**3GPP TSG-CT WG1 Meeting #141eC1-232324**

**Online 17– 21 April 2023**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  | **24.501** | **CR** | **5247** | **rev** | **-** | **Current version:** | **18.2.1** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network |  | Core Network | **x** |

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| ***Title:***  | Support of network slice replacement during PDU session establishment procedure |
|  |  |
| ***Source to WG:*** | LG Electronics, Nokia, Nokia shanghai Bell, ZTE, Huawei, HiSilicon |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | eNS\_Ph3 |  | ***Date:*** | 2023-04-10 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-18 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories 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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | TS 23.501 CR#4083 introduces the following requirement on the PDU session establishment procedure to support network slice replacement.*During a new PDU Session establishment procedure towards an S-NSSAI,* *- if the UE is provided with the mapping of the S-NSSAI to an Alternative S-NSSAI, the UE provides both the Alternative S-NSSAI and the S-NSSAI in the PDU Session Establishment message. When the AMF receives the Alternative S-NSSAI and the S-NSSAI in the PDU Session Establishment message, or when the AMF receives only the S-NSSAI in PDU Session Establishment message the AMF determines that the S-NSSAI is to be replaced with the Alternative S-NSSAI, the AMF includes both the Alternative S-NSSAI and the S-NSSAI to the SMF.* *- if* *the UE is not provided with the mapping of the S-NSSAI to the Alternative S-NSSAI, the UE provides the S-NSSAI in the PDU Session Establishment message. When the AMF determines that the requested S-NSSAI is to be replaced with the Alternative S-NSSAI and if the UE supports Network Slice Replacement, the AMF performs UE Configuration Update procedure to reconfigure the UE with the Alternative S-NSSAI. The AMF continues the PDU Session establishment procedure with the Alternative S-NSSAI and provides both the Alternative S-NSSAI and the S-NSSAI to the SMF.**The SMF proceeds with the PDU Session establishment using the Alternative S-NSSAI. The SMF sends the Alternative S-NSSAI to NG-RAN in N2 SM information and to UE in PDU Session Establishment Accept message.* |
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| ***Summary of change:*** | It is proposed to introduce the PDU session establishment procedure to support network slice replacement. |
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| ***Consequences if not approved:*** | The functionality of network slice replacement can not be supported in PDU session establishment procedure. |
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| ***Clauses affected:*** | 5.4.5.2.2, 5.4.5.2.3, 6.4.1.3, 8.2.10.1, 8.2.10.x(new) |
|  |  |
|  | **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 ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\*\*\* First change \*\*\*\*\*

5.4.5.2.2 UE-initiated NAS transport procedure initiation

In the connected mode, the UE initiates the NAS transport procedure by sending the UL NAS TRANSPORT message to the AMF, as shown in figure 5.4.5.2.2.1.

In case a) in subclause 5.4.5.2.1, the UE shall:

- include the PDU session information (PDU session ID, old PDU session ID, S-NSSAI, mapped S-NSSAI (if available in roaming scenarios), DNN, request type, alternative S-NSSAI, if available;

- set the Payload container type IE to "N1 SM information"; and

- set the Payload container IE to the 5GSM message.

The UE shall set the PDU session ID IE to the PDU session ID. If an old PDU session ID is to be included, the UE shall set the Old PDU session ID IE to the old PDU session ID.

If an alternative S-NSSAI is to be included, the UE shall set the Alternative S-NSSAI IE to the alternative S-NSSAI and shall set the S-NSSAI IE to the S-NSSAI to be replaced.

If an S-NSSAI is to be included, the UE shall set the S-NSSAI IE to the S-NSSAI selected for the PDU session from the allowed NSSAI for the current PLMN or SNPN, associated with the mapped S-NSSAI (if available in roaming scenarios).

If a DNN is to be included, the UE shall set the DNN IE to the DNN. 5GSM procedures specified in clause 6 describe conditions for inclusion of the S-NSSAI, mapped S-NSSAI (if available in roaming scenarios), and the DNN.

If a request type is to be included, the UE shall set the Request type IE to the request type. The request type is not provided along 5GSM messages other than the PDU SESSION ESTABLISHMENT REQUEST message and the PDU SESSION MODIFICATION REQUEST message.

If an MA PDU session information is to be included, the UE shall set the MA PDU session information IE to the MA PDU session information. The MA PDU session information is not provided along 5GSM messages other than the PDU SESSION ESTABLISHMENT REQUEST message and the PDU SESSION MODIFICATION REQUEST message as specified in 3GPP TS 24.193 [13B].

In case b) in subclause 5.4.5.2.1, the UE shall:

- set the Payload container type IE to "SMS"; and

- set the Payload container IE to the SMS payload.

Based on the UE preferences regarding access selection for mobile originated (MO) transmission of SMS over NAS as described in 3GPP TS 23.501 [8]:

- when SMS over NAS is preferred to be sent over 3GPP access: the UE attempts to deliver MO SMS over NAS via the 3GPP access if the UE is registered over both 3GPP access and non-3GPP access. If the delivery of SMS over NAS via the 3GPP access is not available, the UE attempts to deliver MO SMS over NAS via the non-3GPP access; and

- when SMS over NAS is preferred to be sent over non-3GPP access: the UE attempts to deliver MO SMS over NAS via the non-3GPP access if the UE is registered over both 3GPP access and non-3GPP access. If the delivery of SMS over NAS via the non-3GPP access is not available, the UE attempts to deliver MO SMS over NAS via the 3GPP access.

In case c) in subclause 5.4.5.2.1, the UE shall:

- set the Payload container type IE to "LTE Positioning Protocol (LPP) message container";

- set the Payload container IE to the LPP message payload; and

- set the Additional information IE to the routing information provided by the upper layer location services application.

In case d) in subclause 5.4.5.2.1, the UE shall:

- set the Payload container type IE to "SOR transparent container"; and

- set the Payload container IE to the UE acknowledgement due to successful reception of steering of roaming information, and;

i) set the ME support of SOR-CMCI indicator to "SOR-CMCI supported by the ME" ;

ii) set the ME support of SOR-SNPN-SI indicator to "SOR-SNPN-SI supported by the ME"; and

iii) set the ME support of SOR-SNPN-SI-LS indicator to "SOR-SNPN-SI-LS supported by the ME",

- in the Payload container IE carrying the acknowledgement (see 3GPP TS 23.122 [5]).

In case e) in subclause 5.4.5.2.1, the UE shall:

- set the Payload container type IE to "UE policy container"; and

- set the contents of the Payload container IE as specified in Annex D.

In case f) in subclause 5.4.5.2.1, the UE shall:

- set the Payload container type IE to "UE parameters update transparent container"; and

- set the contents of the Payload container IE to the UE acknowledgement due to successful reception of UE parameters update data (see 3GPP TS 23.502 [9]).

In case g) in subclause 5.4.5.2.1, the UE shall:

- set the Payload container type IE to "Location services message container";

- set the Payload container IE to the Location services message payload; and

- set the Additional information IE to the routing information, if provided by the upper layer location services application.

In case h) in subclause 5.4.5.2.1, the UE shall:

- include the PDU session ID, and Release assistance indication (if available);

- set the Payload container type IE to "CIoT user data container"; and

- set the Payload container IE to the user data container.

In case i) in subclause 5.4.5.2.1, the UE shall:

- set the Payload container type IE to "Service-level-AA container"; and

- set the Payload container IE to the Service-level-AA container.

In case j) in subclause 5.4.5.2.1, the UE shall:

- set the Payload container type IE to "Multiple payloads"; and

- set each payload container entry of the Payload container IE (see subclause 9.11.3.39), as follows:

i) set the payload container type field of the payload container entry to a payload container type value set in the Payload container type IE as specified in cases a) to i) above;

ii) set the payload container entry contents field of the payload container entry to the payload container contents set in the Payload container IE as specified in cases a) to i) above, and

iii) set the optional IE fields, if any, to the optional associated payload routing information as specified in cases a) to i) above.

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**Figure 5.4.5.2.2.1: UE-initiated NAS transport procedure**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

 If the S-NSSAI or the mapped S-NSSAI (in roaming scenarios) is an S-NSSAI to be replaced and the alternative S-NSSAI if not provided by the UE, the AMF shall retrieve an alternative S-NSSAI (see clause 5.15.19 of 3GPP TS 23.501 [8]).

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

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

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

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

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

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

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

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

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

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

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

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

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

B) if the SMF selection is successful:

- if the DNN selected by the network is a LADN DNN, the AMF shall determine the UE presence in LADN service area;

Editor’s note [CR#5012, 5GMEC]: In case of the UE supports LADN per DNN and S-NSSAI, how does the AMF determine the UE presence in LADN service area is FFS.

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

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

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

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

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

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

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

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

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

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

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

B) if the SMF selection is successful:

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

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

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

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

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

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

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

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

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

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

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

Editor’s note [CR#5012, 5GMEC]: In case of the UE supports LADN per DNN and S-NSSAI, how does the AMF determine the UE presence in LADN service area is FFS.

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

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

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

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

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

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

 If the DNN is a LADN DNN, the AMF shall determine the UE presence in LADN service area.

B) if the SMF selection is successful:

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

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

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

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

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

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

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

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

g) "Location services message container":

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

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

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

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

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

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

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

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

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

i) decode the payload container type field;

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

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

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

6.4.1.2 UE-requested PDU session establishment procedure initiation

In order to initiate the UE-requested PDU session establishment procedure, the UE shall create a PDU SESSION ESTABLISHMENT REQUEST message.

NOTE 0: When IMS voice is available over either 3GPP access or non-3GPP access, the "voice centric" UE in 5GMM-REGISTERED state will receive a request from upper layers to establish the PDU session for IMS signalling, if the conditions for performing an initial registration with IMS indicated in 3GPP TS 24.229 [14] subclause U.3.1.2 are satisfied.

If the UE requests to establish a new PDU session, the UE shall allocate a PDU session ID which is not currently being used by another PDU session over either 3GPP access or non-3GPP access. If the N5CW device supports 3GPP access and requests to establish a new PDU session via 3GPP access, the N5CW device shall refrain from allocating "PDU session identity value 15". If the TWIF acting on behalf of the N5CW device requests to establish a new PDU session, the TWIF acting on behalf of the N5CW device shall allocate the "PDU session identity value 15".

The UE shall allocate a PTI value currently not used and shall set the PTI IE of the PDU SESSION ESTABLISHMENT REQUEST message to the allocated PTI value.

If the UE is registered for emergency services over the current access, the UE shall not request establishing a non-emergency PDU session over the current access. If the UE is registered for emergency services over the current access it shall not request establishing an emergency PDU session over the non-current access except if the request is for transferring the emergency PDU session to the non-current access. Before transferring an emergency PDU session from non-3GPP access to 3GPP access, or before transferring a PDN connection for emergency bearer services from untrusted non-3GPP access connected to EPC to 3GPP access, the UE shall check whether emergency services are supported in the NG-RAN cell (either an NR cell or an E-UTRA cell) on which the UE is camping.

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

If the UE requests to establish a new emergency PDU session, the UE shall include the PDU session type IE in the PDU SESSION ESTABLISHMENT REQUEST message and shall set the IE to the IP version capability as specified in subclause 6.2.4.2.

If the UE requests to establish a new non-emergency PDU session with a DN, the UE shall include the PDU session type IE in the PDU SESSION ESTABLISHMENT REQUEST message and shall set the IE to one of the following values: "IPv4", "IPv6", "IPv4v6", "Ethernet" or "Unstructured" based on the URSP rules or based on UE local configuration (see 3GPP TS 24.526 [19]) and based on the IP version capability as specified in subclause 6.2.4.2.

