**3GPP TSG-CT WG1 Meeting #133-eC1-216905**

**E-meeting, 11-19 November 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **24.501** | **CR** | **3791** | **rev** | **-** | **Current version:** | **17.4.1** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

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|  |
| ***Title:***  | UUAA abnormal case |
|  |  |
| ***Source to WG:*** | NEC |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | ID\_UAS  |  | ***Date:*** | 2021-11-4 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)...Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | Following application specific errors are agreed: * "AUTHENTICATION\_FAILURE" with 403 Forbidden (C4-215408)
* "PEER\_NOT\_RESPONDING" with 504 Gateway Timeout (C4-215380)

"AUTHENTICATION\_FAILURE" with 403 Forbidden is the case that the authentication/authorization process is performed but failed. "PEER\_NOT\_RESPONDING" with 504 Gateway Timeout is the case that no USS e.g., indicated by the UE is found (authentication/authorization process is not performed).This CR intends to reflect the corresponding change to CT1 spec. |
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| ***Summary of change:*** | For UUAA-MM, NW notifies abnormal cause to the UE. For UUAA-SM, NW rejects with abnormal cause.UE notifies the cause to the upper layer.  |
|  |  |
| ***Consequences if not approved:*** | UE does not know the cause of UUAA abnormal failure |
|  |  |
| ***Clauses affected:*** | 2, 5.4.4.2, 5.4.4.3, 6.3.1A.1, 6.4.1.4.3, 9.11.2.14 |
|  |  |
|  | **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 \* \* \* \*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document in the same Release as the present document.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[1A] 3GPP TS 22.011: "Service accessibility".

[2] 3GPP TS 22.101: "Service aspects; Service principles".

[3] 3GPP TS 22.261: "Service requirements for the 5G system; Stage 1".

[4] 3GPP TS 23.003: "Numbering, addressing and identification".

[4A] 3GPP TS 23.040: "Technical realization of Short Message Service (SMS)".

[5] 3GPP TS 23.122: "Non-Access-Stratum functions related to Mobile Station (MS) in idle mode".

[6] 3GPP TS 23.167: "IP Multimedia Subsystem (IMS) emergency sessions".

[6A] 3GPP TS 23.216: "Single Radio Voice Call Continuity (SRVCC); Stage 2".

[6AB] 3GPP TS 23.256: "Support of Uncrewed Aerial Systems (UAS) connectivity, identification and tracking; Stage 2".

[6B] 3GPP TS 23.273: "5G System (5GS) Location Services (LCS); Stage 2".

[6C] 3GPP TS 23.287: "Architecture enhancements for 5G System (5GS) to support Vehicle-to-Everything (V2X) services".

[6D] 3GPP TS 23.316: "Wireless and wireline convergence access support for the 5G System (5GS)".

[6E] 3GPP TS 23.304: "Proximity based Services (ProSe) in the 5G System (5GS)".

[7] 3GPP TS 23.401: "GPRS enhancements for E-UTRAN access".

[8] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[9] 3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[10] 3GPP TS 23.503: "Policy and Charging Control Framework for the 5G System; Stage 2".

[10A] 3GPP TS 23.548: "5G System Enhancements for Edge Computing; Stage 2".

[11] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".

[12] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols; Stage 3".

[13] 3GPP TS 24.011: "Point-to-Point Short Message Service (SMS) support on mobile radio interface".

[13A] 3GPP TS 24.080: "Mobile radio interface layer 3 Supplementary services specification; Formats and coding".

[13B] 3GPP TS 24.193: "Access Traffic Steering, Switching and Splitting; Stage 3".

[13C] 3GPP TS 24.173: "IMS Multimedia telephony communication service and supplementary services; Stage 3".

[14] 3GPP TS 24.229: "IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".

[14A] 3GPP TS 24.250: "Protocol for Reliable Data Service; Stage 3".

[15] 3GPP TS 24.301: "Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3".

[16] 3GPP TS 24.302: "Access to the 3GPP Evolved Packet Core (EPC) via non-3GPP access networks; Stage 3"

[17] 3GPP TS 24.368: "Non-Access Stratum (NAS) configuration Management Object (MO)".

[18] 3GPP TS 24.502: "Access to the 3GPP 5G System (5GS) via non-3GPP access networks; Stage 3".

[19] 3GPP TS 24.526: "UE policies for 5G System (5GS); Stage 3".

[19BA] 3GPP TS 24.539: "5G System (5GS); Network to TSN translator (TT) protocol aspects; Stage 3".

[19A] 3GPP TS 24.535: "Device-Side Time-Sensitive Networking (TSN) Translator (DS-TT) to Network-Side TSN Translator (NW-TT) protocol aspects; Stage 3".

[19B] 3GPP TS 24.587: "Vehicle-to-Everything (V2X) services in 5G System (5GS); Protocol aspects; Stage 3"

[19C] 3GPP TS 24.588: "Vehicle-to-Everything (V2X) services in 5G System (5GS); User Equipment (UE) policies; Stage 3"

[19D] Void.

[19E] 3GPP TS 24.554: "Proximity-service (ProSe) in 5G System (5GS) protocol aspects; Stage 3".[19F] 3GPP TS 24.555: "Proximity-services (ProSe) in 5G System (5GS); User Equipment (UE) policies; Stage 3".

[20] 3GPP TS 24.623: "Extensive Markup Language (XML) Configuration Access Protocol (XCAP) over the Ut interface for Manipulating Supplementary Services".

[20AA] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

[20A] 3GPP TS 29.502: "5G System; Session Management Services; Stage 3".

[20AB] 3GPP TS 29.503: "5G System; Unified Data Management Services; Stage 3".

[20B] 3GPP TS 29.518: "5G System; Access and Mobility Management Services; Stage 3".

[21] 3GPP TS 29.525: "5G System; UE Policy Control Service; Stage 3".

[21A] 3GPP TS 29.526: "5G System; Network Slice-Specific Authentication and Authorization (NSSAA) services; Stage 3".

[21B] 3GPP TS 29.256: "5G System; Uncrewed Aerial Systems Network Function (UAS-NF); Aerial Management Services; Stage 3

[22] 3GPP TS 31.102: "Characteristics of the Universal Subscriber Identity Module (USIM) application".

