMN or the HPLMN can perform network slice data rate limitation control for the S-NSSAI(s) subject to network slice data rate limitation control to monitor and control the total data rate of established PDU sessions per network slice as specified in 3GPP TS 23.503 [10]. If the maximum data rate of PDU sessions on a network slice associated with an S-NSSAI has been exceeded during the PDU session establishment procedure, the SMF may reject the PDU session establishment request using S-NSSAI based congestion control as specified in clause 6.2.8 and 6.4.1.4.2.

A serving PLMN or the HPLMN can perform management of Slice-Maximum Bit Rate per UE (UE-Slice-MBR) as specified in 3GPP TS 23.503 [10]. When the UE-Slice-MBR for the UE and S-NSSAI to which the PDU session is allocated is exceeded during the PDU session establishment procedure, the SMF may reject the PDU session establishment request using S-NSSAI based congestion control as specified in clause 6.2.8 and 6.4.1.4.2.

NOTE: The network slice data rate limitation control and UE-Slice-MBR management are performed by the PCF.

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

##### 5.5.1.2.2 Initial registration initiation

The UE in state 5GMM-DEREGISTERED shall initiate the registration procedure for initial registration by sending a REGISTRATION REQUEST message to the AMF,

a) when the UE performs initial registration for 5GS services;

b) when the UE performs initial registration for emergency services;

c) when the UE performs initial registration for SMS over NAS;

d) when the UE moves from GERAN to NG-RAN coverage or the UE moves from a UTRAN to NG-RAN coverage and the following applies:

1) the UE initiated a GPRS attach or routing area updating procedure while in A/Gb mode or Iu mode; or

2) the UE has performed 5G-SRVCC from NG-RAN to UTRAN as specified in 3GPP TS 23.216 [6A],

 and since then the UE did not perform a successful EPS attach or tracking area updating procedure in S1 mode or registration procedure in N1 mode;

e) when the UE performs initial registration for onboarding services in SNPN; and

f) when the UE performs initial registration for disaster roaming services;

with the following clarifications to initial registration for emergency services:

a) the UE shall not initiate an initial registration for emergency services over the current access, if the UE is already registered for emergency services over the non-current access, unless the initial registration has to be initiated to perform handover of an existing emergency PDU session from the non-current access to the current access; and

NOTE 1: Transfer of an existing emergency PDU session between 3GPP access and non-3GPP access is needed e.g. if the UE determines that the current access is no longer available.

b) the UE can only initiate an initial registration for emergency services over non-3GPP access if it cannot register for emergency services over 3GPP access.

The UE initiates the registration procedure for initial registration by sending a REGISTRATION REQUEST message to the AMF, starting timer T3510. If timer T3502 is currently running, the UE shall stop timer T3502. If timer T3511 is currently running, the UE shall stop timer T3511.

During initial registration the UE handles the 5GS mobile identity IE in the following order:

a) if:

1) the UE:

i) was previously registered in S1 mode before entering state EMM-DEREGISTERED; and

ii) has received an "interworking without N26 interface not supported" indication from the network; and

2) EPS security context and a valid native 4G-GUTI are available;

 then the UE shall create a 5G-GUTI mapped from the valid native 4G-GUTI as specified in 3GPP TS 23.003 [4] and indicate the mapped 5G-GUTI in the 5GS mobile identity IE. The UE shall include the UE status IE with the EMM registration status set to "UE is not in EMM-REGISTERED state" and shall include an ATTACH REQUEST message as specified in 3GPP TS 24.301 [15] in the EPS NAS message container IE.

 Additionally, if the UE holds a valid 5G‑GUTI, the UE shall include the 5G-GUTI in the Additional GUTI IE in the REGISTRATION REQUEST message in the following order:

1) a valid 5G-GUTI that was previously assigned by the same PLMN with which the UE is performing the registration, if available;

2) a valid 5G-GUTI that was previously assigned by an equivalent PLMN, if available; and

3) a valid 5G-GUTI that was previously assigned by any other PLMN, if available;

b) if:

1) the UE is registering with a PLMN and the UE holds a valid 5G-GUTI that was previously assigned, over 3GPP access or non-3GPP access, by the same PLMN with which the UE is performing the registration, the UE shall indicate the 5G-GUTI in the 5GS mobile identity IE; or

2) the UE is registering with a SNPN, the UE holds a valid 5G-GUTI that was previously assigned, over 3GPP access or non-3GPP access, by the same SNPN with which the UE is performing the registration, and the UE is not initiating the initial registration for onboarding services in SNPN, the UE shall indicate the 5G-GUTI in the 5GS mobile identity IE;

c) if the UE holds a valid 5G-GUTI that was previously assigned, over 3GPP access or non-3GPP access, by an equivalent PLMN, the UE shall indicate the 5G-GUTI in the 5GS mobile identity IE;

d) if:

1) the UE is registering with a PLMN and the UE holds a valid 5G-GUTI that was previously assigned, over 3GPP access or non-3GPP access, by any other PLMN, the UE shall indicate the 5G-GUTI in the 5GS mobile identity IE; or

2) the UE is registering with an SNPN, the UE holds a valid 5G-GUTI that was previously assigned, over 3GPP access or non-3GPP access, by any other SNPN, and the UE is not initiating the initial registration for onboarding services in SNPN, the UE shall indicate the 5G-GUTI in the 5GS mobile identity IE and shall additionally include the NID of the other SNPN in the NID IE;

e) if a SUCI other than an onboarding SUCI is available, and the UE is not initiating the initial registration for onboarding services in SNPN, the UE shall include the SUCI other than an onboarding SUCI in the 5GS mobile identity IE;

f) if the UE does not hold a valid 5G-GUTI or SUCI other than an onboarding SUCI, and is initiating the initial registration for emergency services, the PEI shall be included in the 5GS mobile identity IE; and

g) if the UE is initiating the initial registration for onboarding services in SNPN, an onboarding SUCI shall be included in the 5GS mobile identity IE.

If the SUCI is included in the 5GS mobile identity IE and the timer T3519 is not running, the UE shall start timer T3519 and store the value of the SUCI sent in the REGISTRATION REQUEST message. The UE shall include the stored SUCI in the REGISTRATION REQUEST message while timer T3519 is running.

If the UE is operating in the dual-registration mode and it is in EMM state EMM-REGISTERED, the UE shall include the UE status IE with the EMM registration status set to "UE is in EMM-REGISTERED state".

NOTE 2: Inclusion of the UE status IE with this setting corresponds to the indication that the UE is "moving from EPC" as specified in 3GPP TS 23.502 [9].

NOTE 3: The value of the 5GMM registration status included by the UE in the UE status IE is not used by the AMF.

If the last visited registered TAI is available, the UE shall include the last visited registered TAI in the REGISTRATION REQUEST message.

If the UE requests the use of SMS over NAS, the UE shall include the 5GS update type IE in the REGISTRATION REQUEST message with the SMS requested bit set to "SMS over NAS supported". When the 5GS update type IE is included in the REGISTRATION REQUEST for reasons other than requesting the use of SMS over NAS, and the UE does not need to register for SMS over NAS, the UE shall set the SMS requested bit of the 5GS update type IE to "SMS over NAS not supported" in the REGISTRATION REQUEST message.

If the UE supports MICO mode and requests the use of MICO mode, then the UE shall include the MICO indication IE in the REGISTRATION REQUEST message. If the UE requests to use an active time value, it shall include the active time value in the T3324 IE in the REGISTRATION REQUEST message. Additionally, if the UE supports strictly periodic registration timer, the UE shall set the Strictly Periodic Registration Timer Indication bit of the MICO indication IE in the REGISTRATION REQUEST message to "strictly periodic registration timer supported".

If the UE needs to use the UE specific DRX parameters, the UE shall include the Requested DRX parameters IE in the REGISTRATION REQUEST message.

If the UE is in NB-N1 mode and if the UE needs to use the UE specific DRX parameters for NB-N1 mode, the UE shall include the Requested NB-N1 mode DRX parameters IE in the REGISTRATION REQUEST message.

If the UE supports eDRX and requests the use of eDRX, the UE shall include the Requested extended DRX parameters IE in the REGISTRATION REQUEST message.

If the UE needs to request LADN information for specific LADN DNN(s) or indicates a request for LADN information as specified in 3GPP TS 23.501 [8], the UE shall include the LADN indication IE in the REGISTRATION REQUEST message and:

- request specific LADN DNNs by including a LADN DNN value in the LADN indication IE for each LADN DNN for which the UE requests LADN information; or

- to indicate a request for LADN information by not including any LADN DNN value in the LADN indication IE.

The UE shall include the requested NSSAI containing the S-NSSAI(s) corresponding to the slice(s) to which the UE intends to register with and shall include the mapped S-NSSAI(s) for the requested NSSAI, if available, in the REGISTRATION REQUEST message. If the UE has allowed NSSAI or configured NSSAI or both for the current PLMN, the requested NSSAI shall be either:

a) the configured NSSAI for the current PLMN, or a subset thereof as described below;

b) the allowed NSSAI for the current PLMN, or a subset thereof as described below; or

c) the allowed NSSAI for the current PLMN, or a subset thereof as described below, plus one or more S-NSSAIs from the configured NSSAI for which no corresponding S-NSSAI is present in the allowed NSSAI and those are neither in the rejected NSSAI nor in the pending NSSAI.

If the UE has neither allowed NSSAI for the current PLMN nor configured NSSAI for the current PLMN and has a default configured NSSAI, the UE shall:

a) include the S-NSSAI(s) in the Requested NSSAI IE of the REGISTRATION REQUEST message using the default configured NSSAI; and

b) include the Network slicing indication IE with the Default configured NSSAI indication bit set to "Requested NSSAI created from default configured NSSAI" in the REGISTRATION REQUEST message.

If the UE has no allowed NSSAI for the current PLMN, no configured NSSAI for the current PLMN, and no default configured NSSAI, the UE shall not include a requested NSSAI in the REGISTRATION REQUEST message.

If all the S-NSSAI(s) corresponding to the slice(s) to which the UE intends to register are included in the pending NSSAI, the UE shall not include a requested NSSAI in the REGISTRATION REQUEST message.

The subset of configured NSSAI provided in the requested NSSAI consists of one or more S-NSSAIs in the configured NSSAI applicable to the current PLMN, if the S-NSSAI is neither in the rejected NSSAI nor associated to the S-NSSAI(s) in the rejected NSSAI. In addition, if the NSSRG information is available, the subset of configured NSSAI provided in the requested NSSAI shall be associated with at least one common NSSRG value. If the UE has already an allowed NSSAI for the other access, all the S-NSSAI(s) in the requested NSSAI for the current access shall share at least an NSSRG value common to all the S-NSSAI(s) of the allowed NSSAI for the other access. If the UE is simultaneously performing the registration procedure on the other access, the UE shall include S-NSSAIs that share at least a common NSSRG value across all access types.

