**3GPP TSG-CT WG1 Meeting #122-eC1-****200683**

**Electronic meeting, 20-28 February 2020 (rev of C1-198772, 198075, 197003, …)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **24.501** | **CR** | **1533** | **rev** | **5** | **Current version:** | **16.3.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
|  | | | | | | | | |

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

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | NW slice specific authentication and authorization failure and revocation | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson, Motorola Mobility, Lenovo | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNS | | | | |  | ***Date:*** | | | 2020-02-17 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **C** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) Rel-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Due to network slice specific authentication and authorization failure for a requested network slice associated with a S-NSSAI for the HPLMN, (in addition to that the AMF needs to provide the UE with the authentication and authorization related message received from AAA server) the AMF also needs to update the UE with new network slice related information. The same applies at revocation of a previous successful authorized network slice (expect there is no EAP message received from AAA server that needs to be sent to the UE).  How the AMF sends the EAP message originating from AAA server to the UE is out of this CR scope.  TS 24.501 needs to be updated capturing this. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Updates due to the AMF provides the UE with new NW slice related information due to NSSAA procedure failure or authorization revoked.  Three related Editor’s notes resolved.  The UE can based on local policy remove a S-NSSAI in the rejected NSSAI due to S-NSSAI is not available due to the failed or revoked network slice-specific authorization and authentication.  Editorial corrections.  NSSAA added to abbreviations. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Network slice specific authentication and authorization specification incomplete. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 3.2, 4.6.1, 4.6.2.2, 4.6.2.4, 5.4.4.1, 5.4.4.2, 5.4.4.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | Rev 5: Based on 16.3.0 with some improvements of existing changes. Updates to 5.4.4.2 proposed to address revocation. Editorial fixes.  Rev 4 revokes the changes in 4.6.1 and 5.4.4.3. Adds logic about how the UE moves a S-NSSAI from one rejected NSSAI list to another rejected NSSAI list when NSSAA completes unsuccessfully. The Note added with Rev 3 is moved to 4.6.2.2 and resolved.  Rev 3 changes that the UE, based on local policy may instead of “*request*” a S-NSSAI, “remove” a S-NSSAI from the rejected NSSAI for S-NSSAI is not available due to the failed or revoked network slice-specific authorization and authentication. | | | | | | | | |

\*\*\* Next change \*\*\*

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

4G-GUTI 4G-Globally Unique Temporary Identifier

5GCN 5G Core Network

5G-GUTI 5G-Globally Unique Temporary Identifier

5GMM 5GS Mobility Management

5G-RG 5G Residential Gateway

5G-BRG 5G Broadband Residential Gateway

5G-CRG 5G Cable Residential Gateway

5GS 5G System

5GSM 5GS Session Management

5G-S-TMSI 5G S-Temporary Mobile Subscription Identifier

5G-TMSI 5G Temporary Mobile Subscription Identifier

5QI 5G QoS Identifier

AKA Authentication and Key Agreement

AMBR Aggregate Maximum Bit Rate

AMF Access and Mobility Management Function

APN Access Point Name

AUSF Authentication Server Function

CAG Closed access group

DL Downlink

DN Data Network

DNN Data Network Name

eDRX Extended DRX cycle

DS-TT Device-Side TSN Translator

EUI Extended Unique Identifier

E-UTRAN Evolved Universal Terrestrial Radio Access Network

EAP-AKA' Improved Extensible Authentication Protocol method for 3rd generation Authentication and Key Agreement