[22A] 3GPP TS 31.111: "USIM Application Toolkit (USAT)".

[22B] 3GPP TS 31.115: "Secured packet structure for (Universal) Subscriber Identity Module (U)SIM Toolkit applications".

[23] 3GPP TS 33.102: "3G security; Security architecture".

[23A] 3GPP TS 33.401: "3GPP System Architecture Evolution; Security architecture".

[24] 3GPP TS 33.501: "Security architecture and procedures for 5G System".

[24A] 3GPP TS 33.535: "Authentication and Key Management for Applications (AKMA) based on 3GPP credentials in the 5G System (5GS)".

[25] 3GPP TS 36.323: "NR; Packet Data Convergence Protocol (PDCP) specification".

[25A] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC) protocol specification".

[25B] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description".

[25C] 3GPP TS 36.304: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in idle mode".

[25D] 3GPP TS 36.306: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio access capabilities".

[25E] 3GPP TS 36.321: "Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification".

[26] 3GPP TS 36.355: "Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol (LPP)".

[27] 3GPP TS 38.300: "NR; NR and NG-RAN Overall Description; Stage 2".

[28] 3GPP TS 38.304: "New Generation Radio Access Network; User Equipment (UE) procedures in Idle mode".

[29] 3GPP TS 38.323: "Evolved Universal Terrestrial Radio Access (E-UTRA); Packet Data Convergence Protocol (PDCP) specification".

[30] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol Specification".

[31] 3GPP TS 38.413: "NG Radio Access Network (NG-RAN); NG Application Protocol (NGAP)".

[31A] IEEE Std 802.3™-2018: "Ethernet".

[31AA] 3GPP TS 38.509: "Special conformance testing functions for User Equipment (UE)".

[32] IETF RFC 768: "User Datagram Protocol".

[33] IETF RFC 793: "Transmission Control Protocol."

[33A] IETF RFC 3095: "RObust Header Compression (ROHC): Framework and four profiles: RTP, UDP, ESP and uncompressed".

[33B] Void.

[33C] Void.

[33D] IETF RFC 8415: "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)".

[34] IETF RFC 3748: "Extensible Authentication Protocol (EAP)".

[34A] IETF RFC 3843: "RObust Header Compression (ROHC): A Compression Profile for IP".

[35] Void.

[35A] IETF RFC 4122: "A Universally Unique IDentifier (UUID) URN Namespace".

[36] IETF RFC 4191: "Default Router Preferences and More-Specific Routes".

[37] IETF RFC 7542: "The Network Access Identifier".

[38] IETF RFC 4303: "IP Encapsulating Security Payload (ESP)".

[38A] IETF RFC 4815: "RObust Header Compression (ROHC): Corrections and Clarifications to RFC 3095".

[38B] IETF RFC 4861: "Neighbor Discovery for IP version 6 (IPv6)".

[39] IETF RFC 4862: "IPv6 Stateless Address Autoconfiguration".

[39A] IETF RFC 5225: "RObust Header Compression (ROHC) Version 2: Profiles for RTP, UDP, IP, ESP and UDP Lite".

[39B] IETF RFC 5795: "The RObust Header Compression (ROHC) Framework".

[40] IETF RFC 5448: "Improved Extensible Authentication Protocol Method for 3rd Generation Authentication and Key Agreement (EAP-AKA')".

[40A] IETF RFC 6603: "Prefix Exclude Option for DHCPv6-based Prefix Delegation".

[40B] IETF RFC 6846: "RObust Header Compression (ROHC): A Profile for TCP/IP (ROHC-TCP)".

[41] IETF RFC 7296: "Internet Key Exchange Protocol Version 2 (IKEv2)".

[42] ITU-T Recommendation E.212: "The international identification plan for public networks and subscriptions", 2016-09-23.

[43] IEEE Std 802-2014: "IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture" (30 June 2014).

[43A] IEEE Std 802.1AS-2020: "IEEE Standard for Local and metropolitan area networks--Timing and Synchronization for Time-Sensitive Applications".

[43B] IEEE Std 1588™-2019: "IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems".

[43C] Void.

[43D] Void.

[43E] Void.

[44] Void.

[45] Void.

[46] Void.

[47] Void.

[48] IEEE "Guidelines for Use of Extended Unique Identifier (EUI), Organizationally Unique Identifier (OUI), and Company ID (CID)".

[49] BBF TR-069: "CPE WAN Management Protocol".

[50] BBF TR-369: "User Services Platform (USP)".

[51] 3GPP TS 37.340: "Evolved Universal Terrestrial Radio Access (E-UTRA) and NR; Multi-connectivity; Stage 2".

[52] IETF RFC 8106:"IPv6 Router Advertisement Options for DNS Configuration".

[53] 3GPP TS 23.247: "Architectural enhancements for 5G multicast-broadcast services; Stage 2".

[54] 3GPP TS 23.380: "IMS Restoration Procedures".

\* \* \* 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 S-NSSAI(s) in the Rejected NSSAI IE or in the Extended rejected NSSAI IE, 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, UE radio capability ID deletion indication, truncated 5G-S-TMSI configuration or T3447 value;

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 the UE is registering or registered for onboarding services in SNPN, the serving SNPN shall not provide the configured NSSAI, the allowed NSSAI or the rejected NSSAI to the UE.

If the UE supports extended rejected NSSAI in roaming scenarios, the rejected S-NSSAI(s) shall be included in the Extended rejected NSSAI IE. Otherwise the rejected S-NSSAI(s) shall be included in the Rejected NSSAI IE.

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.

NOTE 1: Generic UE configuration update procedure can be initiated by the AMF for updating the emergency number list, the extended emergency number list or both by indicating "registration requested" in the Registration requested bit of the Configuration update indication IE in the CONFIGURATION UPDATE COMMAND message to the UE.

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 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 the AMF needs to enforce a change in the restriction on the use of enhanced coverage or use of CE mode B as described in subclause 5.3.18, the AMF shall indicate "registration requested" in the Registration requested bit of the Configuration update indication IE and "release of N1 NAS signalling connection not required" in the Signalling connection maintain request bit of the Additional configuration indication IE in the CONFIGURATION UPDATE COMMAND message.

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 over the same access of the requested S-NSSAI; or

b) failure, the AMF shall include this S-NSSAI in the rejected NSSAI for the failed or revoked NSSAA with the rejection cause "S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization" over either 3GPP access or non-3GPP access.