NOTE 4: If the UE has stored mapped S-NSSAI(s) for the rejected NSSAI, and one or more S-NSSAIs in the stored mapped S-NSSAI(s) for the configured NSSAI are not included in the stored mapped S-NSSAI(s) for the rejected NSSAI, then a S-NSSAI in the configured NSSAI associated to one or more of these mapped S-NSSAI(s) for the configured NSSAI are available to be included in the requested NSSAI together with their mapped S-NSSAI.

NOTE 5: If one or more mapped S-NSSAIs in the stored mapped S-NSSAI(s) for the configured NSSAI are not included in the stored rejected NSSAI for the failed or revoked NSSAA, a S-NSSAI in the configured NSSAI associated to one or more of these mapped S-NSSAI(s) for the configured NSSAI are available to be included in the registration request together with their mapped S-NSSAI.

The subset of allowed NSSAI provided in the requested NSSAI consists of one or more S-NSSAIs in the allowed NSSAI for the current PLMN.

NOTE 6: How the UE selects the subset of configured NSSAI or allowed NSSAI to be provided in the requested NSSAI is implementation specific. The UE can take preferences indicated by the upper layers (e.g. policies like URSP, applications) into account.

NOTE 7: The number of S-NSSAI(s) included in the requested NSSAI cannot exceed eight.

If the UE initiates an initial registration for onboarding services in SNPN, the UE shall not include the Requested NSSAI IE in the REGISTRATION REQUEST message.

If the UE initiates an initial registration for emergency services or needs to prolong the established NAS signalling connection after the completion of the initial registration procedure (e.g. due to uplink signalling pending), the UE shall set the Follow-on request indicator to "Follow-on request pending".

NOTE 8: The UE does not have to set the Follow-on request indicator to 1, even if the UE has to request resources for V2X communication over PC5 reference point, ProSe direct discovery over PC5 or ProSe direct communication over PC5.

If the UE supports S1 mode, the UE shall:

- set the S1 mode bit to "S1 mode supported" in the 5GMM capability IE of the REGISTRATION REQUEST message;

- include the S1 UE network capability IE in the REGISTRATION REQUEST message; additionally, if the UE supports EPS-UPIP, the UE shall set the EPS-UPIP bit to "EPS-UPIP supported" in the S1 UE network capability IE in the REGISTRATION REQUEST message; and

- if the UE supports sending an ATTACH REQUEST message containing a PDN CONNECTIVITY REQUEST message with request type set to "handover" to transfer a PDU session from N1 mode to S1 mode, set the HO attach bit to "attach request message containing PDN connectivity request with request type set to handover to transfer PDU session from N1 mode to S1 mode supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the UE supports the LTE positioning protocol (LPP) in N1 mode as specified in 3GPP TS 37.355 [26], the UE shall set the LPP bit to "LPP in N1 mode supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the UE supports the Location Services (LCS) notification mechanisms in N1 mode as specified in 3GPP TS 23.273 [6B], the UE shall set the 5G-LCS bit to "LCS notification mechanisms supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the UE is in NB-N1 mode, then the UE shall set the Control plane CIoT 5GS optimization bit to "Control plane CIoT 5GS optimization supported" in the 5GMM capability IE of the REGISTRATION REQUEST message. If the UE is capable of NB-S1 mode, then the UE shall set the Control plane CIoT EPS optimization bit to "Control plane CIoT EPS optimization supported" in the S1 UE network capability IE of the REGISTRATION REQUEST message.

If the UE supports N3 data transfer and multiple user-plane resources in NB-N1 mode (see 3GPP TS 36.306 [25D], 3GPP TS 36.331 [25A]), then the UE shall set the Multiple user-plane resources support bit to "Multiple user-plane resources supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the UE supports 5G-SRVCC from NG-RAN to UTRAN as specified in 3GPP TS 23.216 [6A], the UE shall:

- set the 5G-SRVCC from NG-RAN to UTRAN capability bit to "5G-SRVCC from NG-RAN to UTRAN supported" in the 5GMM capability IE of the REGISTRATION REQUEST message; and

- include the Mobile station classmark 2 IE and the Supported codecs IE in the REGISTRATION REQUEST message.

If the UE supports service gap control, then the UE shall set the SGC bit to "service gap control supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the UE supports the restriction on use of enhanced coverage, the UE shall set the RestrictEC bit to "Restriction on use of enhanced coverage supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the UE supports network slice-specific authentication and authorization, the UE shall set the NSSAA bit to "network slice-specific authentication and authorization supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the UE supports CAG feature, the UE shall set the CAG bit to "CAG Supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the UE supports extended CAG information list, the UE shall set the Ex-CAG bit to "Extended CAG information list supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

When the UE is not in NB-N1 mode, if the UE supports RACS, the UE shall:

a) set the RACS bit to "RACS supported" in the 5GMM capability IE of the REGISTRATION REQUEST message;

b) if the UE has an applicable network-assigned UE radio capability ID for the current UE radio configuration in the selected PLMN or SNPN, include the applicable network-assigned UE radio capability ID in the UE radio capability ID IE of the REGISTRATION REQUEST message; and

c) if the UE:

1) does not have an applicable network-assigned UE radio capability ID for the current UE radio configuration in the selected PLMN or SNPN; and

2) has an applicable manufacturer-assigned UE radio capability ID for the current UE radio configuration,

 include the applicable manufacturer-assigned UE radio capability ID in the UE radio capability ID IE of the REGISTRATION REQUEST message.

If the UE has one or more stored UE policy sections identified by a UPSI with the PLMN ID part indicating the HPLMN or the selected PLMN, the UE shall set the Payload container type IE to "UE policy container" and include the UE STATE INDICATION message (see annex D) in the Payload container IE of the REGISTRATION REQUEST message.

NOTE 9: In this version of the protocol, the UE can only include the Payload container IE in the REGISTRATION REQUEST message to carry a payload of type "UE policy container".

If the UE does not have a valid 5G NAS security context, the UE shall send the REGISTRATION REQUEST message without including the NAS message container IE. The UE shall include the entire REGISTRATION REQUEST message (i.e. containing cleartext IEs and non-cleartext IEs, if any) in the NAS message container IE that is sent as part of the SECURITY MODE COMPLETE message as described in subclauses 4.4.6 and 5.4.2.3.

If the UE has a valid 5G NAS security context and the UE needs to send non-cleartext IEs, the UE shall send a REGISTRATION REQUEST message including the NAS message container IE as described in subclause 4.4.6. If the UE does not need to send non-cleartext IEs, the UE shall send a REGISTRATION REQUEST message without including the NAS message container IE.

If the UE supports ciphered broadcast assistance data and needs to obtain new ciphering keys, the UE shall include the Additional information requested IE with the CipherKey bit set to "ciphering keys for ciphered broadcast assistance data requested" in the REGISTRATION REQUEST message.

The UE shall set the WUSA bit to "WUS assistance information reception supported" in the 5GMM capability IE if the UE supports WUS assistance information. The UE may include its UE paging probability information in the Requested WUS assistance information IE if the UE has set the WUSA bit to "WUS assistance information reception supported" in the 5GMM capability IE and the UE is not performing the initial registration for emergency services.

The UE shall set the NR-PSSI bit to "NR paging subgrouping supported" in the 5GMM capability IE if the UE supports PEIPS assistance information and the 5GS registration type IE in the REGISTRATION REQUEST message is not set to "emergency registration". The UE may include its UE paging probability information in the Requested PEIPS assistance information IE if the UE has set the NR-PSSI bit to "NR paging subgrouping supported" in the 5GMM capability IE.

If the REGISTRATION REQUEST message includes a NAS message container IE, the AMF shall process the REGISTRATION REQUEST message that is obtained from the NAS message container IE as described in subclause 4.4.6.

If the UE supports V2X as specified in 3GPP TS 24.587 [19B], the UE shall set the V2X bit to "V2X supported" in the 5GMM capability IE of the REGISTRATION REQUEST message. If the UE supports V2X communication over E-UTRA-PC5 as specified in 3GPP TS 24.587 [19B], the UE shall set the V2XCEPC5 bit to "V2X communication over E-UTRA-PC5 supported" in the 5GMM capability IE of the REGISTRATION REQUEST message. If the UE supports V2X communication over NR-PC5 as specified in 3GPP TS 24.587 [19B], the UE shall set the V2XCNPC5 bit to "V2X communication over NR-PC5 supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

The UE shall set the ER-NSSAI bit to "Extended rejected NSSAI supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the UE supports the NSSRG, then the UE shall set the NSSRG bit to "NSSRG supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the W-AGF acting on behalf of an N5GC device initiates an initial registration as specified in 3GPP TS 23.316 [6D], the W-AGF acting on behalf of the N5GC device shall include the N5GC indication IE with the N5GC device indication bit set to "N5GC device registration is requested" in the REGISTRATION REQUEST message.

When the UE supporting UAS services initiates an initial registration for UAS services, the UE shall include the service-level device ID in the Service-level-AA container IE of the REGISTRATION REQUEST message and set the value to the CAA-level UAV ID. The UE shall include the service-level-AA server address in the Service-level-AA container IE of the REGISTRATION REQUEST message and set the value to the USS address, if it is provided by the upper layers.