ECIES Elliptic Curve Integrated Encryption Scheme

EPD Extended Protocol Discriminator

EMM EPS Mobility Management

EPC Evolved Packet Core Network

EPS Evolved Packet System

ESM EPS Session Management

FN-RG Fixed Network RG

FN-BRG Fixed Network Broadband RG

FN-CRG Fixed Network Cable RG

Gbps Gigabits per second

GFBR Guaranteed Flow Bit Rate

GUAMI Globally Unique AMF Identifier

IP-CAN IP-Connectivity Access Network

KSI Key Set Identifier

LADN Local Area Data Network

LCS LoCation Services

LMF Location Management Function

LPP LTE Positioning Protocol

MAC Message Authentication Code

Mbps Megabits per second

MFBR Maximum Flow Bit Rate

MICO Mobile Initiated Connection Only

N3IWF Non-3GPP Inter-Working Function

NAI Network Access Identifier

NITZ Network Identity and Time Zone

NR New Radio

ngKSI Key Set Identifier for Next Generation Radio Access Network

NPN Non-public network

NSSAA Network slice-specific authentication and authorization

NSSAI Network Slice Selection Assistance Information

OS Operating System

OS Id OS Identity

PTI Procedure Transaction Identity

QFI QoS Flow Identifier

QoS Quality of Service

QRI QoS Rule Identifier

RACS Radio Capability Signalling Optimisation

(R)AN (Radio) Access Network

RFSP RAT Frequency Selection Priority

RG Residential Gateway

RPLMN Registered PLMN

RQA Reflective QoS Attribute

RQI Reflective QoS Indication

RSNPN Registered SNPN

S-NSSAI Single NSSAI

SA Security Association

SDF Service Data Flow

SMF Session Management Function

SGC Service Gap Control

SNN Serving Network Name

SNPN Stand-alone Non-Public Network

SOR Steering of Roaming

TA Tracking Area

TAC Tracking Area Code

TAI Tracking Area Identity

Tbps Terabits per second

TMBR Total Maximum Bit Rate

TSC Time Sensitive Communication

TSN Time-Sensitive Networking

UDM Unified Data Management

UL Uplink

UPDS UE policy delivery service

UPF User Plane Function

UPSC UE Policy Section Code

UPSI UE Policy Section Identifier

URN Uniform Resource Name

URSP UE Route Selection Policy

V2XP V2X policy

W-5GAN Wireline 5G Access Network

\*\*\* Next change \*\*\*

### 4.6.1 General

The 5GS supports network slicing as described in 3GPP TS 23.501 [8]. Within a PLMN or SNPN, a network slice is identified by an S-NSSAI, which is comprised of a slice/service type (SST) and a slice differentiator (SD). Inclusion of an SD in an S-NSSAI is optional. A set of one or more S-NSSAIs is called the NSSAI. The following NSSAIs are defined in 3GPP TS 23.501 [8]:

a) configured NSSAI;

b) requested NSSAI;

c) allowed NSSAI; and

d) subscribed S-NSSAIs;

The following NSSAIs are defined in the present document:

a) rejected NSSAI for the current PLMN or SNPN;

b) rejected NSSAI for the current registration area;

b) rejected NSSAI for the failed or revoked NSSAA; and

c) pending NSSAI.

In case of a PLMN, a serving PLMN may configure a UE with the configured NSSAI per PLMN. In addition, the HPLMN may configure a UE with a single default configured NSSAI, and consider the default configured NSSAI as valid in a PLMN for which the UE has neither a configured NSSAI nor an allowed NSSAI. In case of an SNPN, the SNPN may configure a UE with a configured NSSAI applicable to the SNPN.

Editor's note [WI: Vertical\_LAN, CR#1454]: It is FFS whether the default configured NSSAI is supported in an SNPN.

The allowed NSSAI and rejected NSSAI for the current registration area are managed per access type independently, i.e. 3GPP access or non-3GPP access, and is applicable for the registration area. If the registration area contains TAIs belonging to different PLMNs, which are equivalent PLMNs, the allowed NSSAI and the rejected NSSAI for the current registration area are applicable to these PLMNs in this registration area.

The allowed NSSAI that is associated with a registration area containing TAIs belonging to different PLMNs, which are equivalent PLMNs, can be used to form the requested NSSAI for any of the equivalent PLMNs when the UE is outside of the registration area where the allowed NSSAI was received.

When the network slice-specific authentication and authorization procedure is completed for an S-NSSAI that has been in the pending NSSAI, the S-NSSAI will be moved to the allowed NSSAI or rejected NSSAI and communicated to the UE. The pending NSSAI is managed regardless of access type i.e. the pending NSSAI is applicable to both 3GPP access and non-3GPP access even if sent over only one of the accesses.

The rejected NSSAI for the current PLMN or SNPN is applicable for the whole registered PLMN or SNPN. The AMF shall only send a rejected NSSAI for the current PLMN when the registration area consists of TAIs that only belong to the registered PLMN. If the UE receives a rejected NSSAI for the current PLMN, and the registration area also contains TAIs belonging to different PLMNs, the UE shall treat the received rejected NSSAI for the current PLMN as applicable to the whole registered PLMN.