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

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

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

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 2: 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 message 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 EAC mode is activated, the AMF shall perform NSAC for S-NSSAI(s) subject to NSAC before such S-NSSAI(s) are included in the allowed NSSAI in the CONFIGURATION UPDATE COMMAND message. If EAC mode is deactivated, the AMF shall perform NSAC for S-NSSAI(s) subject to NSAC after such S-NSSAI(s) are included in the allowed NSSAI in the CONFIGURATION UPDATE COMMAND message.

If the UE supports extended rejected NSSAI and the AMF determines that maximum number of UEs reached for one or more S-NSSAI(s) in the allowed 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 CONFIGURATION UPDATE COMMAND 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 CONFIGURATION UPDATE COMMAND 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 PLMN or SNPN" in the Rejected NSSAI IE and should not include these S-NSSAIs in the allowed NSSAI in the CONFIGURATION UPDATE COMMAND message.NOTE 3: 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 PLMN or SNPN".

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

a) has an emergency PDU session; and

b) is in

1) a CAG cell and none of the CAG-ID(s) supported by the CAG cell is included in the "allowed CAG list" for the current PLMN in the updated "CAG information list"; or

2) a non-CAG cell and the entry for the current PLMN in the updated "CAG information list" includes an "indication that the UE is only allowed to access 5GS via CAG cells";

the AMF may indicate to the SMF to perform a local release of all non-emergency PDU sessions associated with 3GPP access. 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, 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 CONFIGURATION UPDATE COMMAND message.

If the AMF:

- updated the "CAG information list" to remove one or more CAG-ID(s) in the Allowed CAG list for the serving PLMN or an equivalent PLMN; or

- updated the "CAG information list" to set the "indication that the UE is only allowed to access 5GS via CAG cells" for the serving PLMN or an equivalent PLMN which was not set before,

then upon completion of the configuration update procedure and if the UE does not have an emergency PDU session, the AMF shall initiate the release of the N1 NAS signalling connection according to subclause 5.3.1.3.

If the AMF needs to update the truncated 5G-S-TMSI configuration for a UE in NB-N1 mode using control plane CIoT 5GS optimization, the AMF shall include the Truncated 5G-S-TMSI configuration IE in the CONFIGURATION UPDATE COMMAND message.

If the AMF includes a UE radio capability ID deletion indication IE in the CONFIGURATION UPDATE COMMAND message, the AMF shall indicate "registration requested" in the Registration requested bit of the Configuration update indication IE.

If the AMF needs to redirect the UE to EPC as described in subclause 4.8.4A.2, the AMF shall indicate "registration requested" in the Registration requested bit of the Configuration update indication IE and "release of N1 NAS signalling connection not required" in the Signalling connection maintain request bit of the Additional configuration indication IE in the CONFIGURATION UPDATE COMMAND message.

If the UE is not in NB-N1 mode and the UE supports RACS, the AMF may include either a UE radio capability ID IE or a UE radio capability ID deletion indication 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.

If the AMF needs to deliver to the UE the Service-level-AA payload and the result of the UUAA-MM procedure received from the UAS-NF, the AMF shall include the Service-level-AA payload and the Service-level-AA response in the Service-level-AA container IE of the CONFIGURATION UPDATE COMMAND message. If the CAA-Level UAV ID is received from the UAS-NF as part of the UUAA-MM procedure, the AMF shall include the service-level device ID in the Service-level-AA container IE of the CONFIGURATION UPDATE COMMAND message and set the value to the received CAA-Level UAV ID.

If the AMF detects that the UUAA-MM procedure is

a) succeeded as specified in 3GPP TS 29.256 [21B], the AMF shall set the service-level-AA response to "Service level authentication and authorization was successful";

b) failed due to authentication failure ("AUTHENTICATION\_FAILURE" as specified in 3GPP TS 29.256 [21B]), the AMF shall set the service-level-AA response to "Service level authentication and authorization was not successful".

If the AMF detects that the UUAA-MM procedure is failed due to abnormal case ("PEER\_NOT\_RESPONDING" as specified in 3GPP TS 29.256 [21B]), the AMF shall set the service-level-AA response to "USS not available".

\* \* \* 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 truncated 5G-S-TMSI configuration in the CONFIGURATION UPDATE COMMAND message, the UE shall consider the new truncated 5G-S-TMSI configuration as valid and the old truncated 5G-S-TMSI configuration as invalid; otherwise, the UE shall consider the old truncated 5G-S-TMSI configuration 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:

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

NOTE 1: When the UE receives the CAG information list IE in the HPLMN derived from the IMSI, the EHPLMN list is present and is not empty and the HPLMN is not present in the EHPLMN list, the UE behaves as if it receives the CAG information list IE in a VPLMN.

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 when the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN; or

NOTE 2: When the UE receives the CAG information list IE in a serving PLMN other than the HPLMN or EHPLMN, entries of a PLMN other than the serving VPLMN, if any, in the received CAG information list IE are ignored.

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 in a serving PLMN other than the HPLMN or EHPLMN and the 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 as specified in annex C.

If the received "CAG information list" includes an entry containing the identity of the current PLMN and the UE had set the CAG bit to "CAG supported" in the 5GMM capability IE of the REGISTRATION REQUEST message, the UE shall operate as follows.

a) If the UE receives the CONFIGURATION UPDATE COMMAND message via a CAG cell, the entry for the current 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 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] or 3GPP TS 36.304 [25C] with the updated "CAG information list"; or

2) 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 entry 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 entry for the current 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 [6] 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 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:

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 entry for the current 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 [6] 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 current PLMN and the UE receives the CONFIGURATION UPDATE COMMAND 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 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;

b) a MICO indication is included without a new allowed NSSAI; a new configured NSSAI or the Network slicing subscription change indication, 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;

c) an Additional configuration indication IE is included, and:

1) "release of N1 NAS signalling connection not required" is indicated in the Signalling connection maintain request bit of the Additional configuration indication IE; and

2) a new allowed NSSAI, a new configured NSSAI and the Network slicing subscription change indication is not included in the CONFIGURATION UPDATE COMMAND message,

 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; or

d) a UE radio capability ID deletion indication IE set to "Network-assigned UE radio capability IDs deletion requested" is included, and:

1) the UE is not in NB-N1 mode;

2) a new allowed NSSAI, a new configured NSSAI or a Network slicing subscription change indication is not included; and

3) the UE has set the RACS bit to "RACS supported" in the 5GMM capability IE of the REGISTRATION REQUEST message,

 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.