If the UE supports ProSe direct discovery as specified in 3GPP TS 24.554 [19E], the UE shall set the ProSe-dd bit to "ProSe direct discovery supported" in the 5GMM capability IE of the REGISTRATION REQUEST message. If the UE supports ProSe direct communication as specified in 3GPP TS 24.554 [19E], the UE shall set the ProSe-dc bit to "ProSe direct communication supported" in the 5GMM capability IE of the REGISTRATION REQUEST message. If the UE supports acting as ProSe layer-2 UE-to-network relay UE as specified in 3GPP TS 24.554 [19E], the UE shall set the ProSe-l2relay bit to "Acting as a ProSe layer-2 UE-to-network relay UE supported" in the 5GMM capability IE of the REGISTRATION REQUEST message. If the UE supports acting as ProSe layer-3 UE-to-network relay UE as specified in 3GPP TS 24.554 [19E], the UE shall set the ProSe-l3relay bit to "Acting as a ProSe layer-3 UE-to-network relay UE supported" in the 5GMM capability IE of the REGISTRATION REQUEST message. If the UE supports acting as ProSe layer-2 UE-to-network remote UE as specified in 3GPP TS 24.554 [19E], the UE shall set the ProSe-l2rmt bit to "Acting as a ProSe layer-2 UE-to-network remote UE supported" in the 5GMM capability IE of the REGISTRATION REQUEST message. If the UE supports acting as ProSe layer-3 UE-to-network remote UE as specified in 3GPP TS 24.554 [19E], the UE shall set the ProSe-l3rmt bit to "Acting as a ProSe layer-3 UE-to-network remote UE supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the MUSIM UE supports the N1 NAS signalling connection release, then the UE shall set the N1 NAS signalling connection release bit to "N1 NAS signalling connection release supported" in the 5GMM capability IE of the REGISTRATION REQUEST message otherwise the UE shall not set the N1 NAS signalling connection release bit to "N1 NAS signalling connection release supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the MUSIM UE supports the paging indication for voice services, then the UE shall set the paging indication for voice services bit to "paging indication for voice services supported" in the 5GMM capability IE of the REGISTRATION REQUEST message otherwise the UE shall not set the paging indication for voice services bit to "paging indication for voice services supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the MUSIM UE supports the reject paging request, then the UE shall set the reject paging request bit to "reject paging request supported" in the 5GMM capability IE of the REGISTRATION REQUEST message otherwise the UE shall not set the reject paging request bit to "reject paging request supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the MUSIM UE 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;

and supports the paging restriction, then the UE shall set the paging restriction bit to "paging restriction supported" in the 5GMM capability IE of the REGISTRATION REQUEST message otherwise the UE shall not set the paging restriction bit to "paging restriction supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the UE supports MINT, the UE shall set the MINT bit to "MINT supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the UE initiates the registration procedure for disaster roaming services and:

a) the PLMN with disaster condition is the HPLMN and:

1) the Additional GUTI IE is included in the REGISTRATION REQUEST message and does not contain a valid 5G-GUTI that was previously assigned by the HPLMN; or

2) the Additional GUTI IE is not included in the REGISTRATION REQUEST message and the 5GS mobile identity IE contains neither the SUCI nor a valid 5G-GUTI that was previously assigned by the HPLMN; or

b) the PLMN with disaster condition is not the HPLMN and:

1) the Additional GUTI IE is included in the REGISTRATION REQUEST message and does not contain a valid 5G-GUTI that was previously assigned by the PLMN with disaster condition; or

2) the Additional GUTI IE is not included in the REGISTRATION REQUEST message and the 5GS mobile identity IE does not contain a valid 5G-GUTI that was previously assigned by the PLMN with disaster condition;

then the UE shall include in the REGISTRATION REQUEST message the PLMN with disaster condition IE indicating the PLMN with disaster condition.

If the UE supports event notification, the UE shall set the EventNotification bit to "Event notification supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.

If the UE supports access to an SNPN using credentials from a credentials holder and the UE is in its HPLMN or EHPLMN or a subscribed SNPN, the UE shall set the SSNPNSI bit to "SOR-SNPN-SI supported" in the 5GMM capability IE of the REGISTRATION REQUEST message.



Figure 5.5.1.2.2.1: Registration procedure for initial registration

\* \* \* 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.

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.

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 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.

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.

NOTE 4: The interworking between NAS and lower layers regarding whether NAS needs to inform lower layers that paging indication for voice services is supported or not, is up to UE implementation.

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 5: 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 6: 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 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 bit 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 7: 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.

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 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 8: 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, the entry for the registered PLMN in the received "CAG information list" does not include any of the CAG-ID(s) supported by the current CAG cell, 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 the entry for the registered PLMN in the received "CAG information list" includes one or more CAG-IDs, 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 the entry for the registered PLMN in the received "CAG information list" does not include any CAG-ID 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 the "allowed CAG list" for the registered PLMN in the received "CAG information list" includes one or more CAG-IDs, 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 the entry for the registered PLMN in the received "CAG information list" does not include any CAG-ID 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 9: 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 IE value indicates:

a) "3GPP access", the UE:

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

- if in 5GMM-REGISTERED state over non-3GPP access and on the same PLMN 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;

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

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

- if in the 5GMM-REGISTERED state over 3GPP access and is on the same PLMN 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 5GS registration result IE value 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.

The AMF shall include the allowed NSSAI for the current PLMN 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 if available, 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 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 10: 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 subscribed S-NSSAIs marked as default 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 subscribed S-NSSAIs marked as default,

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 subscribed S-NSSAIs marked as default 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 subscribed S-NSSAIs marked as default 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 subscribed S-NSSAIs marked as default;

the AMF shall in the REGISTRATION ACCEPT message include:

a) pending NSSAI containing one or more subscribed S-NSSAIs marked as default 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 each of which corresponds to a subscribed S-NSSAI marked as default 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 subscribed S-NSSAIs marked as default, 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 subscribed S-NSSAI(s) marked as default subject to NSAC. If the subscription information includes the NSSRG information, any two S-NSSAIs of the 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.

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 11: 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 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;

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

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.

NOTE 12: 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).

If a new configured NSSAI for the current PLMN is included, the AMF shall also include the mapped S-NSSAI(s) for the configured NSSAI for the current PLMN if available 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 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 subscribed S-NSSAI(s) marked as default, 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.

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

NOTE 13: 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 TS 24.008, 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 subscribed S-NSSAIs (containing one or more S-NSSAIs each of which may be associated with a new S-NSSAI) marked as default 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 each of which corresponds to a subscribed S-NSSAI marked as default which are not subject to network slice-specific authentication and authorization;

2) the allowed NSSAI containing the subscribed S-NSSAIs marked as default, 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 subscribed S-NSSAIs marked as default 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 each of which corresponds to a subscribed S-NSSAI marked as default and not subject to network slice-specific authentication and authorization in the allowed NSSAI of the REGISTRATION ACCEPT message;

b) put the subscribed S-NSSAIs marked as default 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 except for the current PLMN as specified in subclause 4.6.2.2.

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 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.

With respect to each of the PDU session(s) active in the UE, if the allowed NSSAI contains neither:

a) an S-NSSAI matching to the S-NSSAI of the PDU session; nor

b) a mapped S-NSSAI matching to the mapped S-NSSAI of the PDU session;

the UE shall perform a local release of all such PDU sessions 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.

For each of the PDU session(s) active in the UE, if the allowed NSSAI contains a mapped S-NSSAI matching to the mapped 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.

If the REGISTRATION ACCEPT message contains a configured NSSAI IE with a new configured NSSAI for the current PLMN and optionally the mapped S-NSSAI(s) for the configured NSSAI for the current PLMN, 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 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 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, 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 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 sessions, the SMF shall consider the UE as removed from the associated 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 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 established:

i) for PDU sessions having user plane resources 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 MBS sessions, the SMF shall consider the UE as removed from the associated MBS sessions; and

ii) for PDU sessions having user plane resources 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 MBS sessions, the SMF shall consider the UE as removed from the associated 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 user plane resources 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"; 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 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".

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

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 MBS sessions, the UE shall locally leave the associated 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 in the UE on the access the REGISTRATION 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 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 MBS sessions, the UE shall locally leave the associated 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 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 MBS sessions, the UE shall locally leave the associated 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 15: 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. 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 MBS sessions, the UE shall locally leave the associated 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 16: 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 17: 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 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", 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 until the UE receives a REGISTRATION ACCEPT message with the MPS indicator bit set to "Access identity 1 not valid" or until the UE selects a non-equivalent PLMN. Access identity 1 is only applicable while the UE is in N1 mode;

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", 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 until the UE receives a REGISTRATION ACCEPT message with the MCS indicator bit set to "Access identity 2 not valid" or until the UE selects a non-equivalent PLMN. Access identity 2 is only applicable while the UE is in N1 mode; 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.

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.

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 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", 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. The MPS indicator bit in the 5GS network feature support IE provided in the REGISTRATION ACCEPT message is valid until the UE receives a REGISTRATION ACCEPT message with the MPS indicator bit set to "Access identity 1 not valid" or until the UE selects another SNPN. Access identity 1 is only applicable while the UE is in N1 mode;

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. 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 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", 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. The MCS indicator bit in the 5GS network feature support IE provided in the REGISTRATION ACCEPT message is valid until the UE receives a REGISTRATION ACCEPT message with the MCS indicator bit set to "Access identity 2 not valid" or until the UE selects another SNPN. Access identity 2 is only applicable while the UE is in N1 mode; 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. In the UE, the ongoing active PDU sessions are not affected by the change of the MCS indicator bit.

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 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 ProSe direct discovery bit to " ProSe direct discovery supported"; or

2) the ProSe direct communication bit to "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. 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, 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 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 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 18: 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 19: 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 into account when determining the Paging subgroup ID for for the UE.

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 5GS registration result IE value 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".

Editor's note (WI eNPN, CR#3839): It is FFS whether the UE needs to signal support for SOR-SNPN-SI in the SOR acknowledgement.

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 or SNPN and its equivalent PLMN(s), if any, 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(s) indicated by the Uplink data status IE is emergency PDU session(s);

- 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 20: 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, 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 in SNPN 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 IE, 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 when the network considers that the UE is in 5GMM-REGISTERED (i.e. the network receives the REGISTRATION COMPLETE message from UE).

NOTE 21: 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 22: 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.

Editor's note: It is FFS how to set the new timer when the mobility or periodic update occurs.

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

b) the 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, the AMF shall determine the PLMN with disaster condition in the PLMN identity of the 5G-GUTI; or

c) the 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, 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, the AMF shall determine the PLMN with disaster condition in the PLMN identity of the SUCI.

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); or

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

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

### 6.2.12 Handling of network rejection not due to congestion control

The network may include a back-off timer value in a 5GS session management reject message to regulate the time interval at which the UE may retry the same procedure for 5GSM cause values other than #26 "insufficient resources", #28 "unknown PDU session type", #39 "reactivation requested", #46 "out of LADN service area", #50 "PDU session type IPv4 only allowed", #51 "PDU session type IPv6 only allowed", #54 "PDU session does not exist", #57 "PDU session type IPv4v6 only allowed", #58 "PDU session type Unstructured only allowed", #61 "PDU session type Ethernet only allowed", #67 "insufficient resources for specific slice and DNN", #68 "not supported SSC mode" and #69 "insufficient resources for specific slice". For 5GSM cause values other than #26 "insufficient resources", #28 "unknown PDU session type", #39 "reactivation requested", #46 "out of LADN service area", #54 "PDU session does not exist", #67 "insufficient resources for specific slice and DNN", #68 "not supported SSC mode", and #69 "insufficient resources for specific slice", the network may also include the re-attempt indicator to indicate whether the UE is allowed to re-attempt the corresponding session management procedure for the same DNN in S1 mode after inter-system change.