The rejected NSSAI for the failed or revoked NSSAA includes one or more S-NSSAIs that have failed the network slice-specific authentication and authorization or for which the authorization have been revoked, and are applicable for the whole registered PLMN or SNPN.

NOTE: Based on local UE policies, the UE can remove an S-NSSAI from the rejected NSSAI for the failed or revoked NSSAA.

\*\*\* 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.

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 and an access type. Each of the configured NSSAI except the default configured NSSAI, and the rejected NSSAI is associated with a PLMN identity or SNPN identity. The S-NSSAI(s) in the rejected NSSAI for the current registration area are further associated with a registration area 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. There shall be no duplicated PLMN identities or SNPN identities in each of the list of configured NSSAI(s), allowed NSSAI(s), rejected NSSAI(s) for the current PLMN or SNPN, and rejected NSSAI(s) for the current registration area.

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 for the current PLMN or SNPN, rejected NSSAI for the current registration area and rejected NSSAI for the failed or revoked NSSAA; and

5) delete any stored pending NSSAI for the current PLMN or SNPN, if any.

Editor’s Note [WI: eNS, CR#1602]: The NSSAI storage update regarding pending NSSAI in scenario where the UE receives CONFIGURATION UPDATE COMMAND message with configured NSSAI while network slice-specific authentication and authorization is ongoing for the pending NSSAI is FFS.

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], 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 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 a new allowed NSSAI is received for a given PLMN or SNPN. 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 with the new allowed NSSAI for this PLMN or SNPN;

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

3) remove from the stored rejected NSSAI, the S-NSSAI(s), if any, included in the new allowed NSSAI for the current PLMN or SNPN; and

4) remove from the stored pending NSSAI, one or more S-NSSAIs, if any, included in the new allowed NSSAI for the current PLMN or SNPN.

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 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 based on the associated rejection cause(s);

2) remove from the stored allowed NSSAI for the current PLMN or SNPN, 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; and

iii) rejected NSSAI due to the failed or revoked network slice-specific authentication and authorization, for each and every access type;

3) remove from the stored pending NSSAI for the current PLMN or SNPN, one or more S-NSSAIs, 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; and

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

When the UE:

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

ii) successfully registers with a new PLMN; or

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

and the UE is not registered with the current PLMN over another access, the rejected NSSAI for the current PLMN and rejected NSSAI for the failed or revoked NSSAA shall be deleted. Once the UE is deregistered over an access type, the rejected NSSAI for the current registration area corresponding to the access type shall be deleted. The UE shall delete, if any, the stored rejected NSSAI for the current registration area if the UE moves out of the registration area;

d) When the UE receives one or more S-NSSAIs included in pending NSSAI in the REGISTRATION ACCEPT message, the UE shall store one or more S-NSSAIs for the pending NSSAI.

When the UE:

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

ii) successfully registers with a new PLMN; or

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

and the UE is not registered with the current PLMN over another access, the pending NSSAI for the current PLMN shall be deleted; and

e) In case of a PLMN, 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 that the UE has slicing information stored for (excluding the current PLMN). The UE shall not delete the default configured NSSAI. Additionally, the UE shall update the network slicing information for the current PLMN (if received) as specified above in bullets a), b), c) and e).

Editor's note [WI: Vertical\_LAN, CR#1454]: It is FFS whether the Network slicing indication IE can be sent by an SNPN.

\*\*\* Next change \*\*\*

#### 4.6.2.4 Network slice-specific authentication and authorization

The UE and network may support network slice-specific authentication and authorization.

A serving PLMN shall perform network slice-specific authentication and authorization for the S-NSSAIs of the HPLMN which are subject to it based on subscription information. The UE shall indicate whether it supports network slice-specific authentication and authorization in the 5GMM Capability IE in the registration procedure.

The upper layer stores an association between each S-NSSAI and its corresponding credentials for the network slice-specific authentication and authorization.

NOTE: The credentials for network slice-specific authentication and authorization and how to provision them in the upper layer are out of the scope of 3GPP.