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

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

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

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

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

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

b) start the timer T3526 with:

1) the back-off timer value received along with the S-NSSAI, if 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 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 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; or

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 value in the CONFIGURATION UPDATE COMMAND 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.

If the UE receives the service-level-AA container IE of the CONFIGURATION UPDATE COMMAND message, the UE passes it to the upper layer.

Editor's note: It is FFS how to identify the application for which [service-level-AA container IE] is transferred.

If the UUAA-MM procedure fails due to abnormal cases where the UE receives "USS not available" in the service-level-AA response, the UE informs the upper layers of the abnormal failure of the UUAA-MM procedure.

NOTE 3: This can result in the upper layers requesting other implementation specific mechanisms, e.g. retry with another USS address.

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

#### 6.3.1A.1 General

The purpose of the service-level authentication and authorization procedure is to enable the DN using NEF services for authentication:

a) to authenticate the upper layers of the UE, when establishing the PDU session;

b) to authorize the upper layers of the UE, when establishing the PDU session;

c) both of the above; or

d) to re-authenticate the upper layers of the UE after establishment of the PDU session.

The service-level authentication and authorization procedure is used for UUAA as specified in TS 23.256 [6AB].

NOTE : The authentication protocol for UUAA is out of scope of 3GPP in this release of specification.

The service-level authentication and authorization procedure can be performed only during or after the UE-requested PDU session procedure establishing a non-emergency PDU session. The service-level authentication and authorization procedure shall not be performed during or after the UE-requested PDU session establishment procedure establishing an emergency PDU session.

If the service-level authentication and authorization procedure is performed during the UE-requested PDU session establishment procedure:

c) and the service-level AA procedure of the UE completes successfully, the service-level AA response is transported from the network to the UE as a part of the UE-requested PDU session establishment procedure in the PDU SESSION ESTABLISHMENT ACCEPT message.

d) and the service-level AA procedure of the UE completes unsuccessfully, the service-level AA response is transported from the network to the UE as a part of the UE-requested PDU session establishment procedure in the PDU SESSION ESTABLISHMENT REJECT message.

If the service-level authentication and authorization procedure is used for UUAA and is failed due to abnormal case ("PEER\_NOT\_RESPONDING" as specified in 3GPP TS 29.256 [21B]), the service-level AA response transported from the network to the UE as a part of the UE-requested PDU session establishment procedure in the PDU SESSION ESTABLISHMENT REJECT message is set to "USS not available".

There can be several rounds of exchange of a service-level AA payload for the service to complete the service-level authentication and authorization of the request for a PDU session (see example in figure 6.3.1A.1-1)



Figure 6.3.1A.1-1: Service-level authentication and authorization procedure

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

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

If the 5GSM cause value is different from #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", and the Back-off timer value IE is included, the UE shall behave as follows: (if the UE is a UE configured for high priority access in selected PLMN, exceptions are specified in subclause 6.2.12):

a) if the timer value indicates neither zero nor deactivated and:

1) if the UE provided a DNN and S-NSSAI to the network during the PDU session establishment and the 5GSM cause value is different from #27 "missing or unknown DNN", the UE shall start the back-off timer with the value provided in the Back-off timer value IE for the PDU session establishment procedure and [PLMN, DNN, (mapped) HPLMN S-NSSAI] combination. The UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message for the same DNN and (mapped) HPLMN S-NSSAI in the current PLMN, until the back-off timer expires, 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 UE does not support access to an SNPN using credentials from a credentials holder, or the selected entry of the "list of subscriber data" is updated if the UE supports access to an SNPN using credentials from a credentials holder;

2) if the UE provided a DNN to the network during the PDU session establishment and the 5GSM cause value is #27 "missing or unknown DNN", the UE shall start the back-off timer with the value provided in the Back-off timer value IE for the PDU session establishment procedure and [PLMN, DNN] combination. The UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message for the same DNN in the current PLMN, until the back-off timer expires, 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 UE does not support access to an SNPN using credentials from a credentials holder, or the selected entry of the "list of subscriber data" is updated if the UE supports access to an SNPN using credentials from a credentials holder;

3) if the UE did not provide a DNN or S-NSSAI or any of the two parameters to the network during the PDU session establishment and the 5GSM cause value is different from #27 "missing or unknown DNN", it shall start the back-off timer accordingly for the PDU session establishment procedure and the [PLMN, DNN, no S-NSSAI], [PLMN, no DNN, (mapped) HPLMN S-NSSAI] or [PLMN, no DNN, no S-NSSAI] combination. Dependent on the combination, the UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message for the same [PLMN, DNN, no S-NSSAI], [PLMN, no DNN, (mapped) HPLMN S-NSSAI] or [PLMN, no DNN, no S-NSSAI] combination in the current PLMN, until the back-off timer expires, 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 UE does not support access to an SNPN using credentials from a credentials holder, or the selected entry of the "list of subscriber data" is updated if the UE supports access to an SNPN using credentials from a credentials holder; or

4) if the UE did not provide a DNN to the network during the PDU session establishment and the 5GSM cause value is #27 "missing or unknown DNN", it shall start the back-off timer accordingly for the PDU session establishment procedure and the [PLMN, no DNN] combination. The UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message for the same [PLMN, no DNN] in the current PLMN, until the back-off timer expires, 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 UE does not support access to an SNPN using credentials from a credentials holder, or the selected entry of the "list of subscriber data" is updated if the UE supports access to an SNPN using credentials from a credentials holder;

b) if the timer value indicates that this timer is deactivated and:

1) if the UE provided a DNN and S-NSSAI to the network during the PDU session establishment and the 5GSM cause value is different from #27 "missing or unknown DNN", the UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message for the same DNN and (mapped) HPLMN S-NSSAI in the current PLMN, 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 UE does not support access to an SNPN using credentials from a credentials holder, or the selected entry of the "list of subscriber data" is updated if the UE supports access to an SNPN using credentials from a credentials holder;