NOTE 2: When the UE initiates the UE-requested PDU session establishment procedure to transfer an existing non-IP PDN connection in the EPS to the 5GS, the UE can use locally available information associated with the PDN connection to select the PDU session type between "Ethernet" and "Unstructured".

If the UE requests to establish a new non-emergency PDU session with a DN and the UE requests an SSC mode, the UE shall set the SSC mode IE of the PDU SESSION ESTABLISHMENT REQUEST message to the SSC mode. If the UE requests to establish a PDU session of "IPv4", "IPv6" or "IPv4v6" PDU session type, the UE shall either omit the SSC mode IE or set the SSC mode IE to "SSC mode 1", "SSC mode 2", or "SSC mode 3". If the UE requests to establish a PDU session of "Ethernet" or "Unstructured" PDU session type, the UE shall either omit the SSC mode IE or set the SSC mode IE to "SSC mode 1" or "SSC mode 2". If the UE requests transfer of an existing PDN connection in the EPS to the 5GS or the UE requests transfer of an existing PDN connection in an untrusted non-3GPP access connected to the EPC to the 5GS, the UE shall set the SSC mode IE to "SSC mode 1".

If the UE requests to establish a new emergency PDU session, the UE shall set the SSC mode IE of the PDU SESSION ESTABLISHMENT REQUEST message to "SSC mode 1".

A UE supporting PDU connectivity service shall support SSC mode 1 and may support SSC mode 2 and SSC mode 3 as specified in 3GPP TS 23.501 [8].

If the UE requests to establish a new non-emergency PDU session with a DN, the UE may include the SM PDU DN request container IE with a DN-specific identity of the UE complying with network access identifier (NAI) format as specified in IETF RFC 7542 [37].

NOTE 3: The UE can avoid including both the SM PDU DN request container IE and the Extended protocol configuration options IE with PAP/CHAP protocol identifiers in the PDU SESSION ESTABLISHMENT REQUEST message. The way to achieve this is implementation dependent.

If the UE requests to:

a) establish a new PDU session;

b) perform handover of an existing PDU session from non-3GPP access to 3GPP access;

c) transfer an existing PDN connection in the EPS to the 5GS according to subclause 4.8.2.3.1;

d) transfer an existing PDN connection in untrusted non-3GPP access connected to the EPC to the 5GS; or

e) establish user plane resources over 3GPP access of an MA PDU session established over non-3GPP access only;

and the UE at the same time intends to join one or more multicast MBS sessions that is associated to the PDU session, the UE should include the Requested MBS container IE in the PDU SESSION ESTABLISHMENT REQUEST message. In that case, the UE shall set the MBS operation to "Join multicast MBS session" and include the multicast MBS session information(s) and shall set the Type of multicast MBS session ID for each of the multicast MBS session information to either "Temporary Mobile Group Identity (TMGI)" or "Source specific IP multicast address" depending on the type of the multicast MBS session ID available in the UE. Then the remaining values of each of the multicast MBS session information shall be set as following:

a) if the Type of multicast MBS session ID is set to "Temporary Mobile Group Identity (TMGI)", the UE shall set the multicast MBS session ID to the TMGI; or

b) if the Type of multicast MBS session ID is set to "Source specific IP multicast address for IPv4" or " Source specific IP multicast address for IPv6", the UE shall set the Source IP address information and the Destination IP address information to the corresponding values.

The UE should not request to join a multicast MBS session for local MBS service if neither current TAI nor CGI of the current cell is part of the MBS service area(s) of the multicast MBS session, if the UE has valid information of the MBS service area(s) of the multicast MBS session.

NOTE 4: The UE obtains the details of the MBS session ID(s) i.e. TMGI, Source IP address information and Destination IP address information as a pre-configuration in the UE or during the MBS service announcement, which is out of scope of this specification.

The UE should set the RQoS bit to "Reflective QoS supported" in the 5GSM capability IE of the PDU SESSION ESTABLISHMENT REQUEST message if the UE supports reflective QoS and:

a) the UE requests to establish a new PDU session of "IPv4", "IPv6", "IPv4v6" or "Ethernet" PDU session type;

b) the UE requests to transfer an existing PDN connection in the EPS of "IPv4", "IPv6", "IPv4v6" or "Ethernet" PDN type or of "Non-IP" PDN type mapping to "Ethernet" PDU session type, to the 5GS; or

c) the UE requests to transfer an existing PDN connection in an untrusted non-3GPP access connected to the EPC of "IPv4", "IPv6" or "IPv4v6" PDN type to the 5GS.

NOTE 5: The determination to not request the usage of reflective QoS by the UE for a PDU session is implementation dependent.

The UE shall indicate the maximum number of packet filters that can be supported for the PDU session in the Maximum number of supported packet filters IE of the PDU SESSION ESTABLISHMENT REQUEST message if:

a) the UE requests to establish a new PDU session of "IPv4", "IPv6", "IPv4v6", or "Ethernet" PDU session type, and the UE can support more than 16 packet filters for this PDU session;

b) the UE requests to transfer an existing PDN connection in the EPS of "IPv4", "IPv6", "IPv4v6", or "Ethernet" PDN type or of "Non-IP" PDN type mapping to "Ethernet" PDU session type, to the 5GS and the UE can support more than 16 packet filters for this PDU session; or

c) the UE requests to transfer an existing PDN connection in an untrusted non-3GPP access connected to the EPC of "IPv4", "IPv6" or "IPv4v6" PDN type to the 5GS and the UE can support more than 16 packet filters for this PDU session.

The UE shall include the Integrity protection maximum data rate IE in the PDU SESSION ESTABLISHMENT REQUEST message to indicate the maximum data rate per UE for user-plane integrity protection supported by the UE for uplink and the maximum data rate per UE for user-plane integrity protection supported by the UE for downlink.

The UE shall set the MH6-PDU bit to "Multi-homed IPv6 PDU session supported" in the 5GSM capability IE of the PDU SESSION ESTABLISHMENT REQUEST message if the UE supports multi-homed IPv6 PDU session and:

a) the UE requests to establish a new PDU session of "IPv6" or "IPv4v6" PDU session type; or.

b) the UE requests to transfer an existing PDN connection of "IPv6" or "IPv4v6" PDN type in the EPS or in an untrusted non-3GPP access connected to the EPC to the 5GS.

The UE shall set the EPT-S1 bit to "Ethernet PDN type in S1 mode supported" in the 5GSM capability IE of the PDU SESSION ESTABLISHMENT REQUEST message if the UE supports Ethernet PDN type in S1 mode and requests "Ethernet" PDU session type.

If the UE requests to establish a new PDU session as an always-on PDU session (e.g. because the PDU session is for time synchronization or TSC), the UE shall include the Always-on PDU session requested IE and set the value of the IE to "Always-on PDU session requested" in the PDU SESSION ESTABLISHMENT REQUEST message.

NOTE 6: Determining whether a PDU session is for time synchronization or TSC is UE implementation dependent.

If the UE has an emergency PDU session, the UE shall not perform the UE-requested PDU session establishment procedure to establish another emergency PDU session. The UE may perform the UE-requested PDU session establishment procedure to transfer an existing emergency PDU session or an existing PDN connection for emergency services.

If:

a) the UE requests to perform handover of an existing PDU session between 3GPP access and non-3GPP access;

b) the UE requests to perform transfer an existing PDN connection in the EPS to the 5GS; or

c) the UE requests to perform transfer an existing PDN connection in an untrusted non-3GPP access connected to the EPC to the 5GS;

the UE shall:

a) set the PDU session ID in the PDU SESSION ESTABLISHMENT REQUEST message and in the UL NAS TRANSPORT message to the stored PDU session ID corresponding to the PDN connection; and

b) set the S-NSSAI in the UL NAS TRANSPORT message to the stored S-NSSAI associated with the PDU session ID of a non-emergency PDU session. The UE shall not request to perform handover of an existing non-emergency PDU session between 3GPP access and non-3GPP access if the S-NSSAI is not included in the allowed NSSAI for the target access.

If the N5CW device supports 3GPP access and requests to perform handover of an existing PDU session from non-3GPP access to 3GPP access, the N5CW device shall set the PDU session ID in the PDU SESSION ESTABLISHMENT REQUEST message and in the UL NAS TRANSPORT message to "PDU session identity value 15".

If the UE is registered to a network which supports ATSSS and the UE requests to establish a new PDU session the UE may allow the network to upgrade the requested PDU session to an MA PDU session. In order to allow the network to upgrade the requested PDU session to an MA PDU session, the UE shall set "MA PDU session network upgrade is allowed" in the MA PDU session information IE and shall set the request type to "initial request" in the UL NAS TRANSPORT message. If the UE is registered to a network which does not support ATSSS, the UE shall not perform the procedure to allow the network to upgrade the requested PDU session to an MA PDU session.

If the UE is registered to a network which supports ATSSS, the UE may request to establish an MA PDU session. If the UE requests to establish an MA PDU session, the UE shall set the request type to "MA PDU request" in the UL NAS TRANSPORT message. If the UE is registered to a network which does not support ATSSS, the UE shall not request to establish an MA PDU session.

When the UE is registered over both 3GPP access and non-3GPP access in the same PLMN and the UE requests to establish a new MA PDU session, the UE may provide an S-NSSAI in the UL NAS TRANSPORT message only if the S-NSSAI is included in the allowed NSSAIs of both accesses.

NOTE 7: If the UE requested DNN corresponds to an LADN DNN, the AMF does not forward the MA PDU session information IE to the SMF but sends the message back to the UE to inform of the unhandled request (see subclause 5.4.5.2.5).

If the UE is registered to a network which supports ATSSS and the UE has already an MA PDU session established over one access, the UE may perform the UE-requested PDU session establishment procedure to establish user-plane resources over the other access for the MA PDU session as specified in subclause 4.22 of 3GPP TS 23.502 [9] and the S-NSSAI associated with the MA PDU session is included in the allowed NSSAI of the other access. If the UE establishes user-plane resources over the other access for the MA PDU session, the UE shall:

a) set the request type to "MA PDU request" in the UL NAS TRANSPORT message;

b) set the PDU session ID to the stored PDU session ID corresponding to the established MA PDU session in the PDU SESSION ESTABLISHMENT REQUEST message and in the UL NAS TRANSPORT message; and

c) set the S-NSSAI in the UL NAS TRANSPORT message to the stored S-NSSAI associated with the PDU session ID.