The network slice-specific authentication and authorization procedure shall not be performed unless:

a) the primary authentication and key agreement procedure as specified in the subclause 5.4.1 has successfully been completed; and

b) the initial registration procedure or the mobility and periodic registration update procedure has been completed.

The AMF informs the UE about S-NSSAIs subject to network slice-specific authentication and authorization in the pending NSSAI. The AMF handles allowed NSSAI, pending NSSAI, rejected NSSAI, service area list, and 5GS registration result in the REGISTRATION ACCEPT message according to subclauses 5.5.1.2.4 and 5.5.1.3.4.

To perform network slice-specific authentication and authorization for an S-NSSAI, the AMF invokes an EAP- based network slice-specific authorization procedure for the S-NSSAI (see subclause 5.4.7, 3GPP TS 33.501 [24] and 3GPP TS 23.502 [9]).

The AMF updates the allowed NSSAI and the rejected NSSAI using the generic UE configuration update procedure as specified in the subclause 5.4.4 after the network slice-specific authentication and authorization procedure has been performed.

The network slice-specific authentication and authorization procedure can be invoked or revoked by an AMF for a UE supporting network slice-specific authentication and authorization at any time. After the network performs the network slice-specific re-authentication and re-authorization procedure:

a) if network slice-specific authentication and authorization for some but not all S-NSSAIs in the allowed NSSAI fails; the AMF updates the allowed NSSAI and the rejected NSSAI accordingly using the generic UE configuration update procedure as specified in the subclause 5.4.4 and release all PDU session associated with the S-NSSAI for which network slice-specific re-authentication and re-authorization fails; or

b) if network slice-specific authentication and authorization fails for all S-NSSAIs in the allowed NSSAI and the pending NSSAI, then AMF performs the network-initiated de-registration procedure and includes the rejected NSSAI in the DEREGISTRATION REQUEST message as specified in the subclause 5.5.2.3 except when the UE has a PDU session for emergency services or the UE is establishing a PDU session for emergency services. In this case the AMF shall send CONFIGURATION UPDATE COMMAND containing rejected NSSAI and release all PDU session associated with the S-NSSAI for which network slice-specific re-authentication and re-authorization fails. After the PDU session for the emergency service is released, the AMF performs the network-initiated de-registration procedure as specified in the subclause 5.5.2.3.

If authorization is revoked for an S-NSSAI that is in the current allowed NSSAI for an access type, the AMF provides to the UE:

a) a new allowed NSSAI, excluding the S-NSSAI(s) for which the authorization is revoked; and

b) a new rejected NSSAI, including the S-NSSAI for which authorization has been revoked,

using the generic UE configuration update procedure as specified in the subclause 5.4.4 and release all PDU sessions associated with the S-NSSAI for this access type.

Editor's Note: How to secure that a UE does not wait indefinitely for completion of the network slice-specific authentication and authorization is FFS.

\*\*\* Next change \*\*\*

#### 5.4.4.1 General

The purpose of this procedure is to:

a) allow the AMF to update the UE configuration for access and mobility management-related parameters decided and provided by the AMF by providing new parameter information within the command; or

b) request the UE to perform a registration procedure for mobility and periodic registration update towards the network to update access and mobility management-related parameters decided and provided by the AMF (see subclause 5.5.1.3).

This procedure is initiated by the network and can only be used when the UE has an established 5GMM context, and the UE is in 5GMM-CONNECTED mode. When the UE is in 5GMM-IDLE mode, the AMF may use the paging or notification procedure to initiate the generic UE configuration update procedure. The AMF can request a confirmation response in order to ensure that the parameter has been updated by the UE.

This procedure shall be initiated by the network to assign a new 5G-GUTI to the UE after a successful service request procedure invoked as a response to a paging request from the network and before the release of the N1 NAS signalling connection. If the service request procedure was triggered due to 5GSM downlink signalling pending, the procedure for assigning a new 5G-GUTI can be initiated by the network after the transport of the 5GSM downlink signalling.

The following parameters are supported by the generic UE configuration update procedure without the need to request the UE to perform the registration procedure for mobility and periodic registration update:

a) 5G-GUTI;

b) TAI list;

c) Service area list;

d) Network identity and time zone information (Full name for network, short name for network, local time zone, universal time and local time zone, network daylight saving time);

e) LADN information;

f) Rejected NSSAI;

g) void;

h) Operator-defined access category definitions;

i) SMS indication;

j) Service gap time value;

k) "CAG information list";

l) UE radio capability ID; and

m) 5GS registration result.