NOTE 1: In a PLMN, if the network includes this back-off timer value for 5GSM cause values other than #27 "missing or unknown DNN", then the UE is blocked from sending another 5GSM request for the same procedure for the same [PLMN, DNN, S-NSSAI], [PLMN, DNN, no S-NSSAI], [PLMN, no DNN, S-NSSAI], or [PLMN, no DNN, no S-NSSAI] combination for the specified duration. If the network includes this back-off timer value for 5GSM cause value #27 "missing or unknown DNN", then the UE is blocked from sending another 5GSM request for the same procedure for the same [PLMN, DNN], or [PLMN, no DNN] combination for the specified duration. In an SNPN, if the network includes this back-off timer value for 5GSM cause values other than #27 "missing or unknown DNN", then the UE is blocked from sending another 5GSM request for the same procedure for the same [SNPN, DNN, S-NSSAI], [SNPN, DNN, no S-NSSAI], [SNPN, no DNN, S-NSSAI], or [SNPN, no DNN, no S-NSSAI] combination for the specified duration if the UE does not support access to an SNPN using credentials from a credentials holder, and the UE is blocked from sending another 5GSM request for the same procedure for the same [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, DNN, S-NSSAI], [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, DNN, no S-NSSAI], [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, no DNN, S-NSSAI], or [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, no DNN, no S-NSSAI] combination for the specified duration if the UE supports access to an SNPN using credentials from a credentials holder . If the network includes this back-off timer value for 5GSM cause value #27 "missing or unknown DNN", then the UE is blocked from sending another 5GSM request for the same procedure for the same [SNPN, DNN], or [SNPN, no DNN] combination for the specified duration if the UE does not support access to an SNPN using credentials from a credentials holder, and the UE is blocked from sending another 5GSM request for the same procedure for the same [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, DNN], or [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, no DNN] combination for the specified duration if the UE supports access to an SNPN using credentials from a credentials holder. Therefore, the operator needs to exercise caution in determining the use of this timer value.

NOTE 2: If the re-attempt indicator is not provided by the network, a UE registered in its HPLMN or in an EHPLMN can use the configured SM\_RetryAtRATChange value specified in the NAS configuration MO or in the USIM NASCONFIG file to derive the re-attempt indicator as specified in subclauses 6.4.1.4.3 and 6.4.2.4.3.

If re-attempt in S1 mode is allowed for 5GSM cause values other than #27 "missing or unknown DNN", the UE shall consider the back-off timer to be applicable only to the 5GS session management in N1 mode for the rejected 5GS session management procedure and the given [PLMN, DNN, S-NSSAI], [PLMN, DNN, no S-NSSAI], [PLMN, no DNN, S-NSSAI], or [PLMN, no DNN, no S-NSSAI] combination. If re-attempt in S1 mode is allowed for 5GSM cause value #27 "missing or unknown DNN", the UE shall consider the back-off timer to be applicable only to the 5GS session management in N1 mode for the rejected 5GS session management procedure and the given [PLMN, DNN], or [PLMN, no DNN] combination.If re-attempt in S1 mode is not allowed, the UE shall consider the back-off timer to be applicable to both NAS protocols, i.e. applicable to the 5GS session management in N1 mode for the rejected 5GS session management procedure and to the EPS session management in S1 mode for the corresponding session management procedure and the given [PLMN, DNN] or [PLMN, no DNN] combination.

NOTE 3: In the present subclause the terms DNN and APN are referring to the same parameter.

In a PLMN, if the back-off timer was provided during the PDU session establishment procedure, the UE behaves as follows: for 5GSM cause values other than #27 "missing or unknown DNN", when the UE is registered in a HPLMN, the DNN and the S-NSSAI of the [PLMN, DNN, S-NSSAI] combination associated with the back-off timer is the DNN and the S-NSSAI provided by the UE when the PDU session is established. When the UE is registered in a VPLMN, the DNN and the S-NSSAI of the [PLMN, DNN, S-NSSAI] combination associated with the back-off timer is the DNN and the mapped S-NSSAI provided by the UE when the PDU session is established. For 5GSM cause value #27 "missing or unknown DNN", the DNN of the [PLMN, DNN] combination associated with the back-off timer is the DNN provided by the UE when the PDU session is established. If no DNN or no S-NSSAI was provided to the network during the PDU session establishment, then the back-off timer is associated with the [PLMN, DNN, no S-NSSAI], [PLMN, no DNN, S-NSSAI], or [PLMN, no DNN, no S-NSSAI] combination, dependent on which parameters were provided for 5GSM cause values other than #27 "missing or unknown DNN". If no DNN was provided to the network during the PDU session establishment, then the back-off timer is associated with the [PLMN, no DNN] combination for 5GSM cause value #27 "missing or unknown DNN". For this purpose, the UE shall memorize the DNN and the S-NSSAI provided to the network during the PDU session establishment.

In a PLMN, if the back-off timer was provided during the PDU session modification procedure, the UE behaves as follows: the DNN associated with the back-off timer is the DNN, including no DNN, provided by the UE when the PDU session is established. If an S-NSSAI was provided by the UE during the PDU session establishment, when the UE is registered in a HPLMN, then the S-NSSAI associated with the back-off timer is the S-NSSAI of the PDU session. If an S-NSSAI was provided by the UE during the PDU session establishment, when the UE is registered in a VPLMN, then the S-NSSAI associated with the back-off timer is the mapped S-NSSAI of the PDU session. If no S-NSSAI was provided by the UE during the PDU session establishment, then the back-off timer is associated with no S-NSSAI. For this purpose, the UE shall memorize the DNN and the S-NSSAI provided to the network during the PDU session establishment.

In a PLMN, the back-off timer associated with the [PLMN, no DNN, no S-NSSAI], or [PLMN, no DNN] combination will never be started due to any 5GSM procedure related to an emergency PDU session. If the back-off timer associated with the [PLMN, no DNN, no S-NSSAI], or [PLMN, no DNN] combination is running, it does not affect the ability of the UE to request an emergency PDU session.

In an SNPN, the back-off timer associated with the [SNPN, no DNN, no S-NSSAI], or [SNPN, no DNN] combination if the UE does not support access to an SNPN using credentials from a credentials holder, or the back-off timer associated with the [SNPN, selected entry of the "list of subscriber data" or selected PLMN subscription, no DNN, no S-NSSAI], or [SNPN, selected entry of the "list of subscriber data" or selected PLMN subscription, no DNN] combination if the UE supports access to an SNPN using credentials from a credentials holder, will never be started due to any 5GSM procedure related to an emergency PDU session. If the back-off timer associated with the [SNPN, no DNN, no S-NSSAI], or [SNPN, no DNN] combination if the UE does not support access to an SNPN using credentials from a credentials holder, or the back-off timer associated with the [SNPN, selected entry of the "list of subscriber data" or selected PLMN subscription, no DNN, no S-NSSAI], or [SNPN, selected entry of the "list of subscriber data" or selected PLMN subscription, no DNN] combination if the UE supports access to an SNPN using credentials from a credentials holder is running, it does not affect the ability of the UE to request an emergency PDU session.

In a PLMN, the network may additionally indicate in the re-attempt indicator that a command to back-off is applicable not only for the PLMN in which the UE received the 5GS session management reject message, but for each PLMN included in the equivalent PLMN list at the time when the 5GS session management reject message was received.

In a PLMN, if the back-off timer is running or is deactivated for a given [PLMN, DNN, S-NSSAI], [PLMN, DNN, no S-NSSAI], [PLMN, no DNN, S-NSSAI], [PLMN, no DNN, no S-NSSAI] , [PLMN, DNN], or [PLMN, no DNN] combination, and the UE is a UE configured for high priority access in selected PLMN, then the UE is allowed to initiate 5GSM procedures for the [PLMN, DNN, S-NSSAI], [PLMN, DNN, no S-NSSAI], [PLMN, no DNN, S-NSSAI], [PLMN, no DNN, no S-NSSAI] , [PLMN, DNN], or [PLMN, no DNN] combination.

In an SNPN, if the back-off timer is running or is deactivated for a given [SNPN, DNN, S-NSSAI], [SNPN, DNN, no S-NSSAI], [SNPN, no DNN, S-NSSAI], [SNPN, no DNN, no S-NSSAI] , [SNPN, DNN], or [SNPN, no DNN] combination if the UE does not support access to an SNPN using credentials from a credentials holder, or the back-off timer is running or is deactivated for a given [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, DNN, S-NSSAI], [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, DNN, no S-NSSAI], [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, no DNN, S-NSSAI], [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, no DNN, no S-NSSAI] , [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, DNN], or [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, no DNN] combination if the UE supports access to an SNPN using credentials from a credentials holder, and the UE is a UE configured for high priority access in selected SNPN, then the UE is allowed to initiate 5GSM procedures for the [SNPN, DNN, S-NSSAI], [SNPN, DNN, no S-NSSAI], [SNPN, no DNN, S-NSSAI], [SNPN, no DNN, no S-NSSAI] , [SNPN, DNN], or [SNPN, no DNN] combination if the UE does not support access to an SNPN using credentials from a credentials holder, or the UE is allowed to initiate 5GSM procedures for the [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, DNN, S-NSSAI], [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, DNN, no S-NSSAI], [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, no DNN, S-NSSAI], [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, no DNN, no S-NSSAI] , [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, DNN], or [SNPN, selected entry of the "list of subscriber data" or selected PLMN subcription, no DNN] combination if the UE supports access to an SNPN using credentials from a credentials holder.

Neither the re-attempt indicator IE nor re-attempt indicator derivation shall be applicable in an SNPN.

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

#### 6.3.2.3 Network-requested PDU session modification procedure accepted by the UE

Upon receipt of the PDU SESSION MODIFICATION COMMAND message, if the UE provided a DNN during the PDU session establishment, the UE shall stop timer T3396, if it is running for the DNN provided by the UE. If the UE did not provide a DNN during the PDU session establishment and the request type was different from "initial emergency request" and different from "existing emergency PDU session", the UE shall stop the timer T3396 associated with no DNN if it is running. If the PDU SESSION MODIFICATION COMMAND message was received for an emergency PDU session, the UE shall not stop the timer T3396 associated with no DNN if it is running.