If the UE requests to establish a new MA PDU session or if the UE requests to establish a new PDU session and the UE allows the network to upgrade the requested PDU session to an MA PDU session:

a) if the UE supports ATSSS Low-Layer functionality with any steering mode (i.e., any steering mode allowed for ATSSS Low-Layer functionality) as specified in subclause 5.32.6 of 3GPP TS 23.501 [8], the UE shall set the ATSSS-ST bits to "ATSSS Low-Layer functionality with any steering mode supported" in the 5GSM capability IE of the PDU SESSION ESTABLISHMENT REQUEST message;

NOTE 8: The ATSSS Low-Layer functionality cannot be used together with the redundant steering mode. When the UE indicates that it is capable of supporting the ATSSS Low-Layer functionality with any steering mode, it implies that the UE supports the ATSSS Low-Layer functionality with any steering mode except the redundant steering mode.

b) if the UE supports MPTCP functionality with any steering mode and ATSSS-LL functionality with only active-standby steering mode as specified in subclause 5.32.6 of 3GPP TS 23.501 [8], the UE shall set the ATSSS-ST bits to "MPTCP functionality with any steering mode and ATSSS-LL functionality with only active-standby steering mode supported" in the 5GSM capability IE of the PDU SESSION ESTABLISHMENT REQUEST message;

c) if the UE supports MPTCP functionality with any steering mode and ATSSS-LL functionality with any steering mode (i.e., any steering mode allowed for ATSSS-LL functionality) as specified in subclause 5.32.6 of 3GPP TS 23.501 [8], the UE shall set the ATSSS-ST bits to "MPTCP functionality with any steering mode and ATSSS-LL functionality with any steering mode supported" in the 5GSM capability IE of the PDU SESSION ESTABLISHMENT REQUEST message;

d) if a performance measurement function in the UE can perform access performance measurements using the QoS flow of the non-default QoS rule as specified in subclause 5.32.5 of 3GPP TS 23.501 [8], the UE shall set the APMQF bit to "Access performance measurements per QoS flow supported" in the 5GSM capability IE of the PDU SESSION ESTABLISHMENT REQUEST message;

e) if the UE supports MPQUIC functionality with any steering mode and ATSSS-LL functionality with only active-standby steering mode as specified in subclause 5.32.6 of 3GPP TS 23.501 [8], the UE shall set the ATSSS-ST bits to "MPQUIC functionality with any steering mode and ATSSS-LL functionality with only active-standby steering mode supported" in the 5GSM capability IE of the PDU SESSION ESTABLISHMENT REQUEST message;

f) if the UE supports MPQUIC functionality with any steering mode and ATSSS-LL functionality with any steering mode as specified in subclause 5.32.6 of 3GPP TS 23.501 [8], the UE shall set the ATSSS-ST bits to "MPQUIC functionality with any steering mode and ATSSS-LL functionality with any steering mode supported" in the 5GSM capability IE of the PDU SESSION ESTABLISHMENT REQUEST message;

g) if the UE supports MPTCP functionality with any steering mode, MPQUIC functionality with any steering mode and ATSSS-LL functionality with only active-standby steering mode as specified in subclause 5.32.6 of 3GPP TS 23.501 [8], the UE shall set the ATSSS-ST bits to "MPTCP functionality with any steering mode, MPQUIC functionality with any steering mode and ATSSS-LL functionality with only active-standby steering mode supported" in the 5GSM capability IE of the PDU SESSION ESTABLISHMENT REQUEST message; and

h) if the UE supports MPTCP functionality with any steering mode, MPQUIC functionality with any steering mode and ATSSS-LL functionality with any steering mode as specified in subclause 5.32.6 of 3GPP TS 23.501 [8], the UE shall set the ATSSS-ST bits to "MPTCP functionality with any steering mode, MPQUIC functionality with any steering mode and ATSSS-LL functionality with any steering mode supported" in the 5GSM capability IE of the PDU SESSION ESTABLISHMENT REQUEST message.

If the UE requests to establish a new MA PDU session and the UE supports to establish a PDN connection as the user plane resource of an MA PDU session, the UE shall include the ATSSS request parameter in the Extended protocol configuration options IE of the PDU SESSION ESTABLISHMENT REQUEST message.

If the UE is registered to a network which does not support ATSSS and the UE has already an MA PDU session established over one access, the UE shall not attempt to establish user-plane resources for the MA PDU session over the network which does not support ATSSS as specified in subclause 4.22 of 3GPP TS 23.502 [9].

If the UE supports 3GPP PS data off, except for the transfer of a PDU session from non-3GPP access to 3GPP access and except for the establishment of user plane resources on the other access for the MA PDU session, the UE shall include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT REQUEST message and include the 3GPP PS data off UE status. The UE behaves as described in subclause 6.2.10.

If the UE supports Reliable Data Service, the UE shall include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT REQUEST message and include the Reliable Data Service request indicator. The UE behaves as described in subclause 6.2.15.

If the UE supports DNS over (D)TLS (see 3GPP TS 33.501 [24]), the UE shall include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT REQUEST message and include DNS server security information indicator and optionally, if the UE wishes to indicate which security protocol type(s) are supported by the UE, it may include the DNS server security protocol support.

NOTE 9: Support of DNS over (D)TLS is based on the informative requirements as specified in 3GPP TS 33.501 [24].

If:

a) the PDU session type value of the PDU session type IE is set to "IPv4", "IPv6" or "IPv4v6";

b) the UE indicates "Control plane CIoT 5GS optimization supported" and "IP header compression for control plane CIoT 5GS optimization supported" in the 5GMM capability IE of the REGISTRATION REQUEST message; and

c) the network indicates "Control plane CIoT 5GS optimization supported" and "IP header compression for control plane CIoT 5GS optimization supported" in the 5GS network support feature IE of the REGISTRATION ACCEPT message;

the UE shall include the IP header compression configuration IE in the PDU SESSION ESTABLISHMENT REQUEST message.

If:

a) the PDU session type value of the PDU session type IE is set to "Ethernet";

b) the UE indicates "Control plane CIoT 5GS optimization supported" and "Ethernet header compression for control plane CIoT 5GS optimization supported" in the 5GMM capability IE of the REGISTRATION REQUEST message; and

c) the network indicates "Control plane CIoT 5GS optimization supported" and "Ethernet header compression for control plane CIoT 5GS optimization supported" in the 5GS network support feature IE of the REGISTRATION ACCEPT message;

the UE shall include the Ethernet header compression configuration IE in the PDU SESSION ESTABLISHMENT REQUEST message.

If the UE supports transfer of port management information containers, the UE shall:

a) set the TPMIC bit to "Transfer of port management information containers supported" in the 5GSM capability IE of the PDU SESSION ESTABLISHMENT REQUEST message;

b) if the UE requests to establish a PDU session of "Ethernet" PDU session type, include the DS-TT Ethernet port MAC address IE in the PDU SESSION ESTABLISHMENT REQUEST message and set its contents to the MAC address of the DS-TT Ethernet port used for the PDU session;

c) if the UE-DS-TT residence time is available at the UE, include the UE-DS-TT residence time IE and set its contents to the UE-DS-TT residence time; and

d) if a Port management information container is provided by the DS-TT, include the Port management information container IE in the PDU SESSION ESTABLISHMENT REQUEST message.

NOTE 10: Only SSC mode 1 is supported for a PDU session which is for time synchronization or TSC.

If the UE supports secondary DN authentication and authorization over EPC, the UE shall set the SDNAEPC bit to "Secondary DN authentication and authorization over EPC supported" in the 5GSM capability IE of the PDU SESSION ESTABLISHMENT REQUEST message.

If the UE supporting S1 mode supports receiving QoS rules with the length of two octets or QoS flow descriptions with the length of two octets via the Extended protocol configuration options IE, the UE shall include the QoS rules with the length of two octets support indicator or the QoS flow descriptions with the length of two octets support indicator, respectively, in the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT REQUEST message.

If:

- the UE is operating in single-registration mode;

- the UE supports local IP address in traffic flow aggregate description and TFT filter in S1 mode; and

- the PDU session Type requested is different from "Unstructured".

the UE shall indicate the support of local address in TFT in S1 mode in the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT REQUEST message.

If the W-AGF acting on behalf of the FN-RG requests to establish a PDU session of "IPv6" or "IPv4v6" PDU session type, the W-AGF acting on behalf of the FN-RG may include in the PDU SESSION ESTABLISHMENT REQUEST message the Suggested interface identifier IE with the PDU session type value field set to "IPv6" and containing the interface identifier for the IPv6 link local address associated with the PDU session suggested to be allocated to the FN-RG.

If the UE supports provisioning of ECS configuration information to the EEC in the UE, then the UE shall include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT REQUEST message and shall include the ECS configuration information provisioning support indicator.

If the UE supports receiving DNS server addresses in protocol configuration options, the UE shall include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT REQUEST message and in the Extended protocol configuration options IE:

a) if the UE requests to establish a PDU session of "IPv4" or "IPv4v6" PDU session type, the UE shall include the DNS server IPv4 address request; and

b) if the UE requests to establish a PDU session of "IPv6" or "IPv4v6" PDU session type, the UE shall include the DNS server IPv6 address request.

If the UE supporting UAS services requests to establish a PDU session for C2 communication, the UE shall include the Service-level-AA container IE in the PDU SESSION ESTABLISHMENT REQUEST message. In the Service-level-AA container IE, the UE shall include:

a) the service-level device ID with the value set to the CAA-level UAV ID of the UE; and

b) if available, the service-level-AA payload with the value set to the C2 authorization payload and the service-level-AA payload type with the value set to "C2 authorization payload".

NOTE 11: The C2 authorization payload in the service-level-AA payload can include the pairing information for C2 communication and the UAV flight authorization information.

If the UE supports the EAS rediscovery, the UE shall include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT REQUEST message and shall include the EAS rediscovery support indication in the Extended protocol configuration options IE.

If the UE needs to include a PDU session pair ID based on the matching URSP rule or UE local configuration, the UE shall include the PDU session pair ID IE in the PDU SESSION ESTABLISHMENT REQUEST message. If the UE needs to include an RSN based on the matching URSP rule or UE local configuration, the UE shall include the RSN IE in the PDU SESSION ESTABLISHMENT REQUEST message.

If the UE is not registered for onboarding services in SNPN and needs PVS information, the UE shall include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT REQUEST message and include the PVS information request in the Extended protocol configuration options IE.

If the UE supports the EDC, the UE shall include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT REQUEST message and shall include the EDC support indicator in the Extended protocol configuration options IE.

If the UE supports a "destination MAC address range type" packet filter component and a "source MAC address range type" packet filter component, the UE shall include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT REQUEST message and shall include the MS support of MAC address range in 5GS indicator in the Extended protocol configuration options IE.

The UE shall transport:

a) the PDU SESSION ESTABLISHMENT REQUEST message;

b) the PDU session ID of the PDU session being established, being handed over, being transferred, or been established as an MA PDU session;

c) if the request type is set to:

1) "initial request" or "MA PDU request" and the UE determined to establish a new PDU session or an MA PDU session based on either a URSP rule including one or more S-NSSAIs in the URSP (see subclause 6.2.9) or UE local configuration, according to subclause 4.2.2 of 3GPP TS 24.526 [19]:

i) if the UE is in the HPLMN or the subscribed SNPN, an S-NSSAI in the allowed NSSAI which corresponds to one of the S-NSSAI(s) in the matching URSP rule, if any, or else to the S-NSSAI(s) in the UE local configuration or in the default URSP rule, if any, according to the conditions given in subclause 4.2.2 of 3GPP TS 24.526 [19];

ii) if the UE is in a non-subscribed SNPN, the UE determined according to the conditions given in subclause 4.2.2 of 3GPP TS 24.526 [19] to establish a new PDU session or an MA PDU session based on a URSP rule including one or more S-NSSAIs, and the URSP rule is a part of a non-subscribed SNPN signalled URSP (see 3GPP TS 24.526 [19]):

A) an S-NSSAI in the allowed NSSAI, which is one of the S-NSSAI(s) in the URSP rule; and

B) a mapped S-NSSAI associated with the S-NSSAI in A); or

iii) otherwise:

A) one of the mapped S-NSSAI(s) which is equal to one of the S-NSSAI(s) in the matching URSP rule, if any, or else to the S-NSSAI(s) in the UE local configuration or in the default URSP rule, if any, according to the conditions given in subclause 4.2.2 of 3GPP TS 24.526 [19]; and

B) the S-NSSAI in the allowed NSSAI associated with the S-NSSAI in A)

C) If there exists an alternative S-NSSAI for the S-NSSAI or the mapped S-NSSAI, the UE shall also transport the alternative S-NSSAI associated with the S-NSSAI to be replaced;

1a) "initial request" and the UE determined to establish a new PDU session based on the PDU session parameters for 5G ProSe layer-3 UE-to-network relay UE including an S-NSSAI in the UE policies for 5G ProSe UE-to-network relay UE as defined in 3GPP TS 24.555 [19F]:

i) in case of a non-roaming scenario, an S-NSSAI in the allowed NSSAI which corresponds to the S-NSSAI in the selected PDU session parameters for 5G ProSe layer-3 UE-to-network relay UE, if any; or

ii) in case of a roaming scenario:

A) one of the mapped S-NSSAI(s) which corresponds to the S-NSSAI in the selected PDU session parameters for 5G ProSe layer-3 UE-to-network relay UE, if any; and

B) the S-NSSAI in the allowed NSSAI associated with the S-NSSAI in A); or

NOTE 12: When the UE is roaming, an AMF compliant with earlier versions of the specification can omit providing to the UE a mapped S-NSSAI for one or more S-NSSAIs in the allowed NSSAI and the UE then locally sets the mapped S-NSSAI as described in clause 4.6.2.1.