The following parameters can be sent to the UE with or without a request to perform the registration procedure for mobility and periodic registration update:

a) Allowed NSSAI;

b) Configured NSSAI; or

c) Network slicing subscription change indication.

The following parameter is sent to the UE with a request to perform the registration procedure for mobility and periodic registration update:

a) MICO indication; or

b) UE radio capability ID deletion indication.

The following parameters are sent over 3GPP access only:

a) LADN information;

b) MICO indication;

c) TAI list;

d) Service area list;

e) Service gap time value;

f) "CAG information list"; and

g) UE radio capability ID.

The following parameters are managed and sent per access type i.e., independently over 3GPP access or non 3GPP access:

a) Allowed NSSAI; and

b) Rejected NSSAI (when the NSSAI is rejected for the current registration area).

The following parameters are managed commonly and sent over 3GPP access or non 3GPP access:

a) 5G-GUTI;

b) Network identity and time zone information;

c) Rejected NSSAI (when the NSSAI is rejected for the current PLMN or for the failed or revoked NSSAA);

d) Configured NSSAI;

e) SMS indication;

f) 5GS registration result.



Figure 5.4.4.1.1: Generic UE configuration update procedure

\*\*\* Next change \*\*\*

#### 5.4.4.2 Generic UE configuration update procedure initiated by the network

The AMF shall initiate the generic UE configuration update procedure by sending the CONFIGURATION UPDATE COMMAND message to the UE.

The AMF shall in the CONFIGURATION UPDATE COMMAND message either:

a) include one or more of the following parameters: 5G-GUTI, TAI list, allowed NSSAI that may include the mapped S-NSSAI(s), LADN information, service area list, MICO indication NITZ information, configured NSSAI that may include the mapped S-NSSAI(s), rejected NSSAI, network slicing subscription change indication, operator-defined access category definitions, SMS indication, service gap time value, "CAG information list", UE radio capability ID, 5GS registration result or UE radio capability ID deletion indication;

b) include the Configuration update indication IE with the Registration requested bit set to "registration requested"; or

c) include a combination of both a) and b).

If an acknowledgement from the UE is requested, the AMF shall indicate "acknowledgement requested" in the Acknowledgement bit of the Configuration update indication IE in the CONFIGURATION UPDATE COMMAND message and shall start timer T3555. Acknowledgement shall be requested for all parameters except when only NITZ is included.

To initiate parameter re-negotiation between the UE and network, the AMF shall indicate "registration requested" in the Registration requested bit of the Configuration update indication IE in the CONFIGURATION UPDATE COMMAND message.

If a new allowed NSSAI information or AMF re-configuration of supported S-NSSAIs requires an AMF relocation, the AMF shall indicate "registration requested" in the Registration requested bit of the Configuration update indication IE and include the Allowed NSSAI IE in the CONFIGURATION UPDATE COMMAND message.

If the AMF includes a new configured NSSAI in the CONFIGURATION UPDATE COMMAND message and the new configured NSSAI requires an AMF relocation as specified in 3GPP TS 23.501 [8], the AMF shall indicate "registration requested" in the Registration requested bit of the Configuration update indication IE in the message.

If the AMF indicates "registration requested" in the Registration requested bit of the Configuration update indication IE, acknowledgement shall be requested.

If the CONFIGURATION UPDATE COMMAND message is initiated only due to changes to the allowed NSSAI and these changes require the UE to initiate a registration procedure, but the AMF is unable to determine an allowed NSSAI for the UE as specified in 3GPP TS 23.501 [8], then the CONFIGURATION UPDATE COMMAND message shall indicate "registration requested" in the Registration requested bit of the Configuration update indication IE, and shall not contain any other parameters.

If a network slice-specific authentication and authorization procedure for an S-NSSAI is completed as a:

a) success, the AMF shall include this S-NSSAI in the allowed NSSAI; or

b) failure, the AMF shall include this S-NSSAI in the rejected NSSAI for the failed or revoked NSSAA with the reject cause "S-NSSAI is not available due to the failed or revoked network slice-specific authorization and authentication".