Upon receipt of the PDU SESSION MODIFICATION COMMAND message, if the UE provided an S-NSSAI and a DNN during the PDU session establishment, the UE shall stop timer T3584, if it is running for the [S-NSSAI of the PDU session, DNN] combination provided by the UE. If the UE provided a DNN and did not provide an S-NSSAI during the PDU session establishment, the UE shall stop timer T3584, if it is running for the same [no S-NSSAI, DNN] combination provided by the UE. If the UE provided an S-NSSAI and did not provide a DNN during the PDU session establishment, the UE shall stop timer T3584, if it is running for the same [S-NSSAI, no DNN] combination provided by the UE. If the UE provided neither a DNN nor an S-NSSAI during the PDU session establishment, the UE shall stop timer T3584, if it is running for the same [no S-NSSAI, no DNN] combination provided by the UE. The timer T3584 to be stopped includes the timer T3584 applied for all the PLMNs, if running, and the timer T3584 applied for the registered PLMN, if running.

Upon receipt of the PDU SESSION MODIFICATION COMMAND message, if the UE provided an S-NSSAI during the PDU session establishment, the UE shall stop timer T3585, if it is running for the S-NSSAI of the PDU session. If the UE did not provide an S-NSSAI during the PDU session establishment and the request type was different from "initial emergency request" and different from "existing emergency PDU session", the UE shall stop the timer T3585 associated with no S-NSSAI if it is running. The timer T3585 to be stopped includes the timer T3585 applied for all the PLMNs, if running, and the timer T3585 applied for the registered PLMN, if running. If the PDU SESSION MODIFICATION COMMAND message was received for an emergency PDU session, the UE shall not stop the timer T3585 associated with no S-NSSAI if it is running.

NOTE 1: Upon receipt of the PDU SESSION MODIFICATION COMMAND message for a PDU session, if the UE provided a DNN (or no DNN) and an S-NSSAI (or no S-NSSAI) when the PDU session is established, timer T3396 associated with the DNN (or no DNN, if no DNN was provided by the UE) is running, and timer T3584 associated with the DNN (or no DNN, if no DNN was provided by the UE) and the S-NSSAI of the PDU session (or no S-NSSAI, if no S-NSSAI was provided by the UE) is running, then the UE stops both the timer T3396 and the timer T3584.

NOTE 2: Upon receipt of the PDU SESSION MODIFICATION COMMAND message for a PDU session, if the UE provided a DNN (or no DNN) and an S-NSSAI (or no S-NSSAI) when the PDU session is established, timer T3585 associated with the S-NSSAI of the PDU session (or no S-NSSAI, if no S-NSSAI was provided by the UE) is running, and timer T3584 associated with the DNN (or no DNN, if no DNN was provided by the UE) and the S-NSSAI of the PDU session (or no S-NSSAI, if no S-NSSAI was provided by the UE) is running, then the UE stops both the timer T3585 and the timer T3584.

If the PDU SESSION MODIFICATION COMMAND message includes the Authorized QoS rules IE, the UE shall process the QoS rules sequentially starting with the first QoS rule.

If the PDU SESSION MODIFICATION COMMAND message includes the Mapped EPS bearer contexts IE, the UE shall process the mapped EPS bearer contexts sequentially starting with the first mapped EPS bearer context.

If the PDU SESSION MODIFICATION COMMAND message includes the Authorized QoS flow descriptions IE, the UE shall process the QoS flow descriptions sequentially starting with the first QoS flow description.

The UE shall replace the stored authorized QoS rules, authorized QoS flow descriptions and session-AMBR of the PDU session with the received value(s), if any, in the PDU SESSION MODIFICATION COMMAND message.

If the PDU SESSION MODIFICATION COMMAND message includes a Mapped EPS bearer contexts IE, the UE shall check each mapped EPS bearer context for different types of errors as follows:

NOTE 3: An error detected in a mapped EPS bearer context does not cause the UE to discard the Authorized QoS rules IE and Authorized QoS flow descriptions IE included in the PDU SESSION MODICATION COMMAND message, if any.

a) Semantic error in the mapped EPS bearer operation:

1) operation code = "Create new EPS bearer" and there is already an existing mapped EPS bearer context with the same EPS bearer identity associated with any PDU session.

2) operation code = "Delete existing EPS bearer" and there is no existing mapped EPS bearer context with the same EPS bearer identity associated with the PDU session that is being modified.

3) operation code = "Modify existing EPS bearer" and there is no existing mapped EPS bearer context with the same EPS bearer identity associated with the PDU session that is being modified.

4) operation code = "Create new EPS bearer" or "Modify existing EPS bearer" and the resulting mapped EPS bearer context has invalid or missing mandatory parameters (e.g., mapped EPS QoS parameters or traffic flow template for a dedicated EPS bearer context).

 In case 1, if the existing mapped EPS bearer context is associated with the PDU session that is being modified, the UE shall not diagnose an error, further process the create request and, if it was process successfully, delete the old EPS bearer context.

 In case 2, the UE shall not diagnose an error, further process the delete request and, if it was processed successfully, consider the mapped EPS bearer context as successfully deleted.

 Otherwise, after sending the PDU SESSION MODIFICATION COMPLETE for the ongoing PDU session modification procedure, the UE shall initiate a PDU session modification procedure by sending a PDU SESSION MODIFICATION REQUEST message to delete the mapped EPS bearer context with 5GSM cause #85 "Invalid mapped EPS bearer identity".

b) if the mapped EPS bearer context includes a traffic flow template, the UE shall check the traffic flow template for different types of TFT IE errors as follows:

1) Semantic errors in TFT operations:

i) TFT operation = "Create a new TFT" when there is already an existing TFT for the EPS bearer context.

ii) When the TFT operation is an operation other than "Create a new TFT" and there is no TFT for the EPS bearer context.

iii) TFT operation = "Delete packet filters from existing TFT" when it would render the TFT empty.

iv) TFT operation = "Delete existing TFT" for a dedicated EPS bearer context.

 In case iv, after sending the PDU SESSION MODIFICATION COMPLETE for the ongoing PDU session modification procedure, the UE shall initiate a PDU session modification procedure by sending a PDU SESSION MODIFICATION REQUEST message to delete the mapped EPS bearer context with 5GSM cause #41 "semantic error in the TFT operation".

 In the other cases the UE shall not diagnose an error and perform the following actions to resolve the inconsistency:

 In case i, the UE shall further process the new activation request to create a new TFT and, if it was processed successfully, delete the old TFT.

 In case ii, the UE shall:

- process the new request and if the TFT operation is "Delete existing TFT" or "Delete packet filters from existing TFT", and if no error according to items 2, 3, and 4 was detected, consider the TFT as successfully deleted;

- process the new request as an activation request, if the TFT operation is "Add packet filters in existing TFT" or "Replace packet filters in existing TFT".

 In case iii, if the packet filters belong to a dedicated EPS bearer context, the UE shall process the new deletion request and, if no error according to items 2, 3, and 4 was detected, after sending the PDU SESSION MODIFICATION COMPLETE for the ongoing PDU session modification procedure, the UE shall initiate a PDU session modification procedure by sending a PDU SESSION MODIFICATION REQUEST message to delete the mapped EPS bearer context with 5GSM cause #41 "semantic error in the TFT operation".

 In case iii, if the packet filters belong to the default EPS bearer context, the UE shall process the new deletion request and if no error according to items 2, 3, and 4 was detected then delete the existing TFT, this corresponds to using match-all packet filter for the default EPS bearer context.

2) Syntactical errors in TFT operations:

i) When the TFT operation = "Create a new TFT", "Add packet filters in existing TFT", "Replace packet filters in existing TFT" or "Delete packet filters from existing TFT" and the packet filter list in the TFT IE is empty.

ii) TFT operation = "Delete existing TFT" or "No TFT operation" with a non-empty packet filter list in the TFT IE.

iii) TFT operation = "Replace packet filters in existing TFT" when the packet filter to be replaced does not exist in the original TFT.

iv) TFT operation = "Delete packet filters from existing TFT" when the packet filter to be deleted does not exist in the original TFT.

v) Void.

vi) When there are other types of syntactical errors in the coding of the TFT IE, such as a mismatch between the number of packet filters subfield, and the number of packet filters in the packet filter list when the rule operation is "delete existing QoS rule" or "create new QoS rule", or the number of packet filters subfield is larger than the maximum possible number of packet filters in the packet filter list (i.e., there is no QoS rule precedence subfield included in the QoS rule IE).

 In case iii, the UE shall not diagnose an error, further process the replace request and, if no error according to items 3 and 4 was detected, include the packet filters received to the existing TFT.

 In case iv, the UE shall not diagnose an error, further process the deletion request and, if no error according to items 3 and 4 was detected, consider the respective packet filter as successfully deleted.

 Otherwise, after sending the PDU SESSION MODIFICATION COMPLETE for the ongoing PDU session modification procedure, the UE shall initiate a PDU session modification procedure by sending a PDU SESSION MODIFICATION REQUEST message to delete the mapped EPS bearer context with 5GSM cause #42 "syntactical error in the TFT operation".

3) Semantic errors in packet filters:

i) When a packet filter consists of conflicting packet filter components which would render the packet filter ineffective, i.e. no IP packet will ever fit this packet filter. How the UE determines a semantic error in a packet filter is outside the scope of the present document.

ii) When the resulting TFT, which is assigned to a dedicated EPS bearer context, does not contain any packet filter applicable for the uplink direction among the packet filters created on request from the network.

 After sending the PDU SESSION MODIFICATION COMPLETE for the ongoing PDU session modification procedure, the UE shall initiate a PDU session modification procedure by sending a PDU SESSION MODIFICATION REQUEST message to delete the mapped EPS bearer context with 5GSM cause #44 "semantic errors in packet filter(s)".

4) Syntactical errors in packet filters:

i) When the TFT operation = "Create a new TFT", "Add packet filters to existing TFT", or "Replace packet filters in existing TFT" and two or more packet filters in the resultant TFT would have identical packet filter identifiers.

ii) When the TFT operation = "Create a new TFT", "Add packet filters to existing TFT" or "Replace packet filters in existing TFT", and two or more packet filters among all TFTs associated with this PDN connection would have identical packet filter precedence values.

iii) When there are other types of syntactical errors in the coding of packet filters, such as the use of a reserved value for a packet filter component identifier.

 In case i, if two or more packet filters with identical packet filter identifiers are contained in the new request, after sending the PDU SESSION MODIFICATION COMPLETE for the ongoing PDU session modification procedure, the UE shall initiate a PDU session modification procedure by sending a PDU SESSION MODIFICATION REQUEST message to delete the mapped EPS bearer context with 5GSM cause #45 "syntactical error in packet filter(s)". Otherwise, the UE shall not diagnose an error, further process the new request and, if it was processed successfully, delete the old packet filters which have the identical packet filter identifiers.