2) "existing PDU session", an S-NSSAI, which is an S-NSSAI associated with the PDU session and (in roaming scenarios) a mapped S-NSSAI, with exception when S-NSSAI is not provided by the network in subclause 6.1.4.2;

d) if the request type is set to:

1) "initial request" or "MA PDU request" and the UE determined to establish a new PDU session or an MA PDU session based on either a URSP rule including one or more DNNs in the URSP (see subclause 6.2.9) or UE local configuration, according to subclause 4.2.2 of 3GPP TS 24.526 [19], a DNN which corresponds to one of the DNN(s) in the matching URSP rule, if any, or else to the DNN(s) in the UE local configuration or in the default URSP rule, if any, according to the conditions given in subclause 4.2.2 of 3GPP TS 24.526 [19];

1a) "initial request" and the UE determined to establish a new PDU session based on the PDU session parameters for 5G ProSe layer-3 UE-to-network relay UE including a DNN in the UE policies for 5G ProSe UE-to-network relay UE as defined in 3GPP TS 24.555 [19F], a DNN which corresponds to the DNN in the selected PDU session parameters for 5G ProSe layer-3 UE-to-network relay UE, if any; or

2) "existing PDU session", a DNN which is a DNN associated with the PDU session;

e) the request type which is set to:

1) "initial request", if the UE is not registered for emergency services and the UE requests to establish a new non-emergency PDU session;

2) "existing PDU session", if the UE is not registered for emergency services and the UE requests:

i) handover of an existing non-emergency PDU session between 3GPP access and non-3GPP access;

ii) transfer of an existing PDN connection for non-emergency bearer services in the EPS to the 5GS; or

iii) transfer of an existing PDN connection for non-emergency bearer services in an untrusted non-3GPP access connected to the EPC to the 5GS;

3) "initial emergency request", if the UE requests to establish a new emergency PDU session;

4) "existing emergency PDU session", if the UE requests:

i) handover of an existing emergency PDU session between 3GPP access and non-3GPP access;

ii) transfer of an existing PDN connection for emergency bearer services in the EPS to the 5GS; or

iii) transfer of an existing PDN connection for emergency bearer services in an untrusted non-3GPP access connected to the EPC to the 5GS; or

5) "MA PDU request", if:

i) the UE requests to establish an MA PDU session;

ii) the UE requests to establish user plane resources over other access of an MA PDU session established over one access only; or

iii) the UE performs inter-system change from S1 mode to N1 mode according to subclause 4.8.2.3.1 and requests transfer of a PDN connection which is a user plane resource of an MA PDU session; and

f) the old PDU session ID which is the PDU session ID of the existing PDU session, if the UE initiates the UE-requested PDU session establishment procedure upon receiving the PDU SESSION MODIFICATION COMMAND messages with the 5GSM cause IE set to #39 "reactivation requested";

using the NAS transport procedure as specified in subclause 5.4.5, and the UE shall start timer T3580 (see example in figure 6.4.1.2.1).

For bullet c) 1), if the matching URSP rule does not have an associated S-NSSAI, or if the UE does not have any matching URSP rule and there is no S-NSSAI in the UE local configuration or in the default URSP rule, the UE shall not provide any S-NSSAI in a PDU session establishment procedure.

For bullet c) 1a), if the selected PDU session parameters for 5G ProSe layer-3 UE-to-network relay UE do not have an associated S-NSSAI, the UE shall not provide any S-NSSAI in a PDU session establishment procedure.

For bullet d) 1),

- If the matching non-default URSP rule does not have an associated DNN, then the UE shall not provide any DNN in a PDU session establishment procedure;

- If the UE does not have any matching non-default URSP rule, the UE requests a connectivity that requires PAP/CHAP and the UE is configured with the default DNN for the S-NSSAI in the UE local configuration corresponding to the request, then the UE should provide such DNN in a PDU session establishment procedure;

- If the UE does not have any matching non-default URSP rule, the UE requests a connectivity that requires PAP/CHAP, the UE is not configured with the default DNN for the S-NSSAI in the UE local configuration corresponding to the request, and the application provides the DNN, then the UE shall use such DNN in a PDU session establishment procedure;

- If the UE does not have any matching non-default URSP rule, the UE requests a connectivity that does not require PAP/CHAP, the UE is not configured with the DNN for the S-NSSAI in the UE local configuration corresponding to the request, and the application provides the DNN, then the UE shall use such DNN in a PDU session establishment procedure;

- If the UE does not have any matching non-default URSP rule, the UE requests a connectivity that requires PAP/CHAP, the UE is not configured with the default DNN for the S-NSSAI in the UE local configuration corresponding to the request, the application does not provide the DNN and there is no DNN in the default URSP rule, then the UE shall not provide any DNN in a PDU session establishment procedure; or

- If the UE does not have any matching non-default URSP rule, the UE requests a connectivity that does not require PAP/CHAP, the UE is not configured with the DNN for the S-NSSAI in the UE local configuration corresponding to the request, the application does not provide the DNN and there is no DNN in the default URSP rule, then the UE shall not provide any DNN in a PDU session establishment procedure.

For bullet d) 1a), if the selected the PDU session parameters for 5G ProSe layer-3 UE-to-network relay UE do not have an associated DNN, the UE shall not provide any DNN in a PDU session establishment procedure.

If the request type is set to "initial emergency request" or "existing emergency PDU session" or the UE is registered for onboarding services in SNPN, neither DNN nor S-NSSAI is transported by the UE using the NAS transport procedure as specified in subclause 5.4.5.

****

**Figure 6.4.1.2.1: UE-requested PDU session establishment procedure**

Upon receipt of a PDU SESSION ESTABLISHMENT REQUEST message, a PDU session ID, optionally an S-NSSAI associated with (in roaming scenarios) a mapped S-NSSAI, optionally a DNN determined by the AMF, optionally a DNN selected by the network (if different from the DNN determined by the AMF), the request type, and optionally an old PDU session ID, the SMF checks whether connectivity with the requested DN can be established. If the requested DNN is not included, the SMF shall use the default DNN.

If the PDU session being established is a non-emergency PDU session, the request type is not set to "existing PDU session" and the PDU session authentication and authorization by the external DN is required due to local policy, the SMF shall check whether the PDU SESSION ESTABLISHMENT REQUEST message includes the SM PDU DN request container IE or the Service-level-AA container IE.

If the PDU session being established is a non-emergency PDU session, the request type is not set to "existing PDU session", the SM PDU DN request container IE is included in the PDU SESSION ESTABLISHMENT REQUEST message, the PDU session authentication and authorization by the external DN is required due to local policy and user's subscription data, and:

a) the information for the PDU session authentication and authorization by the external DN in the SM PDU DN request container IE is compliant with the local policy and user's subscription data, the SMF shall proceed with the EAP Authentication procedure specified in 3GPP TS 33.501 [24] and refrain from accepting or rejecting the PDU SESSION ESTABLISHMENT REQUEST message until the EAP Authentication procedure finalizes; or

b) the information for the PDU session authentication and authorization by the external DN in the SM PDU DN request container IE is not compliant with the local policy and user's subscription data, the SMF shall consider it as an abnormal case and proceed as specified in subclause 6.4.1.7.

If the PDU session being established is a non-emergency PDU session, the request type is not set to "existing PDU session", the SM PDU DN request container IE is not included in the PDU SESSION ESTABLISHMENT REQUEST message and the PDU session authentication and authorization by the external DN is required due to local policy and user's subscription data, the SMF shall proceed with the EAP Authentication procedure specified in 3GPP TS 33.501 [24] and refrain from accepting or rejecting the PDU SESSION ESTABLISHMENT REQUEST message until the EAP Authentication procedure finalizes.

If the SMF receives the old PDU session ID from the AMF and a PDU session exists for the old PDU session ID, the SMF shall consider that the request for the relocation of SSC mode 3 PDU session anchor with multiple PDU sessions as specified in 3GPP TS 23.502 [9] is accepted by the UE.

If the SMF receives the onboarding indication from the AMF, the SMF shall consider that the PDU session is established for onboarding services in SNPN.

If the UE has set the TPMIC bit to "Transfer of port management information containers supported" in the 5GSM capability IE of the PDU SESSION ESTABLISHMENT REQUEST message and has included a DS-TT Ethernet port MAC address IE (if the PDU session type is "Ethernet"), the Port management information container IE, and, optionally, the UE-DS-TT residence time IE in the PDU SESSION ESTABLISHMENT REQUEST message, the SMF shall operate as specified in 3GPP TS 23.502 [9] subclause 4.3.2.2.1.

If requested by the upper layers, the UE supporting UAS services shall initiate a request to establish a PDU session for UAS services, where the UE:

a) shall include the service-level device ID with the value set to the CAA-level UAV ID;

b) if provided by the upper layers, shall include the service-level-AA server address, with the value set to the USS address; and

c) if provided by the upper layers, shall include:

i) the service-level-AA payload type, with the value set to "UUAA payload"; and

ii) the service-level-AA payload, with the value set to UUAA payload,

in the Service-level-AA container IE of the PDU SESSION ESTABLISHMENT REQUEST message.

If the PDU session being established is a non-emergency PDU session, the request type is not set to "existing PDU session", the Service-level-AA container IE is included in the PDU SESSION ESTABLISHMENT REQUEST message, and

a) the service-level authentication and authorization by the external DN is required due to local policy;

b) there is a valid user's subscription information for the requested DNN or for the requested DNN and S-NSSAI; and

c) the information for the service-level authentication and authorization by the external DN in the Service-level-AA container IE includes CAA-level UAV ID,

then the SMF shall proceed with the UUAA-SM procedure as specified in 3GPP TS 23.256 [6AB] and refrain from accepting or rejecting the PDU SESSION ESTABLISHMENT REQUEST message until the service-level authentication and authorization procedure is completed.

The UE supporting UAS services shall not request a PDU session establishment procedure to the same DNN (or no DNN, if no DNN was indicated by the UE) and the same S-NSSAI (or no S-NSSAI, if no S-NSSAI was indicated by the UE) for which the UE has requested a service level authentication and authorization procedure which is ongoing.

If the PDU SESSION ESTABLISHMENT REQUEST message includes the PDU session pair ID IE, the RSN IE, or both, the SMF shall operate as specified in clause 5.33.2 of 3GPP TS 23.501 [8].

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

#### 6.4.1.3 UE-requested PDU session establishment procedure accepted by the network

If the connectivity with the requested DN is accepted by the network, the SMF shall create a PDU SESSION ESTABLISHMENT ACCEPT message.