If authorization is revoked for an S-NSSAI that is in the current allowed NSSAI for an access type, the AMF shall:

a) provide a new allowed NSSAI to the UE, excluding the S-NSSAI for which the authorization is revoked; and

b) provide a new reject NSSAI for the failed or revoked NSSAA, including the S-NSSAI for which the authorization is revoked, with the reject cause "S-NSSAI is not available due to the failed or revoked network slice-specific authorization and authentication".

The allowed NSSAI and the rejected NSSAI shall be included in the CONFIGURATION UPDATE COMMAND message to reflect the result of the procedures subject to network slice-specific authentication and authorization.

NOTE: If there are multiple S-NSSAIs subject to network slice-specific authentication and authorization, it is implementation specific if the AMF informs the UE about the outcome of the procedures in one or more CONFIGURATION UPDATE COMMAND messages.

If the AMF includes the Network slicing indication IE in the CONFIGURATION UPDATE COMMAND with the Network slicing subscription change indication set to "Network slicing subscription changed", and changes to the allowed NSSAI require the UE to initiate a registration procedure, but the AMF is unable to determine an allowed NSSAI for the UE as specified in 3GPP TS 23.501 [8], then the CONFIGURATION UPDATE COMMAND message shall additionally indicate "registration requested" in the Registration requested bit of the Configuration update indication IE and shall not include an allowed NSSAI.

If the AMF needs to update the LADN information, the AMF shall include the LADN information in the LADN information IE of the CONFIGURATION UPDATE COMMAND message.

If the AMF needs to update the CAG information, the AMF shall include the CAG information list IE in the CONFIGURATION UPDATE COMMAND message.

During an established 5GMM context, the network may send none, one, or more CONFIGURATION UPDATE COMMAND messages to the UE. If more than one CONFIGURATION UPDATE COMMAND message is sent, the messages need not have the same content.

\*\*\* Next change \*\*\*

#### 5.4.4.3 Generic UE configuration update accepted by the UE

Upon receiving the CONFIGURATION UPDATE COMMAND message, the UE shall stop timer T3346 if running and use the contents to update appropriate information stored within the UE.

If "acknowledgement requested" is indicated in the Acknowledgement bit of the Configuration update indication IE in the CONFIGURATION UPDATE COMMAND message, the UE shall send a CONFIGURATION UPDATE COMPLETE message.

If the UE receives a new 5G-GUTI in the CONFIGURATION UPDATE COMMAND message, the UE shall consider the new 5G-GUTI as valid, the old 5G-GUTI as invalid, stop timer T3519 if running, and delete any stored SUCI; otherwise, the UE shall consider the old 5G-GUTI as valid. The UE shall provide the 5G-GUTI to the lower layer of 3GPP access if the CONFIGURATION UPDATE COMMAND 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 UE receives a new TAI list in the CONFIGURATION UPDATE COMMAND message, the UE shall consider the new TAI list as valid and the old TAI list as invalid; otherwise, the UE shall consider the old TAI list as valid.

If the UE receives a new service area list in the CONFIGURATION UPDATE COMMAND message, the UE shall consider the new service area list as valid and the old service area list as invalid; otherwise, the UE shall consider the old service area list, if any, as valid.

If the UE receives new NITZ information in the CONFIGURATION UPDATE COMMAND message, the UE considers the new NITZ information as valid and the old NITZ information as invalid; otherwise, the UE shall consider the old NITZ information as valid.

If the UE receives a LADN information IE in the CONFIGURATION UPDATE COMMAND message, the UE shall consider the old LADN information as invalid and the new LADN information as valid, if any; otherwise, the UE shall consider the old LADN information as valid.

If the UE receives a new allowed NSSAI for the associated access type in the CONFIGURATION UPDATE COMMAND message, the UE shall consider the new allowed NSSAI as valid for the associated access type, store the allowed NSSAI for the associated access type as specified in subclause 4.6.2.2 and consider the old allowed NSSAI for the associated access type as invalid; otherwise, the UE shall consider the old Allowed NSSAI as valid for the associated access type.

If the UE receives a new configured NSSAI in the CONFIGURATION UPDATE COMMAND message, the UE shall consider the new configured NSSAI for the registered PLMN as valid and the old configured NSSAI for the registered PLMN as invalid; otherwise, the UE shall consider the old configured NSSAI for the registered PLMN as valid The UE shall store the new configured NSSAI as specified in subclause 4.6.2.2.