2) if the UE provided a DNN to the network during the PDU session establishment and the 5GSM cause value is #27 "missing or unknown DNN", the UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message for the same DNN in the current PLMN, 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 UE does not support access to an SNPN using credentials from a credentials holder, or the selected entry of the "list of subscriber data" is updated if the UE supports access to an SNPN using credentials from a credentials holder;

3) if the UE did not provide a DNN or S-NSSAI or any of the two parameters to the network during the PDU session establishment and the 5GSM cause value is different from #27 "missing or unknown DNN", the UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message for the same [PLMN, DNN, no S-NSSAI], [PLMN, no DNN, (mapped) HPLMN S-NSSAI] or [PLMN, no DNN, no S-NSSAI] combination in the current PLMN, 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 UE does not support access to an SNPN using credentials from a credentials holder, or the selected entry of the "list of subscriber data" is updated if the UE supports access to an SNPN using credentials from a credentials holder; or

4) if the UE did not provide a DNN to the network during the PDU session establishment and the 5GSM cause value is #27 "missing or unknown DNN", the UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message for the same [PLMN, no DNN] in the current PLMN, 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 UE does not support access to an SNPN using credentials from a credentials holder, or the selected entry of the "list of subscriber data" is updated if the UE supports access to an SNPN using credentials from a credentials holder; and

c) if the timer value indicates zero and the 5GSM cause value is different from #27 "missing or unknown DNN", the UE may send another PDU SESSION ESTABLISHMENT REQUEST message for the same combination of [PLMN, DNN, (mapped) HPLMN S-NSSAI], [PLMN, DNN, no S-NSSAI], [PLMN, no DNN, (mapped) HPLMN S-NSSAI], or [PLMN, no DNN, no S-NSSAI] in the current PLMN. If the timer value indicates zero and the 5GSM cause value is #27 "missing or unknown DNN", the UE may send another PDU SESSION ESTABLISHMENT REQUEST message for the same combination of [PLMN, DNN], or [PLMN, no DNN] in the current PLMN.

If the Back-off timer value IE is not included, then the UE shall ignore the Re-attempt indicator IE provided by the network in the PDU SESSION ESTABLISHMENT REJECT message, if any.

a) Additionally, if the 5GSM cause value is #8 "operator determined barring", #32 "service option not supported", #33 "requested service option not subscribed" or #70 "missing or unknown DNN in a slice", then:

1) the UE not operating in SNPN access operation mode shall proceed as follows:

i) if the UE is registered in the HPLMN or in a PLMN that is within the EHPLMN list, the UE shall behave as described above in the present subclause using the configured SM Retry Timer value as specified in 3GPP TS 24.368 [17] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [22], if available, as back-off timer value; and

NOTE 0: The way to choose one of the configured SM Retry Timer values for back-off timer value is up to UE implementation if the UE is configured with:
- an SM Retry Timer value in ME as specified in 3GPP TS 24.368 [17]; and
- an SM Retry Timer value in USIM file NASCONFIG as specified in 3GPP TS 31.102 [22].

ii) otherwise, if the UE is not registered in its HPLMN or in a PLMN that is within the EHPLMN list, or if the SM Retry Timer value is not configured, the UE shall behave as described above in the present subclause, using the default value of 12 minutes for the back-off timer; or

2) the UE operating in SNPN access operation mode shall proceed as follows:

i) if:

A) the SM Retry Timer value for the current SNPN as specified in 3GPP TS 24.368 [17] is available; or

B) the UE used the USIM for registration to the current SNPN and the SM Retry Timer value in USIM file NASCONFIG as specified in 3GPP TS 31.102 [22] is available;

 then the UE shall behave as described above in the present subclause using the configured SM Retry Timer value as back-off timer value; or

NOTE 1: The way to choose one of the configured SM Retry Timer values for back-off timer value is up to UE implementation if both conditions in bullets A) and B) above are satisfied.

ii) otherwise, the UE shall behave as described above in the present subclause, using the default value of 12 minutes for the back-off timer.

b) For 5GSM cause value #27 "missing or unknown DNN", then:

1) the UE not operating in SNPN access operation mode shall proceed as follows:

i) if the UE is registered in the HPLMN or in a PLMN that is within the EHPLMN list, the UE shall start the back-off timer with the configured SM Retry Timer value as specified in 3GPP TS 24.368 [17] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [22], if available, as back-off timer value for the PDU session establishment procedure and the [PLMN, DNN] or [PLMN, no DNN] combination. The UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message for the same DNN in the current PLMN, until the back-off timer expires, the UE is switched off or the USIM is removed; and

NOTE 1a: The way to choose one of the configured SM Retry Timer values for back-off timer value is up to UE implementation if the UE is configured with:
- an SM Retry Timer value in ME as specified in 3GPP TS 24.368 [17]; and
- an SM Retry Timer value in USIM file NASCONFIG as specified in 3GPP TS 31.102 [22].

ii) otherwise, if the UE is not registered in its HPLMN or in a PLMN that is within the EHPLMN list, or if the SM Retry Timer value is not configured, the UE shall start the back-off timer with the default value of 12 minutes as back-off timer value for the PDU session establishment procedure and the [PLMN, DNN] or [PLMN, no DNN] combination. The UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message for the same DNN in the current PLMN, until the back-off timer expires, the UE is switched off or the USIM is removed; or

2) the UE operating in SNPN access operation mode shall proceed as follows:

i) if:

A) the SM Retry Timer value for the current SNPN as specified in 3GPP TS 24.368 [17] is available; or

B) the UE used the USIM for registration to the current SNPN and the SM Retry Timer value in USIM file NASCONFIG as specified in 3GPP TS 31.102 [22] is available;

 then:

- if the UE does not support access to an SNPN using credentials from a credentials holder, the UE shall start the back-off timer with the configured SM Retry Timer value as back-off timer value for the PDU session establishment procedure and the [SNPN, DNN] or [SNPN, no DNN] combination. The UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message for the same DNN in the current SNPN, until the back-off timer expires, the UE is switched off, or the entry in the "list of subscriber data" for the current SNPN is updated; and