If the UE requests establishing an emergency PDU session, the network shall not check for service area restrictions or subscription restrictions when processing the PDU SESSION ESTABLISHMENT REQUEST message.

The SMF shall set the Authorized QoS rules IE of the PDU SESSION ESTABLISHMENT ACCEPT message to the authorized QoS rules of the PDU session and may include the authorized QoS flow descriptions IE of the PDU SESSION ESTABLISHMENT ACCEPT message set to the authorized QoS flow descriptions of the PDU session.

NOTE 1: This is applicable also if the PDU session establishment procedure was initiated to perform handover of an existing PDU session between 3GPP access and non-3GPP access, and even if the authorized QoS rules and authorized QoS flow descriptions for source and target access of the handover are the same.

The SMF shall ensure that the number of the packet filters used in the authorized QoS rules of the PDU Session does not exceed the maximum number of packet filters supported by the UE for the PDU session. If the received request type is "initial emergency request", the SMF shall set the Authorized QoS flow descriptions IE according to the QoS parameters used for establishing emergency services as specified in subclause 5.16.4 of 3GPP TS 23.501 [8].

SMF shall set the Authorized QoS flow descriptions IE to the authorized QoS flow descriptions of the PDU session, if:

a) the Authorized QoS rules IE contains at least one GBR QoS flow;

b) the QFI is not the same as the 5QI of the QoS flow identified by the QFI;

c) the QoS flow can be mapped to an EPS bearer as specified in subclause 4.11.1 of 3GPP TS 23.502 [9]; or

d) the QoS flow is established for the PDU session used for relaying, as specified in subclause 5.6.2.1 of 3GPP TS 23.304 [6E].

NOTE 2: In cases other than above listed cases, it is up to the SMF implementation to include the authorized QoS flow description for the QoS flow in the Authorized QoS flow descriptions IE of the PDU SESSION ESTABLISHMENT ACCEPT message.

If interworking with EPS is supported for the PDU session, the SMF shall set in the PDU SESSION ESTABLISHMENT ACCEPT message:

a) the Mapped EPS bearer contexts IE to the EPS bearer contexts mapped from one or more QoS flows of the PDU session; and

b) the EPS bearer identity parameter in the Authorized QoS flow descriptions IE to the EPS bearer identity corresponding to the QoS flow, for each QoS flow which can be transferred to EPS.

If the "Create new EPS bearer" operation code in the Mapped EPS bearer contexts IE was received, and there is no corresponding Authorized QoS flow descriptions IE in the PDU SESSION ESTABLISHMENT ACCEPT message, the UE shall send a PDU SESSION MODIFICATION REQUEST message including a Mapped EPS bearer contexts IE to delete the mapped EPS bearer context. If the EPS bearer identity parameter in the Authorized QoS flow descriptions IE was received, the operation code is "Create new QoS flow description" and there is no corresponding Mapped EPS bearer contexts IE in the PDU SESSION ESTABLISHMENT ACCEPT message, the UE shall not diagnose an error, and shall keep storing the association between the QoS flow and the corresponding EPS bearer identity.

Furthermore, the SMF shall store the association between the QoS flow and the mapped EPS bearer context, for each QoS flow which can be transferred to EPS.

The SMF shall set the selected SSC mode IE of the PDU SESSION ESTABLISHMENT ACCEPT message to:

a) the received SSC mode in the SSC mode IE included in the PDU SESSION ESTABLISHMENT REQUEST message based on one or more of the PDU session type, the subscription and the SMF configuration;

b) either the default SSC mode for the data network listed in the subscription or the SSC mode associated with the SMF configuration, if the SSC mode IE is not included in the PDU SESSION ESTABLISHMENT REQUEST message.

NOTE 3: For bullet b), to avoid issues for UEs not supporting all SSC modes, the network operator can, in the subscription data and local configuration, include at least SSC mode 1 in the allowed SSC modes, and set the default SSC mode to "SSC mode 1" as per 3GPP TS 23.501 [8].

If the PDU session is an emergency PDU session, the SMF shall set the Selected SSC mode IE of the PDU SESSION ESTABLISHMENT ACCEPT message to "SSC mode 1". If the PDU session is a non-emergency PDU session of "Ethernet" or "Unstructured" PDU session type, the SMF shall set the Selected SSC mode IE to "SSC mode 1" or "SSC mode 2". If the PDU session is a non-emergency PDU session of "IPv4", "IPv6" or "IPv4v6" PDU session type, the SMF shall set the selected SSC mode IE to "SSC mode 1", "SSC mode 2", or "SSC mode 3".

If the PDU session is a non-emergency PDU session and the UE is not registered for onboarding services in SNPN, the SMF shall set the S-NSSAI IE of the PDU SESSION ESTABLISHMENT ACCEPT message to:

a) the S-NSSAI of the PDU session; and

b) the mapped S-NSSAI (in roaming scenarios).

The S-NSSAI of the PDU session or the mapped S-NSSAI (in roaming scenarios) shall be the alternative S-NSSAI if the SMF has received an alternative S-NSSAI from the AMF.

The SMF shall set the Selected PDU session type IE of the PDU SESSION ESTABLISHMENT ACCEPT message to the selected PDU session type, i.e. the PDU session type of the PDU session.

If the PDU SESSION ESTABLISHMENT REQUEST message includes a PDU session type IE set to "IPv4v6", the SMF shall select "IPv4", "IPv6" or "IPv4v6" as the Selected PDU session type. If the subscription, the SMF configuration, or both, are limited to IPv4 only or IPv6 only for the DNN selected by the network, the SMF shall include the 5GSM cause value #50 "PDU session type IPv4 only allowed", or #51 "PDU session type IPv6 only allowed", respectively, in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT ACCEPT message.

If the selected PDU session type is "IPv4", the SMF shall include the PDU address IE in the PDU SESSION ESTABLISHMENT ACCEPT message and shall set the PDU address IE to an IPv4 address is allocated to the UE in the PDU session.

If the selected PDU session type is "IPv6", the SMF shall include the PDU address IE in the PDU SESSION ESTABLISHMENT ACCEPT message and shall set the PDU address IE to an interface identifier for the IPv6 link local address allocated to the UE in the PDU session.

If the selected PDU session type is "IPv4v6", the SMF shall include the PDU address IE in the PDU SESSION ESTABLISHMENT ACCEPT message and shall set the PDU address IE to an IPv4 address and an interface identifier for the IPv6 link local address, allocated to the UE in the PDU session.

If the selected PDU session type of a PDU session established by the W-AGF acting on behalf of the FN-RG is "IPv4v6" or "IPv6", the SMF shall also indicate the SMF's IPv6 link local address in the PDU address IE of the PDU SESSION ESTABLISHMENT ACCEPT message.

If the PDU session is a non-emergency PDU session and the UE is not registered for onboarding services in SNPN, the SMF shall set the DNN IE of the PDU SESSION ESTABLISHMENT ACCEPT message to the DNN determined by the AMF of the PDU session.

The SMF shall set the Session-AMBR IE of the PDU SESSION ESTABLISHMENT ACCEPT message to the Session-AMBR of the PDU session.

If the selected PDU session type is "IPv4", "IPv6", "IPv4v6" or "Ethernet" and if the PDU SESSION ESTABLISHMENT REQUEST message includes a 5GSM capability IE with the RQoS bit set to "Reflective QoS supported", the SMF shall consider that reflective QoS is supported for QoS flows belonging to this PDU session and may include the RQ timer IE set to an RQ timer value in the PDU SESSION ESTABLISHMENT ACCEPT message.

If the selected PDU session type is "IPv4", "IPv6", "IPv4v6" or "Ethernet" and if the PDU SESSION ESTABLISHMENT REQUEST message includes a Maximum number of supported packet filters IE, the SMF shall consider this number as the maximum number of packet filters that can be supported by the UE for this PDU session. Otherwise the SMF considers that the UE supports 16 packet filters for this PDU session.

The SMF shall consider that the maximum data rate per UE for user-plane integrity protection supported by the UE for uplink and the maximum data rate per UE for user-plane integrity protection supported by the UE for downlink are valid for the lifetime of the PDU session.

If the value of the RQ timer is set to "deactivated" or has a value of zero, the UE considers that RQoS is not applied for this PDU session.

NOTE 4: If the 5G core network determines that reflective QoS is to be used for a QoS flow, the SMF sends reflective QoS indication (RQI) to UPF to activate reflective QoS. If the QoS flow is established over 3GPP access, the SMF also includes reflective QoS Attribute (RQA) in QoS profile of the QoS flow during QoS flow establishment.

If the selected PDU session type is "IPv6" or "IPv4v6" and if the PDU SESSION ESTABLISHMENT REQUEST message includes a 5GSM capability IE with the MH6-PDU bit set to "Multi-homed IPv6 PDU session supported", the SMF shall consider that this PDU session is supported to use multiple IPv6 prefixes.

If the selected PDU session type is "Ethernet", the PDU SESSION ESTABLISHMENT REQUEST message includes a 5GSM capability IE with the EPT-S1 bit set to "Ethernet PDN type in S1 mode supported" and the network supports Ethernet PDN type in S1 mode, the SMF shall set the EPT-S1 bit of the 5GSM network feature support IE of the PDU SESSION ESTABLISHMENT ACCEPT message to "Ethernet PDN type in S1 mode supported".

If the DN authentication of the UE was performed and completed successfully, the SMF shall set the EAP message IE of the PDU SESSION ESTABLISHMENT ACCEPT message to an EAP-success message as specified in IETF RFC 3748 [34], provided by the DN.

Based on local policies or configurations in the SMF and the Always-on PDU session requested IE in the PDU SESSION ESTABLISHMENT REQUEST message (if available), if the SMF determines that either:

a) the requested PDU session needs to be established as an always-on PDU session (e.g. because the PDU session is for time synchronization or TSC, for URLLC, or for both), the SMF shall include the Always-on PDU session indication IE in the PDU SESSION ESTABLISHMENT ACCEPT message and shall set the value to "Always-on PDU session required"; or

b) the requested PDU session shall not be established as an always-on PDU session and:

i) if the UE included the Always-on PDU session requested IE, the SMF shall include the Always-on PDU session indication IE in the PDU SESSION ESTABLISHMENT ACCEPT message and shall set the value to "Always-on PDU session not allowed"; or

ii) if the UE did not include the Always-on PDU session requested IE, the SMF shall not include the Always-on PDU session indication IE in the PDU SESSION ESTABLISHMENT ACCEPT message.

If the PDU session is an MA PDU session, the SMF shall include the ATSSS container IE in the PDU SESSION ESTABLISHMENT ACCEPT message. The SMF shall set the content of the ATSSS container IE as specified in 3GPP TS 24.193 [13B]. If the UE requests to establish user plane resources over the second access of an MA PDU session which has already been established over the first access and the parameters associated with ATSSS previously provided to the UE are not to be updated, the "ATSSS container contents" shall not be included in the ATSSS container IE in the PDU SESSION ESTABLISHMENT ACCEPT message.

If the PDU session is a single access PDU session containing the MA PDU session information IE with the value set to "MA PDU session network upgrade is allowed" and:

a) if the SMF decides to establish a single access PDU session, the SMF shall not include the ATSSS container IE in the PDU SESSION ESTABLISHMENT ACCEPT message; or

b) if the SMF decides to establish an MA PDU session, the SMF shall include the ATSSS container IE in the PDU SESSION ESTABLISHMENT ACCEPT message, which indicates to the UE that the requested single access PDU session was established as an MA PDU Session.