 In case ii, if the old packet filters do not belong to the default EPS bearer context, the UE shall not diagnose an error, shall further process the new request and, if it was processed successfully, shall delete the old packet filters which have identical filter precedence values.

 In case ii, if one or more old packet filters belong to the default EPS bearer context, after sending the PDU SESSION MODIFICATION COMPLETE for the ongoing PDU session modification procedure, the UE shall initiate a PDU session modification procedure by sending a PDU SESSION MODIFICATION REQUEST message to delete the mapped EPS bearer context with 5GSM cause #45 "syntactical errors in packet filter(s)".

 Otherwise, after sending the PDU SESSION MODIFICATION COMPLETE for the ongoing PDU session modification procedure, the UE shall initiate a PDU session modification procedure by sending a PDU SESSION MODIFICATION REQUEST message to delete the mapped EPS bearer context with 5GSM cause #45 "syntactical error in packet filter(s)".

And if a new EPS bearer identity parameter in Authorized QoS flow descriptions IE is received for a QoS flow which can be transferred to EPS, the UE shall update the association between the QoS flow and the mapped EPS bearer context, based on the new EPS bearer identity and the mapped EPS bearer contexts. If the "Delete existing EPS bearer" operation code in the Mapped EPS bearer contexts IE was received, the UE shall discard the association between the QoS flow and the corresponding mapped EPS bearer context.

If:

a) the UE detects different errors in the mapped EPS bearer contexts as described above which requires sending a PDU SESSION MODIFICATION REQUEST message to delete the erroneous mapped EPS bearer contexts; and

b) optionally, if the UE detects errors in QoS rules that require to delete at least one QoS rule as described in subclause 6.3.2.4 which requires sending a PDU SESSION MODIFICATION REQUEST message to delete the erroneous QoS rules;

the UE, after sending the PDU SESSION MODIFICATION COMPLETE message for the ongoing PDU session modification procedure, may send a single PDU SESSION MODIFICATION REQUEST message to delete the erroneous mapped EPS bearer contexts, and optionally to delete the erroneous QoS rules. The UE shall include a 5GSM cause IE in the PDU SESSION MODIFICATION REQUEST message.

NOTE 4: The 5GSM cause to use cannot be different from #41 "semantic error in the TFT operation", #42 "syntactical error in the TFT operation", #44 "semantic error in packet filter(s)", #45 "syntactical errors in packet filter(s)", #83 "semantic error in the QoS operation", #84 "syntactical error in the QoS operation", or #85 "Invalid mapped EPS bearer identity". The selection of a 5GSM cause is up to UE implementation.

Upon receipt of a PDU SESSION MODIFICATION COMMAND message and a PDU session ID, using the NAS transport procedure as specified in subclause 5.4.5, if the UE accepts the PDU SESSION MODIFICATION COMMAND message, the UE considers the PDU session as modified and the UE shall create a PDU SESSION MODIFICATION COMPLETE message.

If the PDU SESSION MODIFICATION COMMAND message contains the PTI value allocated in the UE-requested PDU session modification procedure, the UE shall stop the timer T3581. The UE should ensure that the PTI value assigned to this procedure is not released immediately.

NOTE 5: The way to achieve this is implementation dependent. For example, the UE can ensure that the PTI value assigned to this procedure is not released during the time equal to or greater than the default value of timer T3591.

While the PTI value is not released, the UE regards any received PDU SESSION MODIFICATION COMMAND message with the same PTI value as a network retransmission (see subclause 7.3.1).

If the selected SSC mode of the PDU session is "SSC mode 3" and the PDU SESSION MODIFICATION COMMAND message includes 5GSM cause #39 "reactivation requested", the UE can provide to the upper layers the PDU session address lifetime if received in the PDU session address lifetime parameter of the Extended protocol configuration options IE of the PDU SESSION MODIFICATION COMMAND message. After the completion of the network-requested PDU session modification procedure:

a) if the PDU session is an MA PDU session:

1) established over both 3GPP access and non-3GPP access, and:

- the UE is registered over both 3GPP access and non-3GPP access in the same PLMN:

- the UE should re-initiate a UE-requested PDU session establishment procedure as specified in subclause 6.4.1 over the access the PDU SESSION MODIFICATION COMMAND message is received; or

- the UE is registered over both 3GPP access and non-3GPP access in different PLMNs:

- the UE should re-initiate UE-requested PDU session establishment procedures as specified in subclause 6.4.1 over both accesses. The UE should re-initiate the UE-requested PDU session establishment procedure over the access the PDU SESSION MODIFICATION COMMAND message is received first; or

2) established over only single access:

- the UE should re-initiate a UE-requested PDU session establishment procedure as specified in subclause 6.4.1 over the access the user plane resources were established; or

b) if the PDU session is a single access PDU session:

- the UE should re-initiate a UE-requested PDU session establishment procedure as specified in subclause 6.4.1 over the access the PDU session was associated with; and

for the re-initiated UE-requested PDU session establishment procedure(s) the UE should set a new PDU session ID different from the PDU session ID associated with the present PDU session and should set:

a) the PDU session type to the PDU session type associated with the present PDU session;

b) the SSC mode to the SSC mode associated with the present PDU session;

c) the DNN to the DNN associated with the present PDU session; and

d) the S-NSSAI to the S-NSSAI associated with (if available in roaming scenarios) a mapped S-NSSAI if provided in the UE-requested PDU session establishment procedure of the present PDU session.

If the UE has indicated support for CIoT 5GS optimizations and receives a small data rate control parameters container in the Extended protocol configuration options IE in the PDU SESSION MODIFICATION COMMAND message, the UE shall store the small data rate control parameters value and use the stored small data rate control parameters value as the maximum allowed limit of uplink user data for the PDU session in accordance with 3GPP TS 23.501 [8]. If the UE has a previously stored small data rate control parameter value for the PDU session, the UE shall replace the stored small data rate control parameters value for the PDU session with the received small data rate control parameters value in the Extended protocol configuration options IE in the PDU SESSION MODIFICATION COMMAND message.

If the UE has indicated support for CIoT 5GS optimizations and receives an additional small data rate control parameters for exception data container in the Extended protocol configuration options IE in the PDU SESSION MODIFICATION COMMAND message, the UE shall store the additional small data rate control parameters for exception data value and use the stored additional small data rate control parameters for exception data value as the maximum allowed limit of uplink exception data for the PDU session in accordance with 3GPP TS 23.501 [8]. If the UE has a previously stored additional small data rate control parameters for exception data value for the PDU session, the UE shall replace the stored additional small data rate control parameters for exception data value for the PDU session with the received additional small data rate control parameters for exception data value in the Extended protocol configuration options IE in the PDU SESSION MODIFICATION COMMAND message.

The UE shall include the PDU session ID of the old PDU session which is about to get released in the old PDU session ID IE of the UL NAS TRANSPORT message that transports the PDU SESSION ESTABLISHMENT REQUEST message.

NOTE 6: The UE is expected to maintain the PDU session for which the PDU SESSION MODIFICATION COMMAND message including 5GSM cause #39 "reactivation requested" is received during the time indicated by the PDU session address lifetime value or until receiving an indication from upper layers (e.g. that the old PDU session is no more needed).

If the selected PDU session type of the PDU session is "Unstructured", the UE supports inter-system change from N1 mode to S1 mode, the UE does not support establishment of a PDN connection for the PDN type set to "non-IP" in S1 mode, and the parameters list field of one or more authorized QoS flow descriptions received in the Authorized QoS flow descriptions IE of the PDU SESSION MODIFICATION COMMAND message contains an EPS bearer identity (EBI), then the UE shall locally remove the EPS bearer identity (EBI) from the parameters list field of such one or more authorized QoS flow descriptions. After sending the PDU SESSION MODIFICATION COMPLETE message for the ongoing PDU session modification procedure, the UE shall initiate a PDU session modification procedure by sending a PDU SESSION MODIFICATION REQUEST message to delete the mapped EPS bearer context with 5GSM cause #85 "Invalid mapped EPS bearer identity".

If the selected PDU session type of the PDU session is "Ethernet", the UE supports inter-system change from N1 mode to S1 mode, the UE does not support establishment of a PDN connection for the PDN type set to "non-IP" in S1 mode, the UE, the network or both of them do not support Ethernet PDN type in S1 mode, and the parameters list field of one or more authorized QoS flow descriptions received in the Authorized QoS flow descriptions IE of the PDU SESSION MODIFICATION COMMAND message contains an EPS bearer identity (EBI), the UE shall locally remove the EPS bearer identity (EBI) from the parameters list field of such one or more authorized QoS flow descriptions. After sending the PDU SESSION MODIFICATION COMPLETE message for the ongoing PDU session modification procedure, the UE shall initiate a PDU session modification procedure by sending a PDU SESSION MODIFICATION REQUEST message to delete the mapped EPS bearer context with 5GSM cause #85 "Invalid mapped EPS bearer identity".

If the Always-on PDU session indication IE is included in the PDU SESSION MODIFICATION COMMAND message and:

a) the value of the IE is set to "Always-on PDU session required", the UE shall consider the established PDU session as an always-on PDU session; or

b) the value of the IE is set to "Always-on PDU session not allowed", the UE shall not consider the established PDU session as an always-on PDU session.

If the UE does not receive the Always-on PDU session indication IE in the PDU SESSION MODIFICATION COMMAND message:

a) if the network-requested PDU session modification procedure is triggered by a UE-requested PDU session modification procedure upon an inter-system change from S1 mode to N1 mode for a PDN connection established when in S1 mode, the UE shall not consider the modified PDU session as an always-on PDU session; or

b) otherwise:

1) if the UE has received the Always-on PDU session indication IE with the value set to "Always-on PDU session required" for this PDU session, the UE shall consider the PDU session as an always-on PDU session; or

2) otherwise the UE shall not consider the PDU session as an always-on PDU session.

If the PDU SESSION MODIFICATION COMMAND message contains a Port management information container IE, the UE shall forward the contents of the Port management information container IE to the DS-TT (see 3GPP TS 23.501 [8] and 3GPP TS 23.502 [9]).

If the UE receives a Serving PLMN rate control IE in the PDU SESSION MODIFICATION COMMAND message, the UE shall store the Serving PLMN rate control IE value, replacing any existing value, and use the stored serving PLMN rate control value as the maximum allowed limit of uplink control plane user data for the corresponding PDU session in accordance with 3GPP TS 23.501 [8].