- if the UE supports access to an SNPN using credentials from a credentials holder, the UE shall start the back-off timer with the configured SM Retry Timer value as back-off timer value for the PDU session establishment procedure and the [SNPN, selected entry of the "list of subscriber data" or selected PLMN subscription, DNN] or [SNPN, selected entry of the "list of subscriber data" or selected PLMN subscription, no DNN] combination. The UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message for the same DNN in the current SNPN using the selected entry in the "list of subscriber data" or selected PLMN subscription, until the back-off timer expires, the UE is switched off, the UICC containing the USIM is removed or the selected entry of the "list of subscriber data" is updated; or

NOTE 2: The way to choose one of the configured SM Retry Timer values for back-off timer value is up to UE implementation if both conditions in bullets A) and B) above are satisfied.

ii) otherwise:

- if the UE does not support access to an SNPN using credentials from a credentials holder, the UE shall start the back-off timer with the default value of 12 minutes as back-off timer value for the PDU session establishment procedure and the [SNPN, DNN] or [SNPN, no DNN] combination. The UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message for the same DNN in the current SNPN, until the back-off timer expires, the UE is switched off, or the entry in the "list of subscriber data" for the current SNPN is updated; and

- if the UE supports access to an SNPN using credentials from a credentials holder, the UE shall start the back-off timer with the default value of 12 min as back-off timer value for the PDU session establishment procedure and the [SNPN, selected entry of the "list of subscriber data" or selected PLMN subscription, DNN] or [SNPN, selected entry in the "list of subscriber data" or selected PLMN subscription, no DNN] combination. The UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message for the same DNN in the current SNPN using the selected entry of the "list of subscriber data", until the back-off timer expires, the UE is switched off, the UICC containing the USIM is removed or the selected entry of the "list of subscriber data" is updated; and

c) For 5GSM cause values different from #8 "operator determined barring", #27 "missing or unknown DNN", #32 "service option not supported", #33 "requested service option not subscribed" and #70 "missing or unknown DNN in a slice", the UE behaviour regarding the start of a back-off timer is unspecified.

The UE shall not stop any back-off timer:

a) upon a PLMN change;

b) upon an inter-system change; or

c) upon registration over another access type.

If the network indicates that a back-off timer for the PDU session establishment procedure is deactivated, then it remains deactivated;

a) upon a PLMN change;

b) upon an inter-system change; or

c) upon registration over another access type.

NOTE 3: This means the back-off timer can still be running or be deactivated for the given 5GSM procedure when the UE returns to the PLMN or when it performs inter-system change back from S1 mode to N1 mode. Thus, the UE can still be prevented from sending another PDU SESSION ESTABLISHMENT REQUEST message for the combination of [PLMN, DNN, (mapped) HPLMN S-NSSAI], [PLMN, DNN, no S-NSSAI], [PLMN, no DNN, (mapped) HPLMN S-NSSAI], [PLMN, no DNN, no S-NSSAI] , [PLMN, DNN], or [PLMN, no DNN] in the PLMN.

If the back-off timer is started upon receipt of a PDU SESSION ESTABLISHMENT REJECT (i.e. the timer value was provided by the network, a configured value is available or the default value is used as explained above) or the back-off timer is deactivated, the UE behaves as follows:

a) after a PLMN change:

1) the UE may send a PDU SESSION ESTABLISHMENT REQUEST message for the combination of [new PLMN, DNN, (mapped) HPLMN S-NSSAI], [new PLMN, DNN, no S-NSSAI], [new PLMN, no DNN, (mapped) HPLMN S-NSSAI], or [new PLMN, no DNN, no S-NSSAI] in the new PLMN, if the back-off timer is not running and is not deactivated for the PDU session establishment procedure and the combination of [new PLMN, DNN, (mapped) HPLMN S-NSSAI], [new PLMN, DNN, no S-NSSAI], [new PLMN, no DNN, (mapped) HPLMN S-NSSAI], or [new PLMN, no DNN, no S-NSSAI];

2) as an implementation option, for the 5GSM cause value #8 "operator determined barring", #32 "service option not supported", #33 "requested service option not subscribed" and #70 "missing or unknown DNN in a slice", if the network does not include a Re-attempt indicator IE, the UE may decide not to automatically send another PDU SESSION ESTABLISHMENT REQUEST message for the same combination of [PLMN, DNN, (mapped) HPLMN S-NSSAI], [PLMN, DNN, no S-NSSAI], [PLMN, no DNN, (mapped) HPLMN S-NSSAI], or [PLMN, no DNN, no S-NSSAI] using the same PDU session type if the UE is registered to a new PLMN which is in the list of equivalent PLMNs; and

3) as an implementation option, for the 5GSM cause value #27 "missing or unknown DNN", if the network does not include a Re-attempt indicator IE, the UE may decide not to automatically send another PDU SESSION ESTABLISHMENT REQUEST message for the same combination of [PLMN, DNN] or [PLMN, no DNN] using the same PDU session type if the UE is registered to a new PLMN which is in the list of equivalent PLMNs;

b) if the network does not include the Re-attempt indicator IE to indicate whether re-attempt in S1 mode is allowed, or the UE ignores the Re-attempt indicator IE, e.g. because the Back-off timer value IE is not included, then:

1) if the UE is registered in its HPLMN or in a PLMN that is within the EHPLMN list and the back-off timer is running for the combination of [PLMN, DNN, (mapped) HPLMN S-NSSAI] or [PLMN, DNN, no S-NSSAI], the UE shall apply the configured value SM\_RetryAtRATChange value as specified in 3GPP TS 24.368 [17] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [22], if available, to determine whether the UE may attempt a PDN connectivity procedure for the same [PLMN, DNN] combination in S1 mode. If the back-off timer is running for the combination of [PLMN, no DNN, (mapped) HPLMN S-NSSAI] or [PLMN, no DNN, no S-NSSAI], the same applies for the PDN connectivity procedure for the [PLMN, no DNN] combination in S1 mode accordingly; and

2) if the UE is not registered in its HPLMN or in a PLMN that is within the EHPLMN list, or if the NAS configuration MO as specified in 3GPP TS 24.368 [17] is not available and the value for inter-system change is not configured in the USIM file NASCONFIG, then the UE behaviour regarding a PDN connectivity procedure for the same [PLMN, DNN] or [PLMN, no DNN] combination in S1 mode is unspecified; and

c) if the network includes the Re-attempt indicator IE indicating that re-attempt in an equivalent PLMN is not allowed, then depending on the timer value received in the Back-off timer value IE, for each combination of a PLMN from the equivalent PLMN list and the respective [DNN, (mapped) HPLMN S-NSSAI], [DNN, no S-NSSAI], [no DNN, (mapped) HPLMN S-NSSAI], or [no DNN, no S-NSSAI] combination, the UE shall start a back-off timer for the PDU session establishment procedure with the value provided by the network, or deactivate the respective back-off timer as follows:

1) if the Re-attempt indicator IE additionally indicates that re-attempt in S1 mode is allowed, the UE shall start or deactivate the back-off timer for N1 mode only; and

2) otherwise, the UE shall start or deactivate the back-off timer for S1 and N1 mode.