If the network decides that the PDU session is only for control plane CIoT 5GS optimization, the SMF shall include the control plane only indication in the PDU SESSION ESTABLISHMENT ACCEPT message.

If:

a) the UE provided the IP header compression configuration IE in the PDU SESSION ESTABLISHMENT REQUEST message; and

b) the SMF supports IP header compression for control plane CIoT 5GS optimization;

the SMF shall include the IP header compression configuration IE in the PDU SESSION ESTABLISHMENT ACCEPT message.

If:

a) the UE provided the Ethernet header compression configuration IE in the PDU SESSION ESTABLISHMENT REQUEST message; and

b) the SMF supports Ethernet header compression for control plane CIoT 5GS optimization;

the SMF shall include the Ethernet header compression configuration IE in the PDU SESSION ESTABLISHMENT ACCEPT message.

If the PDU SESSION ESTABLISHMENT REQUEST included the Requested MBS container IE with the MBS operation set to "Join MBS session", the SMF:

a) shall include the TMGI for the multicast MBS session IDs that the UE is allowed to join, if any, in the Received MBS container IE, shall set the MBS decision to "MBS join is accepted" for each of those Received MBS information, may include the MBS start time to indicate the time when the multicast MBS session starts and shall include the MBS security container in each of those Received MBS information if security protection is applied for that multicast MBS session and the control plane security procedure is used as specified in annex W.4.1.2 in 3GPP TS 33.501 [24], and shall use separate QoS flows dedicated for multicast by including the Authorized QoS flow descriptions IE if no separate QoS flows dedicated for multicast exist or if the SMF wants to establish new QoS flows dedicated for multicast;

NOTE 5: The network determines whether security protection applies or not for the multicast MBS session as specified in 3GPP TS 33.501 [24].

b) shall include the TMGI for multicast MBS session IDs that the UE is not allowed to join, if any, in the Received MBS container IE, shall set the MBS decision to "MBS join is rejected" for each of those Received MBS information, shall set the Rejection cause for each of those Received MBS information with the reason of rejection, and if the Rejection cause is set to "multicast MBS session has not started or will not start soon", may include an MBS back-off timer value; and

c) may include in the Received MBS container IE the MBS service area for each multicast MBS session and include in it the MBS TAI list, the NR CGI list or both, that identify the service area(s) for the local MBS service

NOTE 6: For an multicast MBS session that has multiple MBS service areas, the MBS service areas are indicated to the UE using MBS service announcement as described in 3GPP TS 23.247 [53], which is out of scope of this specification.

in the PDU SESSION ESTABLISHMENT ACCEPT message. If the UE has set the Type of multicast MBS session ID to "Source specific IP multicast address" in the Requested multicast MBS container IE for certain MBS session(s) in the PDU SESSION ESTABLISHMENT REQUEST message, the SMF shall include the Source IP address information and Destination IP address information in the Received MBS information together with the TMGI for each of those multicast MBS sessions.

NOTE 7: Including the Source IP address information and Destination IP address information in the Received MBS information in that case is to allow the UE to perform the mapping between the requested multicast MBS session ID and the provided TMGI.

NOTE 8: In SNPN, TMGI is used together with NID to identify an MBS Session.

If the request type is "existing PDU session", the SMF shall not perform network slice admission control for the PDU session, except for the following cases:

a) when EPS counting is not required for the S-NSSAI of the PDU session for network slice admission control and the PDU session is established due to transfer the PDN connection from S1 mode to N1 mode in case of inter-system change; or

b) handover of an existing PDU session between 3GPP access and non-3GPP access is performed.

The SMF shall send the PDU SESSION ESTABLISHMENT ACCEPT message.

Upon receipt of a PDU SESSION ESTABLISHMENT ACCEPT message and a PDU session ID, using the NAS transport procedure as specified in subclause 5.4.5, the UE shall stop timer T3580, shall release the allocated PTI value and shall consider that the PDU session was established.

If the PDU session establishment procedure was initiated to perform handover of an existing PDU session between 3GPP access and non-3GPP access, then upon receipt of the PDU SESSION ESTABLISHMENT ACCEPT message the UE shall locally delete any authorized QoS rules, authorized QoS flow descriptions, the session-AMBR and the parameters provided in the Protocol configuration options IE when in S1 mode or the Extended protocol configuration options IE stored for the PDU session before processing the new received authorized QoS rules, authorized QoS flow descriptions, the session-AMBR and the parameters provided in the Extended protocol configuration options IE, if any.

NOTE 9: For the case of handover from 3GPP access to non-3GPP access, deletion of the QoS flow descriptions implies deletion of the associated EPS bearer identities, if any, and according to subclause 6.1.4.1 also deletion of the associated EPS bearer contexts. Regarding the reverse direction, for PDU sessions via non-3GPP access the network does not allocate associated EPS bearer identities (see 3GPP TS 23.502 [9], subclause 4.11.1.4.1).

If the PDU session establishment procedure was initiated to perform handover of an existing PDU session from 3GPP access to non-3GPP access and that existing PDU session is associated with one or more multicast MBS sessions, the UE shall locally leave the associated multicast MBS sessions and the SMF shall consider the UE as removed from the associated multicast MBS sessions.

For an MA PDU session already established on a single access, except for all those MA PDU sessions with a PDN connection established as a user-plane resource, upon receipt of PDU SESSION ESTABLISHMENT ACCEPT message over the other access:

a) the UE shall delete the stored authorized QoS rules and the stored session-AMBR;

b) if the authorized QoS flow descriptions IE is included in the PDU SESSION ESTABLISHMENT ACCEPT message, the UE shall delete the stored authorized QoS flow descriptions; and

c) if the mapped EPS bearer contexts IE is included in the PDU SESSION ESTABLISHMENT ACCEPT message, the UE shall delete the stored mapped EPS bearer contexts.

The UE shall store the authorized QoS rules, and the session-AMBR received in the PDU SESSION ESTABLISHMENT ACCEPT message for the PDU session. The UE shall also store the authorized QoS flow descriptions if it is included in the Authorized QoS flow descriptions IE of the PDU SESSION ESTABLISHMENT ACCEPT message for the PDU session.

If the number of the authorized QoS rules, the number of the packet filters, or the number of the authorized QoS flow descriptions associated with the PDU session have reached the maximum number supported by the UE upon receipt of a PDU SESSION ESTABLISHMENT ACCEPT message, then the UE may initiate the PDU session release procedure by sending a PDU SESSION RELEASE REQUEST message with 5GSM cause #26 "insufficient resources".

For a PDU session that is being established with the request type set to "initial request", "initial emergency request" or "MA PDU request", or a PDU session that is being transferred from EPS to 5GS and established with the request type set to "existing PDU session" or "existing emergency PDU session" or a PDU session that is being handed over between non-3GPP access and 3GPP access and established with the request type set to "existing PDU session" or "existing emergency PDU session ", the UE shall verify the authorized QoS rules and the authorized QoS flow descriptions provided in the PDU SESSION ESTABLISHMENT ACCEPT message for different types of errors as follows:

a) Semantic errors in QoS operations:

1) When the rule operation is "Create new QoS rule", and the DQR bit is set to "the QoS rule is the default QoS rule" when there's already a default QoS rule.

2) When the rule operation is "Create new QoS rule", and there is no rule with the DQR bit set to "the QoS rule is the default QoS rule".

3) When the rule operation is "Create new QoS rule" and two or more QoS rules associated with this PDU session would have identical precedence values.

4) When the rule operation is an operation other than "Create new QoS rule".

5) When the rule operation is "Create new QoS rule", the DQR bit is set to "the QoS rule is not the default QoS rule", and the UE is in NB-N1 mode.

6) When the rule operation is "Create new QoS rule" and there is already an existing QoS rule with the same QoS rule identifier.

7) When the rule operation is "Create new QoS rule", the DQR bit is set to "the QoS rule is not the default QoS rule", and the PDU session type of the PDU session is "Unstructured".

8) When the flow description operation is an operation other than "Create new QoS flow description".

8a) When the flow description operation is "Create new QoS flow description" and there is already an existing QoS flow description with the same QoS flow identifier.

9) When the flow description operation is "Create new QoS flow description", the QFI associated with the QoS flow description is not the same as the QFI of the default QoS rule and the UE is NB-N1 mode.

10) When the flow description operation is "Create new QoS flow description", the QFI associated with the QoS flow description is not the same as the QFI of the default QoS rule, and the PDU session type of the PDU session is "Unstructured".

11) When the rule operation is "Create new QoS rule" and the DQR bit is set to "the QoS rule is not the default QoS rule" and one match-all packet filter is to be associated with the QoS rule.

 In case 4, case 5, or case 7 if the rule operation is for a non-default QoS rule, the UE shall send a PDU SESSION MODIFICATION REQUEST message to delete the QoS rule with 5GSM cause #83 "semantic error in the QoS operation".

 In case 6, if the existing QoS rule is not the default QoS rule and the DQR bit of the new QoS rule is set to "the QoS rule is not the default QoS rule", the UE shall not diagnose an error, further process the create request and, if it was processed successfully, delete the old QoS rule (i.e. the QoS rule that existed when case 6 was detected). If the existing QoS rule is the default QoS rule or the DQR bit of the new QoS rule is set to "the QoS rule is the default QoS rule", the UE shall initiate a PDU session release procedure by sending a PDU SESSION RELEASE REQUEST message with 5GSM cause #83 "semantic error in the QoS operation".

 In case 8, case 9, or case 10, the UE shall send a PDU SESSION MODIFICATION REQUEST message to delete the QoS flow description with 5GSM cause #83 "semantic error in the QoS operation".

 In case 8a, the UE shall not diagnose an error, further process the create request and, if it was processed successfully, delete the old QoS flow description (i.e. the QoS flow description that existed when case 8a was detected).

 Otherwise for all the cases above, the UE shall initiate a PDU session release procedure by sending a PDU SESSION RELEASE REQUEST message with 5GSM cause #83 "semantic error in the QoS operation".

b) Syntactical errors in QoS operations:

1) When the rule operation is "Create new QoS rule", the QoS rule is a QoS rule of a PDU session of IPv4, IPv6, IPv4v6 or Ethernet PDU session type, and the packet filter list in the QoS rule is empty.

2) When the rule operation is "Create new QoS rule", the DQR bit is set to "the QoS rule is the default QoS rule", the PDU session type of the PDU session is "Unstructured", and the packet filter list in the QoS rule is not empty.

3) When there are other types of syntactical errors in the coding of the Authorized QoS rules IE or the Authorized QoS flow descriptions IE, such as: a mismatch between the number of packet filters subfield and the number of packet filters in the packet filter list when the rule operation is create new QoS rule", or the number of packet filters subfield is larger than the maximum possible number of packet filters in the packet filter list (i.e., there is no QoS rule precedence subfield included in the QoS rule IE), the QoS Rule Identifier is set to "no QoS rule identifier assigned", or the QoS flow identifier is set to "no QoS flow identifier assigned".

4) When, the rule operation is "Create new QoS rule", there is no QoS flow description with a QFI corresponding to the QFI of the resulting QoS rule and the UE determines, by using the QoS rule’s QFI as the 5QI, that there is a resulting QoS rule for a GBR QoS flow (as described in 3GPP TS 23.501 [8] table 5.7.4-1).

5) When the flow description operation is "Create new QoS flow description", and the UE determines that there is a QoS flow description of a GBR QoS flow (as described in 3GPP TS 23.501 [8] table 5.7.4-1) which lacks at least one of the mandatory parameters (i.e., GFBR uplink, GFBR downlink, MFBR uplink and MFBR downlink). If the QoS flow description does not include a 5QI, the UE determines this by using the QFI as the 5QI.