If the PDU SESSION MODIFICATION COMMAND message includes the Received MBS container IE, for each of the Received MBS informations:

a) if MBS decision is set to "MBS join is accepted", the UE shall consider that it has successfully joined the MBS session. The UE shall store the received TMGI and shall use it for any further operation on that MBS session. The UE shall store the received MBS service area associated with the received TMGI, if any. The UE may provide the MBS start time if it is included in the Received MBS information to upper layers;

b) if MBS decision is set to "MBS join is rejected", the UE shall consider the requested join as rejected. The UE shall store the received MBS service area associated with the received TMGI, if any. If the received Rejection cause is set to "User is outside of local MBS service area", the UE shall not request to join the same MBS session if the UE is camping on a cell that is outside the received MBS service area. If the received Rejection cause is set to "MBS session has not started or will not start soon" and an MBS back-off timer value is included with value that indicates neither zero nor deactivated, the UE shall start a back-off timer T3530 with the value provided in the MBS back-off timer value for the received TMGI, and shall not attempt to join the MBS session with the same TMGI until the expiry of T3530. If the MBS back-off timer value indicates that this timer is deactivated, the UE shall not attempt to join the MBS session with the same TMGI until the UE is switched off, the USIM is removed, or the entry in the "list of subscriber data" for the current SNPN is updated. If the MBS back-off timer value indicates zero, the UE may attempt to join the MBS session with the same TMGI;

c) if the MBS decision is set to "Remove UE from MBS session", the UE shall consider that it has successfully left the MBS session. If the received Rejection cause is set to "MBS session is released", the UE shall consider the MBS session as released; or

d) if the MBS decision is set to "MBS service area update", the UE shall store the received MBS service area associated with the received TMGI and replace the current MBS service area with the received one.

If the UE has indicated support for ECS configuration information provisioning and receives one or more ECS IPv4 addresses, ECS IPv6 addresses, ECS FQDNs, or an ECS provider identifier in the Extended protocol configuration options IE of the PDU SESSION MODIFICATION COMMAND message, then the UE shall pass the ECS IPv4 address(es), if any, ECS IPv6 address(es), if any, ECS FQDN(s), if any, and the ECS provider identifier, if any, to the upper layers. If the UE receives spatial validity condition along with the ECS IPv4 Address, ECS IPv6 Address, or ECS FQDN respectively in the Extended protocol configuration options IE, then the UE shall pass the spatial validity condition associated with the ECS IPv4 Address, ECS IPv6 Address, or ECS FQDN respectively to the upper layers.

If the UE supports receiving DNS server addresses in protocol configuration options and receives one or more DNS server IPv4 address(es), one or more DNS server IPv6 address(es) or both of them, in the Extended protocol configuration options IE of the PDU SESSION MODIFICATION COMMAND message, then the UE shall pass the received DNS server IPv4 address(es), if any, and the received DNS server IPv6 address(es), if any, to upper layers.

NOTE 7: The received DNS server address(es) replace previously provided DNS server address(es), if any.

If the UE supports the EAS rediscovery and receives:

a) the EAS rediscovery indication without indicated impact; or

b) the following:

1) one or more EAS rediscovery indication(s) with impacted EAS IPv4 address range, if supported by the UE;

2) one or more EAS rediscovery indication(s) with impacted EAS IPv6 address range, if supported by the UE;

3) one or more EAS rediscovery indication(s) with impacted EAS FQDN, if supported by the UE; or

4) any combination of the above;

in the Extended protocol configuration options IE of the PDU SESSION MODIFICATION COMMAND message, then the UE shall pass the EAS rediscovery indication and the received impacted EAS IPv4 address range(s), if supported and included, the received EAS IPv6 address range(s), if supported and included, and the received EAS FQDN(s), if supported and included, to upper layers.

NOTE 8: The upper layers handle the EAS rediscovery indication and the impacted EAS IPv4 address range(s), if any, the impacted EAS IPv6 address range(s), if any, and the received EAS FQDN(s), if any, according to 3GPP TS 23.548 [10A].

Upon receipt of PDU SESSION MODIFICATION COMMAND message, if the network-requested PDU session modification procedure is triggered by a UE-requested PDU session modification procedure, the Service-level-AA container IE is included and it contains a CAA-level UAV ID and the C2 authorization result, the UE shall replace its currently stored CAA-level UAV ID with the new CAA-level UAV ID.

If the UE supports EDC and receives the EDC usage allowed indicator in the Extended protocol configuration options IE of the PDU SESSION MODIFICATION COMMAND message, the UE shall indicate to upper layers that network allows the use of EDC.

If the UE supports EDC and receives the EDC usage required indicator in the Extended protocol configuration options IE of the PDU SESSION MODIFICATION COMMAND message, the UE shall indicate to upper layers that network requires the use of EDC.

NOTE 9: Handling of indication that network allows the use of EDC or that network requires the use of EDC is specified in 3GPP TS 23.548 [182].

The UE shall transport the PDU SESSION MODIFICATION COMPLETE message and the PDU session ID, using the NAS transport procedure as specified in subclause 5.4.5.

After sending the PDU SESSION MODIFICATION COMPLETE message, if the "Create new EPS bearer" operation code in the Mapped EPS bearer contexts IE was received in the PDU SESSION MODIFICATION COMMAND message and there is neither a corresponding Authorized QoS flow descriptions IE in the PDU SESSION MODIFICATION COMMAND message nor an existing QoS flow description corresponding to the EPS bearer identity included in the mapped EPS bearer context, the UE shall send a PDU SESSION MODIFICATION REQUEST message including a Mapped EPS bearer contexts IE to delete the mapped EPS bearer context.

After sending the PDU SESSION MODIFICATION COMPLETE message, if for the PDU session being modified, there are mapped EPS bearer context(s) but none of them is associated with the default QoS rule, the UE shall locally delete the mapped EPS bearer context(s) and shall locally delete the stored EPS bearer identity (EBI) in all the QoS flow descriptions of the PDU session, if any.

If a port management information container needs to be delivered (see 3GPP TS 23.501 [8] and 3GPP TS 23.502 [9]), the UE shall include a Port management information container IE in the PDU SESSION MODIFICATION COMPLETE message.

Upon receipt of a PDU SESSION MODIFICATION COMPLETE message, the SMF shall stop timer T3591 and shall consider the PDU session as modified. If the selected SSC mode of the PDU session is "SSC mode 3" and the PDU SESSION MODIFICATION COMMAND message included 5GSM cause #39 "reactivation requested", the SMF shall start timer T3593. If the PDU Session Address Lifetime value is sent to the UE in the PDU SESSION MODIFICATION COMMAND message then timer T3593 shall be started with the same value, otherwise it shall use a default value. If the PDU SESSION MODIFICATION COMPLETE message contains a Port management information container IE, the SMF shall handle the contents of the Port management information container IE as specified in 3GPP TS 23.501 [8] and 3GPP TS 23.502 [9].

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

## A.3 Causes related to PLMN or SNPN specific network failures and congestion/authentication failures

Cause #20 – MAC failure

 This 5GMM cause is sent to the network if the USIM detects that the MAC in the AUTHENTICATION REQUEST message is not fresh.

Cause #21 – Synch failure

 This 5GMM cause is sent to the network if the USIM detects that the SQN in the AUTHENTICATION REQUEST message is out of range.

Cause #22 – Congestion

 This 5GMM cause is sent to the UE because of congestion in the network (e.g. no channel, facility busy/congested etc.).

Cause #23 – UE security capabilities mismatch

 This 5GMM cause is sent to the network if the UE detects that the UE security capability does not match the one sent back by the network.

Cause #24 – Security mode rejected, unspecified

 This 5GMM cause is sent to the network if the security mode command is rejected by the UE for unspecified reasons.

Cause #26 – Non-5G authentication unacceptable

 This 5GMM cause is sent to the network in N1 mode if the "separation bit" in the AMF field of AUTN is set to 0 in the AUTHENTICATION REQUEST message (see 3GPP TS 33.501 [24]).

Cause #28 – Restricted service area

 This 5GMM cause is sent to the UE if it requests service in a tracking area of the 3GPP access or in an area of the wireline access, which is a part of the UE's non-allowed area or is not a part of the UE's allowed area.

Cause #43 – LADN not available

 This 5GMM cause is sent to the UE if the user-plane resources of the PDU session are not established when the UE is located outside the LADN service area.

Cause #62 – No network slices available

 This 5GMM cause is sent by the network if none of the requested network slice(s) in the registration request are allowed and there are no default network slice(s) configured in the network.

NOTE: Network does not send this cause in REGISTRATION REJECT message if the UE does not include a requested NSSAI in the REGISTRATION REQUEST message. In that case, if the UE is not registered for onboarding services in SNPN, the network uses other causes (e.g. #13, #15, etc.) based on the subscription.

Cause #65 – Maximum number of PDU sessions reached

 This 5GMM cause is used by the network to indicate that the procedure requested by the UE was rejected as the network has reached the maximum number of simultaneously active PDU sessions for the UE.

Cause #67 – Insufficient resources for specific slice and DNN

 This 5GMM cause is sent by the network to indicate that the requested service cannot be provided due to insufficient resources for specific slice and DNN.

Cause #69 – Insufficient resources for specific slice

 This 5GMM cause is sent by the network to indicate that the requested service cannot be provided due to insufficient resources for specific slice.

Cause #71 – ngKSI already in use

 This 5GMM cause is sent to the network in N1 mode if the ngKSI value received in the AUTHENTICATION REQUEST message is already associated with one of the 5G security contexts stored in the UE.

Cause #73 – Serving network not authorized

 This 5GMM cause is sent to the UE if the UE initiates registration towards a serving network and the serving network fails to be authorized by the UE's home network.

Cause #78 –PLMN not allowed to operate at the present UE location

 This 5GMM cause is sent to the UE to indicate that the PLMN is not allowed to operate at the present UE location.

NOTE: This cause is only applicable for NR satellite access.

Cause #90 – Payload was not forwarded

 This 5GMM cause is sent by the network to indicate that the requested service cannot be provided because payload could not be forwarded by AMF.

Cause #91 – DNN not supported or not subscribed in the slice

 This 5GMM cause is sent by the network to indicate that the requested service cannot be provided because payload could not be forwarded by AMF because the DNN is not supported or not subscribed in the slice selected by the network if the UE did not indicate a slice, or the DNN is not supported or not subscribed in the slice indicated by the UE.

Cause #92 – Insufficient user-plane resources for the PDU session

 This 5GMM cause is sent by the network to indicate that the requested service cannot be provided due to insufficient user-plane resources for the PDU session.

Cause #93 – Onboarding services terminated

 This 5GMM cause is sent by the network if the network initiates a de-registration procedure because the onboarding services are terminated.