If the back-off timer for a [PLMN, DNN] or [PLMN, no DNN] combination, was started or deactivated in S1 mode upon receipt of PDN CONNECTIVITY REJECT message (see 3GPP TS 24.301 [15]) and the network indicated that re-attempt in N1 mode is allowed, then this back-off timer does not prevent the UE from sending a PDU SESSION ESTABLISHMENT REQUEST message in this PLMN for the same DNN, or without DNN, after inter-system change to N1 mode. If the network indicated that re-attempt in N1 mode is not allowed, the UE shall not send any PDU SESSION ESTABLISHMENT REQUEST message in this PLMN for the same DNN in combination with any S-NSSAI or without S-NSSAI, or in this PLMN without DNN in combination with any S-NSSAI or without S-NSSAI, after inter-system change to N1 mode until the timer expires, the UE is switched off or the USIM is removed.

NOTE 4: The back-off timer is used to describe a logical model of the required UE behaviour. This model does not imply any specific implementation, e.g. as a timer or timestamp.

NOTE 5: Reference to back-off timer in this section can either refer to use of timer T3396 or to use of a different packet system specific timer within the UE. Whether the UE uses T3396 as a back-off timer or it uses different packet system specific timers as back-off timers is left up to UE implementation.

When the back-off timer is running or the timer is deactivated, the UE is allowed to initiate a PDU session establishment procedure if the procedure is for emergency services.

If the 5GSM cause value is #28 "unknown PDU session type" and the PDU SESSION ESTABLISHMENT REQUEST message contained a PDU session type IE indicating a PDU session type, the UE shall ignore the Back-off timer value IE and Re-attempt indicator IE provided by the network, if any. The UE may send another PDU SESSION ESTABLISHMENT REQUEST message with the PDU session type IE indicating another PDU session type or without the PDU session type IE, e.g. using another value which can be used for the rejected component in the same route selection descriptor as specified in 3GPP TS 24.526 [19]. The behaviour of the UE for 5GSM cause value #28 also applies if the PDU session is a MA PDU Session.

If the 5GSM cause value is #39 "reactivation requested", the UE shall ignore the Back-off timer value IE and Re-attempt indicator IE provided by the network, if any.

NOTE 6: Further UE behaviour upon receipt of 5GSM cause value #39 is up to the UE implementation.

If the 5GSM cause value is #46 "out of LADN service area", the UE shall ignore the Back-off timer value IE and Re-attempt indicator IE provided by the network, if any. The UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message or another PDU SESSION MODIFICATION REQUEST message for the LADN DNN provided by the UE during the PDU session establishment procedure until the LADN information for the specific LADN DNN is updated as described in subclause 5.4.4 and subclause 5.5.1. The UE shall not indicate the PDU session(s) for the LADN DNN provided by the UE during the PDU session establishment procedure in the Uplink data status IE included in the SERVICE REQUEST message until the LADN information for the specific LADN DNN is updated as described in subclause 5.4.4 and subclause 5.5.1.

If the 5GSM cause value is #50 "PDU session type IPv4 only allowed", #51 "PDU session type IPv6 only allowed", #57 "PDU session type IPv4v6 only allowed", #58 "PDU session type Unstructured only allowed", or #61 "PDU session type Ethernet only allowed", the UE shall ignore the Back-off timer value IE provided by the network, if any. The UE shall evaluate the URSP rules if available as specified in 3GPP TS 24.526 [19]. The UE shall not subsequently send another PDU SESSION ESTABLISHMENT REQUEST message for the same DNN (or no DNN, if no DNN was indicated by the UE) and the same (mapped) HPLMN S-NSSAI (or no S-NSSAI, if no S-NSSAI was indicated by the UE) to obtain a PDU session type different from the one allowed by the network until any of the following conditions is fulfilled:

a) the UE is registered to a new PLMN which was not in the list of equivalent PLMNs at the time when the PDU SESSION ESTABLISHMENT REJECT message was received;

b) the UE is registered to a new PLMN which was in the list of equivalent PLMNs at the time when the PDU SESSION ESTABLISHMENT REJECT message was received, and either the network did not include a Re-attempt indicator IE in the PDU SESSION ESTABLISHMENT REJECT message or the Re-attempt indicator IE included in the message indicated that re-attempt in an equivalent PLMN is allowed;

c) void;

d) the UE is switched off; or

e) the USIM is removed, the entry in the "list of subscriber data" for the current SNPN is updated if the UE does not support access to an SNPN using credentials from a credentials holder, or the selected entry of the "list of subscriber data" is updated if the UE supports access to an SNPN using credentials from a credentials holder.

For the 5GSM cause values #50 "PDU session type IPv4 only allowed", #51 "PDU session type IPv6 only allowed", #57 "PDU session type IPv4v6 only allowed", #58 "PDU session type Unstructured only allowed", and #61 "PDU session type Ethernet only allowed", the UE shall ignore the value of the RATC bit in the Re-attempt indicator IE provided by the network, if any.

NOTE 7: For the 5GSM cause values #50 "PDU session type IPv4 only allowed", #51 "PDU session type IPv6 only allowed", #57 "PDU session type IPv4v6 only allowed", #58 "PDU session type Unstructured only allowed", and #61 "PDU session type Ethernet only allowed", re-attempt in S1 mode for the same DNN (or no DNN, if no DNN was indicated by the UE) is only allowed using the PDU session type(s) indicated by the network using the same PDU session type is not allowed.