 In case 1, case 3 or case 4, if the QoS rule is not the default QoS rule, the UE shall initiate a PDU session release procedure by sending a PDU SESSION RELEASE REQUEST message with 5GSM cause #84 "syntactical error in the QoS operation". Otherwise, the UE shall send a PDU SESSION MODIFICATION REQUEST message including a requested QoS rule IE, a requested QoS flow description IE or both to delete the QoS rule, the QoS flow description or both with 5GSM cause #84 "syntactical error in the QoS operation".

 In case 2, if the QoS rule is the default QoS rule, the UE shall send a PDU SESSION MODIFICATION REQUEST message including a requested QoS rule IE to delete all the packet filters of the default QoS rule. The UE shall include the 5GSM cause #84 "syntactical error in the QoS operation".

 In case 5, if the default QoS rule is associated with the QoS flow description which lacks at least one of the mandatory parameters, the UE shall initiate a PDU session release procedure by sending a PDU SESSION RELEASE REQUEST message with 5GSM cause #84 "syntactical error in the QoS operation". Otherwise, the UE shall send a PDU SESSION MODIFICATION REQUEST message to delete the QoS flow description which lacks at least one of the mandatory parameters and the associated QoS rule(s), if any, with 5GSM cause #84 "syntactical error in the QoS operation".

NOTE 10: It is not considered an error if the UE determines that after processing all QoS operations on QoS rules and QoS flow descriptions there is a QoS flow description that is not associated with any QoS rule and the UE is not in NB-N1 mode.

c) Semantic errors in packet filters:

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

 If the QoS rule is the default QoS rule, the UE shall initiate a PDU session release procedure by sending a PDU SESSION RELEASE REQUEST message with 5GSM cause #44 "semantic error in packet filter(s)". Otherwise, the UE shall send a PDU SESSION MODIFICATION REQUEST message to delete the QoS rule with 5GSM cause #44 "semantic error in packet filter(s)".

d) Syntactical errors in packet filters:

1) When the rule operation is "Create new QoS rule" and two or more packet filters in the resultant QoS rule would have identical packet filter identifiers.

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

 If the QoS rule is the default QoS rule, the UE shall initiate a PDU session release procedure by sending a PDU SESSION RELEASE REQUEST message with 5GSM cause #45 "syntactical errors in packet filter(s)". Otherwise, the UE shall send a PDU SESSION MODIFICATION REQUEST message to delete the QoS rule with 5GSM cause #45 "syntactical errors in packet filter(s)".

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

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

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

The UE shall not consider the established PDU session as an always-on PDU session if the UE does not receive the Always-on PDU session indication IE in the PDU SESSION ESTABLISHMENT ACCEPT message.

The UE shall store the mapped EPS bearer contexts, if received in the PDU SESSION ESTABLISHMENT ACCEPT message. Furthermore, the UE shall also store the association between the QoS flow and the mapped EPS bearer context, for each QoS flow which can be transferred to EPS, based on the received EPS bearer identity parameter in Authorized QoS flow descriptions IE and the mapped EPS bearer contexts. The UE shall check each mapped EPS bearer context for different types of errors as follows:

NOTE 11: An error detected in a mapped EPS bearer context does not cause the UE to discard the Authorized QoS rules IE and Authorized QoS flow descriptions IE included in the PDU SESSION ESTABLISHMENT ACCEPT, if any.

a) Semantic error in the mapped EPS bearer operation:

1) When the operation code is an operation code other than "Create new EPS bearer".

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

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

 In case 2, if the existing mapped EPS bearer context is associated with the PDU session that is being established, the UE shall not diagnose an error, further process the create request and, if it was process successfully, delete the old EPS bearer context.

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

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

1) Semantic errors in TFT operations:

i) When the TFT operation is an operation other than "Create new TFT"

 The UE shall initiate a PDU session modification procedure by sending a PDU SESSION MODIFICATION REQUEST message to delete the mapped EPS bearer context with 5GSM cause #41 "semantic error in the TFT operation".

2) Syntactical errors in TFT operations:

i) When the TFT operation = "Create new TFT" and the packet filter list in the TFT IE is empty.

ii) When there are other types of syntactical errors in the coding of the TFT IE, such as a mismatch between the number of packet filters subfield, and the number of packet filters in the packet filter list.

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

3) Semantic errors in packet filters:

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

ii) When the resulting TFT, which is assigned to a dedicated EPS bearer context, does not contain any packet filter which applicable for the uplink direction.

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

4) Syntactical errors in packet filters:

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

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

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

 In case ii, if the old packet filters do not belong to the default EPS bearer context, the UE shall not diagnose an error and shall delete the old packet filters which have identical filter precedence values.

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

 In cases i and iii the UE shall initiate a PDU session modification procedure by sending a PDU SESSION MODIFICATION REQUEST message to delete the mapped EPS bearer context with 5GSM cause #45 "syntactical error in packet filter(s)".

If the UE detects different errors in the mapped EPS bearer contexts, QoS rules or QoS flow descriptions, the UE may send a single PDU SESSION MODIFICATION REQUEST message to delete the erroneous mapped EPS bearer contexts, QoS rules or QoS flow descriptions. In that case, the UE shall include a single 5GSM cause in the PDU SESSION MODIFICATION REQUEST message.

NOTE 12: The 5GSM cause to use cannot be different from: #41 "semantic error in the TFT operation", #42 "syntactical error in the TFT operation", #44 "semantic error in packet filter(s)", #45 "syntactical errors in packet filter(s)", #83 "semantic error in the QoS operation", #84 "syntactical error in the QoS operation", and #85 "Invalid mapped EPS bearer identity". The selection of a 5GSM cause is up to the UE implementation.

If there are mapped EPS bearer context(s) associated with a PDU session, but none of them is associated with the default QoS rule, the UE shall initiate a PDU session modification procedure by sending a PDU SESSION MODIFICATION REQUEST message to delete the mapped EPS bearer context(s) with 5GSM cause #85 "Invalid mapped EPS bearer identity" and shall locally delete the stored EPS bearer identity (EBI) in all the QoS flow descriptions of the PDU session, if any.

The UE shall only use the Control plane CIoT 5GS optimization for this PDU session if the Control plane only indication is included in the PDU SESSION ESTABLISHMENT ACCEPT message.

If the UE requests the PDU session type "IPv4v6" and:

a) the UE receives the selected PDU session type set to "IPv4" and does not receive the 5GSM cause value #50 "PDU session type IPv4 only allowed"; or

b) the UE receives the selected PDU session type set to "IPv6" and does not receive the 5GSM cause value #51 "PDU session type IPv6 only allowed";

the UE may subsequently request another PDU session for the other IP version using the UE-requested PDU session establishment procedure to the same DNN (or no DNN, if no DNN was indicated by the UE) and the same S-NSSAI associated with (in roaming scenarios) a mapped S-NSSAI (or no S-NSSAI, if no S-NSSAI was indicated by the UE) with a single address PDN type (IPv4 or IPv6) other than the one already activated.

If the UE requests the PDU session type "IPv4v6", receives the selected PDU session type set to "IPv4" and the 5GSM cause value #50 "PDU session type IPv4 only allowed", the UE shall not subsequently request another PDU session using the UE-requested PDU session establishment procedure to the same DNN (or no DNN, if no DNN was indicated by the UE) and the same S-NSSAI associated with (in roaming scenarios) a mapped 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;

b) the UE is switched off; or

c) the USIM is removed or the entry in the "list of subscriber data" for the current SNPN is updated.

If the UE requests the PDU session type "IPv4v6", receives the selected PDU session type set to "IPv6" and the 5GSM cause value #51 "PDU session type IPv6 only allowed", the UE shall not subsequently request another PDU session using the UE-requested PDU session establishment procedure to the same DNN (or no DNN, if no DNN was indicated by the UE) and the same S-NSSAI associated with (in roaming scenarios) a mapped 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;

b) the UE is switched off; or

c) the USIM is removed or the entry in the "list of subscriber data" for the current SNPN is updated.

NOTE 13: For the 5GSM cause values #50 "PDU session type IPv4 only allowed", and #51 "PDU session type IPv6 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.

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

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

For a UE which is registered for disaster roaming services and for a PDU session which is not a PDU session for emergency services:

a) if the parameters list field of one or more authorized QoS flow descriptions received in the Authorized QoS flow descriptions IE of the PDU SESSION ESTABLISHMENT ACCEPT message contains an EPS bearer identity (EBI), then the UE shall locally remove the EPS bearer identity (EBI) from the parameters list field of such one or more authorized QoS flow descriptions; and

b) the UE shall locally delete the contents of the Mapped EPS bearer contexts IE if it is received in the PDU SESSION ESTABLISHMENT ACCEPT message.

If the UE receives an IPv4 Link MTU parameter, an Ethernet Frame Payload MTU parameter, an Unstructured Link MTU parameter, or a Non-IP Link MTU parameter in the Extended protocol configuration options IE of the PDU SESSION ESTABLISHMENT ACCEPT message, the UE shall pass to the upper layer the received IPv4 link MTU size, the received Ethernet frame payload MTU size, the unstructured link MTU size, or the non-IP link MTU size.

NOTE 14: The IPv4 link MTU size corresponds to the maximum length of user data packet that can be sent either via the control plane or via N3 interface for a PDU session of the "IPv4" PDU session type.

NOTE 15: The Ethernet frame payload MTU size corresponds to the maximum length of a payload of an Ethernet frame that can be sent either via the control plane or via N3 interface for a PDU session of the "Ethernet" PDU session type.

NOTE 16: The unstructured link MTU size correspond to the maximum length of user data packet that can be sent either via the control plane or via N3 interface for a PDU session of the "Unstructured" PDU session type.

NOTE 17: A PDU session of "Ethernet" or "Unstructured" PDU session type can be transferred to a PDN connection of "non-IP" PDN type, thus the UE can request the non-IP link MTU parameter in the PDU session establishment procedure. The non-IP link MTU size corresponds to the maximum length of user data that can be sent either in the user data container in the ESM DATA TRANSPORT message or via S1-U interface as specified in 3GPP TS 24.301 [15].

If the 5G-RG receives an ACS information parameter in the Extended protocol configuration options IE of the PDU SESSION ESTABLISHMENT ACCEPT message, the 5G-RG shall pass the ACS URL in the received ACS information parameter to the upper layer.

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

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

If the UE has indicated support for CIoT 5GS optimizations and receives an initial small data rate control parameters container or an initial additional small data rate control parameters for exception data container in the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT ACCEPT message, the UE shall use these parameters for the newly established PDU Session. When the validity period of the initial parameters expire, the parameters received in a small data rate control parameters container or an additional small data rate control parameters for exception data container shall be used.

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

If the UE receives an APN rate control parameters container or an additional APN rate control for exception data parameters container in the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT ACCEPT message, the UE shall store these parameters and use them to limit the rate at which it generates uplink user data messages for the PDN connection corresponding to the PDU session if the PDU session is transferred to EPS upon inter-system change from N1 mode to S1 mode in accordance with 3GPP TS 24.301 [15]. The received APN rate control parameters and additional APN rate control for exception data parameters shall replace any previously stored APN rate control parameters and additional APN rate control for exception data parameters, respectively, for this PDN connection.

If the UE receives an initial APN rate control parameters container or an initial additional APN rate control for exception data parameters container in the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT ACCEPT message, the UE shall store these parameters in the APN rate control status and use them to limit the rate at which it generates exception data messages for the PDN connection corresponding to the PDU session if the PDU session is transferred to EPS upon inter-system change from N1 mode to S1 mode in accordance with 3GPP TS 24.301 [15]. The received APN rate control status shall replace any previously stored APN rate control status for this PDN connection.