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

## C.1 Storage of 5GMM information for UEs not operating in SNPN access operation mode

The following 5GMM parameters shall be stored on the USIM if the corresponding file is present:

a) 5G-GUTI;

b) last visited registered TAI;

c) 5GS update status;

d) 5G NAS security context parameters from a full native 5G NAS security context (see 3GPP TS 33.501 [24]);

e) KAUSF and KSEAF (see 3GPP TS 33.501 [24]);

f) SOR counter (see subclause 9.11.3.51); and

g) UE parameter update counter (see subclause 9.11.3.53A);

The UE may support multiple records of NAS security context storage for multiple registration (see 3GPP TS 31.102 [22]). If the UE supports multiple records of NAS security context storage for multiple registration, the first 5G security context of one access shall be stored in record 1 of the 5G NAS Security Context USIM file for that access and the second 5G security context of that access shall be stored in record 2 of the same file. The presence and format of corresponding files on the USIM is specified in 3GPP TS 31.102 [22].

If the corresponding file is not present on the USIM, these 5GMM parameters are stored in a non-volatile memory in the ME together with the SUPI from the USIM. These 5GMM parameters can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory; else the UE shall delete the 5GMM parameters.

The following 5GMM parameters shall be stored in a non-volatile memory in the ME together with the SUPI from the USIM:

- configured NSSAI(s);

- NSSRG information;

- NSSAI inclusion mode(s);

- MPS indicator;

- MCS indicator;

- operator-defined access category definitions;

- network-assigned UE radio capability IDs;

- "CAG information list", if the UE supports CAG;

- signalled URSP (see 3GPP TS 24.526 [19]);

- SOR-CMCI;

- one or more lists of type "list of PLMN(s) to be used in disaster condition", if the UE supports MINT;

- disaster roaming wait range, if the UE supports MINT;

- disaster return wait range, if the UE supports MINT;

- indication of whether disaster roaming is enabled in the UE; and

- indication of 'applicability of "lists of PLMN(s) to be used in disaster condition" provided by a VPLMN'.

Each configured NSSAI consists of S-NSSAI(s) stored together with a PLMN identity, if it is associated with a PLMN. The UE shall store the S-NSSAI(s) of the HPLMN. If the UE is in the VPLMN, the UE shall also store the configured NSSAI for the current PLMN and any necessary mapped S-NSSAI(s). The configured NSSAI(s) can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME; else the UE shall delete the configured NSSAI(s). A configured NSSAI may be associated with NSSRG information.

Each NSSAI inclusion mode is associated with a PLMN identity and access type. The NSSAI inclusion mode(s) can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME; else the UE shall delete the NSSAI inclusion mode(s).

The MPS indicator is stored together with a PLMN identity of the PLMN that provided it, and is valid in that RPLMN or equivalent PLMN. The MPS indicator can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME, else the UE shall delete the MPS indicator.

The MCS indicator is stored together with a PLMN identity of the PLMN that provided it, and is valid in that RPLMN or equivalent PLMN. The MCS indicator can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME, else the UE shall delete the MCS indicator.

Operator-defined access category definitions are stored together with a PLMN identity of the PLMN that provided them, and is valid in that PLMN or equivalent PLMN. The operator-defined access category definitions can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME, else the UE shall delete the operator-defined access category definitions. The maximum number of stored operator-defined access category definitions is UE implementation dependent.

Each network-assigned UE radio capability ID is stored together with a PLMN identity of the PLMN that provided it as well as a mapping to the corresponding UE radio configuration, and is valid in that PLMN. A network-assigned UE radio capability ID can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME, else the UE shall delete the network-assigned UE radio capability ID. The UE shall be able to store at least the last 16 received network-assigned UE radio capability IDs. There shall be only one network-assigned UE radio capability ID stored for a given combination of PLMN identity and UE radio configuration and any existing UE radio capability ID shall be deleted when a new UE radio capability ID is added for the same combination of PLMN identity and UE radio configuration. If the UE receives a network-assigned UE radio capability ID with a Version ID value different from the value included in the network-assigned UE radio capability ID(s) stored at the UE for the serving PLMN, the UE may delete these stored network-assigned UE radio capability ID(s).

The allowed NSSAI(s) can be stored in a non-volatile memory in the ME together with the SUPI from the USIM. Allowed NSSAI consists of S-NSSAI(s) stored together with a PLMN identity, if it is associated with a PLMN. If the allowed NSSAI is stored, then the UE shall store the S-NSSAI(s) of the HPLMN. If the UE is in the VPLMN, the UE shall also store the allowed NSSAI for the serving PLMN and any necessary mapping of the allowed NSSAI for the serving PLMN to the S-NSSAI(s) of the HPLMN. The allowed NSSAI(s) can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME; else the UE shall delete the allowed NSSAI(s).

If the UE is registered for emergency services, the UE shall not store the 5GMM parameters described in this annex on the USIM or in non-volatile memory. Instead the UE shall temporarily store these parameters locally in the ME and the UE shall delete these parameters when the UE is deregistered.

If the UE is configured for eCall only mode as specified in 3GPP TS 31.102 [22], the UE shall not store the 5GMM parameters described in this annex on the USIM or in non-volatile memory. Instead the UE shall temporarily store these parameters locally in the ME and the UE shall delete these parameters when the UE enters 5GMM-DEREGISTERED.eCALL-INACTIVE state, the UE is switched-off or the USIM is removed.

The "CAG information list" can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME; else the UE shall delete the "CAG information list".

The handling of the SOR-CMCI stored in the non-volatile memory in the ME is specified in 3GPP TS 23.122 [5].

Each "list of PLMN(s) to be used in disaster condition" is stored together with the PLMN identity of the PLMN that provided it. The stored lists of type "list of PLMN(s) to be used in disaster condition" can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME; else the UE shall delete the lists of type "list of PLMN(s) to be used in disaster condition". The UE shall store at least the "list of PLMN(s) to be used in disaster condition" provided by the HPLMN or EHPLMN. The maximum number of stored lists of type "list of PLMN(s) to be used in disaster condition" provided by a PLMN other than the HPLMN or EHPLMN is UE implementation dependent.

The disaster roaming wait range can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME; else the UE shall delete the disaster roaming wait range.

The disaster return wait range can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME; else the UE shall delete the disaster return wait range.

The indication of whether disaster roaming is enabled in the UE can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME; else the UE shall delete the indication of whether disaster roaming is enabled in the UE.

The indication of 'applicability of "lists of PLMN(s) to be used in disaster condition" provided by a VPLMN' can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME; else the UE shall delete the indication of 'applicability of "lists of PLMN(s) to be used in disaster condition" provided by a VPLMN'.

Editor's note (WI MINT, CR#4066): Whether the ME deletes the indication of "whether disaster roaming is enabled" or the indication of 'applicability of "lists of PLMN(s) to be used in disaster condition" provided by a VPLMN' upon change of country or when the UE is switched-off is FFS. Also for further study are the conditions on how to coordinate and make use of the mentioned indications stored on the USIM and the ME.

## C.2 Storage of 5GMM information for UEs operating in SNPN access operation mode

The 5GMM information for UEs operating in SNPN access operation mode are stored according to the following conditions:

- if the UE does not support access to an SNPN using credentials from a credentials holder, the following 5GMM parameters shall be stored per subscribed SNPN in a non-volatile memory in the ME together with the subscriber identifier associated with the SNPN identity of the SNPN in the "list of subscriber data" configured in the ME (see 3GPP TS 23.122 [5]);and

- if the UE supports access to an SNPN using credentials from a credentials holder, the following 5GMM parameters shall be stored in a non-volatile memory in the ME per:

i) the subscribed SNPN together with the subscriber identifier associated with the selected entry in the "list of subscriber data" configured in the ME (see 3GPP TS 23.122 [5]); or

ii) the PLMN subscription together with the SUPI from the USIM which is associated with the PLMN subscription:

a) 5G-GUTI;

b) last visited registered TAI;

c) 5GS update status;

d) 5G NAS security context parameters from a full native 5G NAS security context (see 3GPP TS 33.501 [24]);

e) KAUSF and KSEAF (see 3GPP TS 33.501 [24]);

f) UE parameter update counter (see subclause 9.11.3.53A);

g) configured NSSAI(s);

g1) NSSRG information;

h) NSSAI inclusion mode(s);

i) MPS indicator;

j) MCS indicator;

k) operator-defined access category definitions;

l) network-assigned UE radio capability IDs; and

m) signalled URSP (see 3GPP TS 24.526 [19]).

NOTE: Steering of roaming does not apply to an SNPN. Therefore, for a KAUSF which is generated for an SNPN, the UE does not store an associated SOR counter in the non-volatile memory.

If the 5GMM parameters are associated with the PLMN subscription, then the 5GMM parameters can only be used if the SUPI from the USIM which is associated with the selected PLMN subscription matches the SUPI stored in the non-volatile memory; else the UE shall delete the 5GMM parameters.

If the 5GMM parameters are associated with the subscribed SNPN of the entry in the "list of subscriber data", then the 5GMM parameters can only be used if the subscriber identifier of the selected entry of the "list of subscriber data" matches the subscriber identifier stored in the non-volatile memory.

Each configured NSSAI consists of S-NSSAI(s) stored together with an SNPN identity, if it is associated with an SNPN. A configured NSSAI may be associated with NSSRG information.

Each NSSAI inclusion mode is associated with an SNPN identity and access type.

The MPS indicator is stored together with an SNPN identity of the SNPN that provided it, and is valid in that registered SNPN.

The MCS indicator is stored together with an SNPN identity of the SNPN that provided it, and is valid in that registered SNPN.

Operator-defined access category definitions are stored together with an SNPN identity of the SNPN that provided them, and are valid in that SNPN. The maximum number of stored operator-defined access category definitions is UE implementation dependent.

Each network-assigned UE radio capability ID is stored together with an SNPN identity of the SNPN that provided it as well as a mapping to the corresponding UE radio configuration, and is valid in that SNPN. The UE shall be able to store at least the last 16 received network-assigned UE radio capability IDs. There shall be only one network-assigned UE radio capability ID stored for a given combination of SNPN identity and UE radio configuration and any existing UE radio capability ID shall be deleted when a new UE radio capability ID is added for the same combination of SNPN identity and UE radio configuration. If the UE receives a network-assigned UE radio capability ID with a Version ID value different from the value included in the network-assigned UE radio capability ID(s) stored at the UE for the serving SNPN, the UE may delete these stored network-assigned UE radio capability ID(s).

The allowed NSSAI(s) can be stored in a non-volatile memory in the ME. Allowed NSSAI consists of S-NSSAI(s) stored together with an SNPN identity, if it is associated with an SNPN.

\* \* \* End of Changes \* \* \* \*