If the UE receives the Network slicing indication IE in the CONFIGURATION UPDATE COMMAND message 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 UE receives Operator-defined access category definitions IE in the CONFIGURATION UPDATE COMMAND 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 CONFIGURATION UPDATE COMMAND 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 CONFIGURATION UPDATE COMMAND 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 receives the SMS indication IE in the CONFIGURATION UPDATE COMMAND message with the SMS availability indication set to:

a) "SMS over NAS not available", the UE shall consider that SMS over NAS transport is not allowed by the network; and

b) "SMS over NAS available", the UE may request the use of SMS over NAS transport by performing a registration procedure for mobility and periodic registration update as specified in subclause 5.5.1.3, after the completion of the generic UE configuration update procedure.

If the UE receives the CAG information list IE in the CONFIGURATION UPDATE COMMAND message, the UE shall delete any stored "CAG information list" and shall store the received "CAG information list" via the CAG information list IE as specified in annex C.

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

a) If the UE receives the CONFIGURATION UPDATE COMMAND message via a CAG cell, the "allowed CAG list" for the current PLMN in the received "CAG information list" does not include the CAG-ID of the current CAG cell, and:

i) the entry for the current 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] with the updated "CAG information list"; or

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

b) If the UE receives the CONFIGURATION UPDATE COMMAND message via a non-CAG cell and the entry for the current 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 "allowed CAG list" for the current 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 "allowed CAG list" for the current PLMN in the received "CAG information list" does not include any CAG-ID, the UE shall enter the state 5GMM-DEREGISTERED.PLMN-SEARCH and shall apply the PLMN selection process defined in 3GPP TS 23.122 [6] with the updated "CAG information list".

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

a) contains no other parameters or contains at least one of the following parameters: a new allowed NSSAI, a new configured NSSAI or the Network slicing subscription change indication, and:

1) an emergency PDU session exists, the UE shall, after the completion of the generic UE configuration update procedure and the release of the emergency PDU session, release the existing N1 NAS signalling connection, and start a registration procedure for mobility and periodic registration update as specified in subclause 5.5.1.3; or

2) no emergency PDU Session exists, the UE shall, after the completion of the generic UE configuration update procedure and the release of the existing N1 NAS signalling connection, start a registration procedure for mobility and periodic registration update as specified in subclause 5.5.1.3; or

b) an MICO indication is included without a new allowed NSSAI or a new configured NSSAI, the UE shall, after the completion of the generic UE configuration update procedure, start a registration procedure for mobility and registration update as specified in subclause 5.5.1.3 to re-negotiate MICO mode with the network.

The UE receiving the rejected NSSAI in the CONFIGURATION UPDATE COMMAND message takes the following actions based on the rejection cause in the rejected NSSAI:

"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 not attempt to use these S-NSSAI in the current PLMN until switching off the UE, the UICC containing the USIM is removed, or the entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated.

"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 not attempt to use these S-NSSAI 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, or the entry of the "list of subscriber data" with the SNPN identity of the current SNPN is updated.

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

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

If the UE receives a T3447 value IE in the CONFIGURATION UPDATE COMMAND message and has indicated "service gap control supported" in the REGISTRATION REQUEST, then the UE shall replace the stored T3447 value with the received value in the T3447 value IE, and if neither zero nor deactivated use the received T3447 value with the timer T3447 next time it is started. If the received T3447 value is zero or deactivated, then the UE shall stop the timer T3447 if running.

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 CONFIGURATION UPDATE COMMAND message includes:

a) a UE radio capability ID deletion indication IE set to "Network-assigned UE radio capability IDs requested", the UE shall delete any network-assigned UE radio capability IDs associated with the RPLMN or RSNPN 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. If the UE has an applicable manufacturer-assigned UE radio capability ID for the current UE radio configuration, the UE shall include the manufacturer-assigned UE radio capability ID in the UE radio capability ID IE of the REGISTRATION REQUEST message; and

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

If the UE is not currently registered for emergency services and the 5GS registration result IE in the CONFIGURATION UPDATE COMMAND message is set to "Registered for emergency services", the UE shall consider itself registered for emergency services.