NOTE 18: In the PDU SESSION ESTABLISHMENT ACCEPT message, the SMF provides either APN rate control parameters container, or initial APN rate control parameters container, in the Extended protocol configuration options IE, but not both.

NOTE 19: In the PDU SESSION ESTABLISHMENT ACCEPT message, the SMF provides either additional APN rate control for exception data parameters container, or initial additional APN rate control for exception data parameters container, in the Extended protocol configuration options IE, but not both.

If the network accepts the use of Reliable Data Service to transfer data for the PDU session, the network shall include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT ACCEPT message and include the Reliable Data Service accepted indicator. The UE behaves as described in subclause 6.2.15.

If the UE indicates support of DNS over (D)TLS by providing DNS server security information indicator to the network and optionally, if the UE wishes to indicate which security protocol type(s) are supported by the UE, providing the DNS server security protocol support and the network wants to enforce the use of DNS over (D)TLS, the network may include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT ACCEPT message and include the DNS server security information with length of two octets. Upon receiving the DNS server security information, the UE shall pass it to the upper layer. The UE shall use this information to send the DNS over (D)TLS (See 3GPP TS 33.501 [24]).

NOTE 20: Support of DNS over (D)TLS is based on the informative requirements as specified in 3GPP TS 33.501 [24] and it is implemented based on the operator requirement.

If the PDU SESSION ESTABLISHMENT REQUEST message includes the Service-level-AA container IE with the service-level device ID set to the CAA-level UAV ID, and the SMF is provided by the UAS-NF the successful UUAA-SM result and the CAA-level UAV ID, the SMF shall store the successful result together with the authorized CAA-level UAV ID and transmit the PDU SESSION ESTABLISHMENT ACCEPT message to the UE, where the PDU SESSION ESTABLISHMENT ACCEPT message shall include the Service-level-AA container IE containing:

a) the service-level-AA response, with the SLAR field set to "Service level authentication and authorization was successful";

b) the service-level device ID with the value set to the CAA-level UAV ID; and

c) if a payload is received from the UAS-NF,the service-level-AA payload, with the value set to the payload;

d) if a payload type associated with the payload is received from the UAS-NF, the service-level-AA payload type with the values set to the associated payload type.

NOTE 21: UAS security information can be included in the UUAA payload by the USS as specified in 3GPP TS 33.256 [24B].

If the network accepts the request of the PDU session establishment for C2 communication, the network shall send the PDU SESSION ESTABLISHMENT ACCEPT message including the Service-level-AA container IE containing:

a) the service-level-AA response with the value of C2AR field set to the "C2 authorization was successful";

b) if a payload is provided from the UAS-NF, the service-level-AA payload with the value set to the payload;

c) if a payload type associated with the payload is provided from the UAS-NF, the service-level-AA payload type with the value set to the payload type; and

d) if the CAA-level UAV ID is provided from the UAS-NF, the service-level device ID with the value set to the CAA-level UAV ID.

NOTE 22:The C2 authorization payload in the service-level-AA payload can include the C2 session security information.

Upon receipt of the PDU SESSION ESTABLISHMENT ACCEPT message of the PDU session for C2 communication, if the Service-level-AA container IE is included, the UE shall forward the service-level-AA contents of the Service-level-AA container IE to the upper layers.

The SMF may be configured with one or more PVS IP addresses or PVS names or both associated with the DNN and S-NSSAI used for onboarding services in SNPN, for configuration of SNPN subscription parameters in PLMN via the user plane, or for configuration of a UE via the user plane with credentials for NSSAA or PDU session authentication and authorization procedure. If the PDU session was established for onboarding services in SNPN, or the PVS information request is included in the Extended protocol configuration options IE of the PDU SESSION ESTABLISHMENT REQUEST message establishing a PDU session providing connectivity for configuration of SNPN subscription parameters in PLMN via the user plane, the network may include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT ACCEPT message and include the PVS IP address(es) or the PVS name(s) or both associated with the DNN and S-NSSAI of the established PDU session, if available. If the PVS information request is included in the Extended protocol configuration options IE of the PDU SESSION ESTABLISHMENT REQUEST message establishing the PDU session providing connectivity for configuration of a UE via the user plane with credentials for PDU session authentication and authorization procedure, based on the subscribed DNN(s) and S-NSSAI(s) of the UE and the DNN and S-NSSAI of the established PDU session, the network should include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT ACCEPT message and include the PVS IP address(es) or the PVS name(s) or both, which are associated with the established PDU session and per subscribed DNN(s) and S-NSSAI(s) of the UE, if available. If the PVS information request is included in the Extended protocol configuration options IE of the PDU SESSION ESTABLISHMENT REQUEST message establishing the PDU session providing connectivity for configuration of a UE via the user plane with credentials for NSSAA, based on the subscribed S-NSSAI(s) of the UE and the S-NSSAI of the established PDU session, the network should include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT ACCEPT message and include the PVS IP address(es) or the PVS name(s) or both, which are associated with the established PDU session and per subscribed S-NSSAI(s) of the UE, if available.

NOTE 23: If the PVS information request is included in the Extended protocol configuration options IE of the PDU SESSION ESTABLISHMENT REQUEST message establishing a PDU session providing connectivity for configuration of SNPN subscription parameters in SNPN via the user plane by a UE which is not registered for onboarding services in SNPN, the SMF can include the PVS IP address(es) or the PVS name(s) or both, associated with the DNN and S-NSSAI of the established PDU session, if available, in the Extended protocol configuration options IE of the PDU SESSION ESTABLISHMENT ACCEPT message.

The UE upon receiving one or more PVS IP address(es), if any, one or more the PVS name(s), if any, or both shall pass them to the upper layers.

NOTE 24: If several PVS IP addresses, several PVS name(s), or one or more PVS IP addresses and one or more PVS name(s) are received, how the UE uses this information is up to UE implementation.

If the UE indicates support for ECS configuration information provisioning by providing the ECS configuration information provisioning support indicator in the Extended protocol configuration options IE of the PDU SESSION ESTABLISHMENT REQUEST message, then the SMF may include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT ACCEPT message with

- at least one of ECS IPv4 Address(es), ECS IPv6 Address(es), and ECS FQDN(s);

- at least one associated ECSP identifier; and

- optionally, spatial validity conditions associated with the ECS address.

The UE upon receiving one or more ECS IPv4 address(es), if any, ECS IPv6 address(es), if any, or ECS FQDN(s), if any, with the associated spatial validity condition, if any, and an ECSP identifier shall pass them to the upper layers.

NOTE 25: The IP address(es) and/or FQDN(s) are associated with the ECSP identifier and replace previously provided ECS configuration information associated with the same ECSP identifier, if any.

If the SMF needs to provide DNS server address(es) to the UE and the UE has provided the DNS server IPv4 address request, the DNS server IPv6 address request or both of them, in the PDU SESSION ESTABLISHMENT REQUEST message, then the SMF shall include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT ACCEPT message with one or more DNS server IPv4 address(es), one or more DNS server IPv6 address(es) or both of them. If the UE supports receiving DNS server addresses in protocol configuration options and receives one or more DNS server IPv4 address(es), one or more DNS server IPv6 address(es) or both of them, in the Extended protocol configuration options IE of the PDU SESSION ESTABLISHMENT ACCEPT message, then the UE shall pass the received DNS server IPv4 address(es), if any, and the received DNS server IPv6 address(es), if any, to upper layers.

NOTE 26: The received DNS server address(es) replace previously provided DNS server address(es), if any.

If the PDU SESSION ESTABLISHMENT ACCEPT message includes the Received MBS container IE, for each of the Received MBS information:

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

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

If the PDU session is established for IMS signalling and the UE has requested P-CSCF IPv6 address or P-CSCF IPv4 address, the SMF shall include P-CSCF IP address(es) in the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT ACCEPT message.

NOTE 27: The P-CSCF selection functionality is specified in subclause 5.16.3.11 of 3GPP TS 23.501 [8].

Upon receipt of the PDU SESSION ESTABLISHMENT ACCEPT message, if the UE included the PDU session pair ID in the PDU SESSION ESTABLISHMENT REQUEST message, the UE shall associate the PDU session with the PDU session pair ID. If the UE included the RSN in the PDU SESSION ESTABLISHMENT REQUEST message, the UE shall associate the PDU session with the RSN.

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

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

If the PDU SESSION ESTABLISHMENT REQUEST message includes a MS support of MAC address range in 5GS indicator in the Extended protocol configuration options IE, the SMF:

a) shall consider that the UE supports a "destination MAC address range type" packet filter component and a "source MAC address range type" packet filter component; and

b) if the SMF supports a "destination MAC address range type" packet filter component and a "source MAC address range type" packet filter component and enables the UE to request QoS rules with a "destination MAC address range type" packet filter component and a "source MAC address range type" packet filter component, shall include the Extended protocol configuration options IE in the PDU SESSION ESTABLISHMENT ACCEPT message and shall include the Network support of MAC address range in 5GS indicator in the Extended protocol configuration options IE.

If the PDU SESSION ESTABLISHMENT ACCEPT message includes a Network support of MAC address range in 5GS indicator in the Extended protocol configuration options IE, the UE shall consider that the network supports a "destination MAC address range type" packet filter component and a "source MAC address range type" packet filter component.

NOTE 28: Handling of indication that network allows the use of EDC or that network requires the use of EDC is specified in 3GPP TS 23.548 [182].

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

8.2.10 UL NAS transport

8.2.10.1 Message definition

The UL NAS TRANSPORT message transports message payload and associated information to the AMF. See table 8.2.10.1.1.

Message type: UL NAS TRANSPORT

Significance: dual

Direction: UE to network

**Table 8.2.10.1.1: UL NAS TRANSPORT message content**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **IEI** | **Information Element** | **Type/Reference** | **Presence** | **Format** | **Length** |
|  | Extended protocol discriminator | Extended protocol discriminator9.2 | M | V | 1 |
|  | Security header type | Security header type9.3 | M | V | 1/2 |
|  | Spare half octet | Spare half octet9.5 | M | V | 1/2 |
|  | UL NAS TRANSPORT message identity | Message type9.7 | M | V | 1 |
|  | Payload container type | Payload container type9.11.3.40 | M | V | 1/2 |
|  | Spare half octet | Spare half octet9.5 | M | V | 1/2 |
|  | Payload container | Payload container9.11.3.39 | M | LV-E | 3-65537 |
| 12 | PDU session ID | PDU session identity 29.11.3.41 | C | TV | 2 |
| 59 | Old PDU session ID | PDU session identity 29.11.3.41 | O | TV | 2 |
| 8- | Request type | Request type9.11.3.47 | O | TV | 1 |
| 22 | S-NSSAI | S-NSSAI9.11.2.8 | O | TLV | 3-10 |
| 25 | DNN | DNN9.11.2.1B | O | TLV | 3-102 |
| 24 | Additional information | Additional information9.11.2.1 | O | TLV | 3-n |
| A- | MA PDU session information | MA PDU session information9.11.3.31A | O | TV | 1 |
| F- | Release assistance indication | Release assistance indication9.11.3.46A | O | TV | 1 |
| TBD | Alternative S-NSSAI | S-NSSAI9.11.2.8 | O | TLV | 3-10 |

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

#### 8.2.10.x Alternative S-NSSAI

The UE shall this IE if the UE can provide alternative S-NSSAI associated with the SNSAI to be replaced to the network

\*\*\*\*\* End of change \*\*\*\*\*