If the 5GSM cause value is #54 "PDU session does not exist", the UE shall ignore the Back-off timer value IE and Re-attempt indicator IE provided by the network, if any. If the PDU session establishment procedure is to perform handover of an existing PDU session between 3GPP access and non-3GPP access, the UE shall release locally the existing PDU session with the PDU session ID included in the PDU SESSION ESTABLISHMENT REJECT message. The UE may initiate another UE-requested PDU session establishment procedure with the request type set to "initial request" in the subsequent PDU SESSION ESTABLISHMENT REQUEST message to establish a PDU session with the same DNN (or no DNN, if no DNN was indicated by the UE) and the same (mapped) HPLMN S-NSSAI (or no S-NSSAI, if no S-NSSAI was indicated by the UE).

NOTE 8: User interaction is necessary in some cases when the UE cannot re-establish the PDU session(s) automatically.

If the 5GSM cause value is #68 "not supported SSC mode", the UE shall ignore the Back-off timer value IE and Re-attempt indicator IE provided by the network, if any. The UE shall evaluate the URSP rules if available as specified in 3GPP TS 24.526 [19]. The UE shall not subsequently send another PDU SESSION ESTABLISHMENT REQUEST message for the same DNN (or no DNN, if no DNN was indicated by the UE) and the same (mapped) HPLMN S-NSSAI (or no S-NSSAI, if no S-NSSAI was indicated by the UE) using the same SSC mode or an SSC mode which was not included in the Allowed SSC mode IE until any of the following conditions is fulfilled:

a) the UE is registered to a new PLMN which was not in the list of equivalent PLMNs at the time when the PDU SESSION ESTABLISHMENT REJECT message was received;

b) the SSC mode which is used to access to the DNN (or no DNN, if no DNN was indicated by the UE) and the (mapped) HPLMN S-NSSAI (or no S-NSSAI, if no S-NSSAI was indicated by the UE) is changed by the UE which subsequently requests a new SSC mode in the Allowed SSC mode IE or no SSC mode;

c) the UE is switched off; or

d) the USIM is removed, the entry in the "list of subscriber data" for the current SNPN is updated if the UE does not support access to an SNPN using credentials from a credentials holder, or the selected entry of the "list of subscriber data" is updated if the UE supports access to an SNPN using credentials from a credentials holder.

If the UE receives the 5GSM cause value is #33 "requested service option not subscribed" upon sending PDU SESSION ESTABLISHMENT REQUEST to establish an MA PDU session, the UE shall ignore the Back-off timer value IE and Re-attempt indicator IE provided by the network, if any. The UE shall evaluate URSP rules, if available, as specified in 3GPP TS 24.526 [19] and the UE may send PDU SESSION ESTABLISHMENT REQUEST after evaluating those URSP rules.

Upon receipt of an indication from 5GMM sublayer that the 5GSM message was not forwarded because the DNN is not supported or not subscribed in a slice along with a PDU SESSION ESTABLISHMENT REQUEST message with the PDU session ID IE set to the PDU session ID of the PDU session, the UE shall stop timer T3580, shall abort the procedure and shall behave as follows:

a) if the timer value indicates neither zero nor deactivated, the UE shall start the back-off timer with the value received from the 5GMM sublayer for the PDU session establishment procedure and the [PLMN, DNN, S-NSSAI] combination or the [PLMN, DNN, no S-NSSAI] combination, if no S-NSSAI was provided during the PDU session establishment. The UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message in the PLMN for the same DNN and the same S-NSSAI that were sent by the UE, or for the same DNN and no S-NSSAI if S-NSSAI that was not sent by the UE, until:

1) the back-off timer expires;

2) the UE is switched off;

3) the USIM is removed the entry in the "list of subscriber data" for the current SNPN is updated if the UE does not support access to an SNPN using credentials from a credentials holder, or the selected entry of the "list of subscriber data" is updated if the UE supports access to an SNPN using credentials from a credentials holder; or

4) the DNN is included in the LADN information and the network provides the LADN information during the registration procedure or the generic UE configuration update procedure;

b) if the timer value is not received from the 5GMM sublayer or the timer value indicates that this timer is deactivated, the UE shall not send another PDU SESSION ESTABLISHMENT REQUEST message in the PLMN for the same DNN and the same S-NSSAI that were sent by the UE, or for the same DNN and no S-NSSAI if S-NSSAI that was not sent by the UE, until:

1) the UE is switched off;

2) the USIM is removed, the entry in the "list of subscriber data" for the current SNPN is updated if the UE does not support access to an SNPN using credentials from a credentials holder, or the selected entry of the "list of subscriber data" is updated if the UE supports access to an SNPN using credentials from a credentials holder; or

3) the DNN is included in the LADN information and the network provides the LADN information during the registration procedure or the generic UE configuration update procedure; and

c) if the timer value indicates zero, the UE may send another PDU SESSION ESTABLISHMENT REQUEST message for the same combination of [PLMN, DNN, S-NSSAI], [PLMN, DNN, no S-NSSAI] in the current PLMN.

If the UUAA-SM procedure fails due to abnormal cases where the UE receives "USS not available" in the service-level-AA response, the UE informs the upper layers of the abnormal failure of the UUAA-SM procedure.

NOTE 9: This can result in the upper layers requesting other implementation specific mechanisms, e.g. retry with another USS address.

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

#### 9.11.2.14 Service-level-AA response

The purpose of the Service-level-AA response information element is to provide information regarding the service level authentication and authorization request, e.g. to indicate that the authentication and authorization request to the service level authentication server was successful.

The Service-level-AA response information element is coded as shown in figure 9.11.2.14.1 and table 9.11.2.14.1.

The Service-level-AA response is a type 4 information element with minimum length of 3 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Service-level-AA response IEI | octet 1 |
| Service-level-AA response length | octet 2 |
| 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | SLAR | octet 3 |

Figure 9.11.2.14.1: Service-level-AA response information element

Table 9.11.2.14.1: Service-level-AA response information element

|  |
| --- |
| Service-level-AA result bit (SLAR) (octet 3, bit 2) |
| Bit |
| 2 | 1 |  |
| 0 | 0 | Service level authentication and authorization was successful |
| 0 | 1 | Service level authentication and authorization was not successful |
| 1 | 0 | USS not available |
| 1 | 1 | reserved |
|  |
| Bits 3 to 8 of octet 3 are spare and shall be coded as zero. |