**3GPP TSG-CT WG1 Meeting #137-eC1-22xxxx**

**E-Meeting, 18th – 26th August 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **24.501** | **CR** | **4610** | **rev** | **1** | **Current version:** | **17.7.1** |  |
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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:***  | MBS Security keys update to the UE |
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| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5MBS |  | ***Date:*** | 2022-07-14 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)...Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | As specified in Annex W in TS 33.501 for MBS multicast security aspects:*The MSK may be updated based on the request from MB-SMF or AS (e.g., due to the change of authorization information) or based on the local policy (e.g., key lifetime expiration). When the MSK is updated, the MBSF shall send the new MSK with MBS session ID and its key ID to the MB-SMF and then the MB-SMF shall trigger the session update as specified in clause 7.2.6 in TS 23.247 [103]. The MSK with MBS session ID and the corresponding key ID are delivered to the UEs that has joined the multicast session.* The highlighted text indicates that, the updated MSK is delivered to the UE using the procedure in clause 7.2.6 in TS 23.247, i.e. using a network-triggered PDU Session Modification procedure.This CR captures the corresponding requirements for the above into the stage-3.**NOTE**: it is worth to note that, the LS **S3-221262** sent by SA3 emphasizes on the possibility to deliver both MSK and MTK simultaneously -i.e. in the same signalling message- which happens when the UE firstly joins the MBS session. See the following questions and answers from the LS:***Question 1:*** *Are (or can) MSK and MTK delivered simultaneously when using Control Plane procedure?****Answer 1:*** *Yes.****Question 2:*** *If the answer to Question 1 is Yes, is it a potential security flaw that the key which is used to protect MTK is delivered along with it?****Answer 2:*** *No. The primary use of MSK is to protect the delivery of updated MTK using MIKEY over UDP in the multicast channel.* |
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| ***Summary of change:*** | Adding a new trigger for the network-triggered PDU Session Modification procedure, which is for the purpose of updating the MBS multicast security keys, and doing corresponding updates in the MBS IE definition. |
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| ***Consequences if not approved:*** | No possibility for the network to update MBS multicast security keys to the UE over control plane and misalignment with what SA3 has specified. |
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| ***Clauses affected:*** | 6.3.2.1, 6.3.2.2, 6.3.2.3, 8.3.9.16, 9.11.4.31 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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

#### 6.3.2.1 General

The purpose of the network-requested PDU session modification procedure is to enable the network to modify a PDU session, re-negotiate header compression configuration associated to a PDU session, convey a port management information container, to trigger EAS rediscovery, provide updated DNS server address(es) due to the newly selected local DNS server or the newly selected EASDF, provide updated ECS configuration information, remove joined UE from one or more MBS multicast sessions associated with a PDU session, update ATSSS parameters (e.g. ATSSS rules), update the MBS service area or the security information of MBS multicast session that the UE has joined or to inform about the result of service-level AA procedure or C2 authorization for UAS services.

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

#### 6.3.2.2 Network-requested PDU session modification procedure initiation

In order to initiate the network-requested PDU session modification procedure, the SMF shall create a PDU SESSION MODIFICATION COMMAND message.

If the authorized QoS rules of the PDU session is modified or is marked as to be synchronised with the UE, the SMF shall set the Authorized QoS rules IE of the PDU SESSION MODIFICATION COMMAND message to the authorized QoS rules of the PDU session. 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. The SMF may bind service data flows for which the UE has requested traffic segregation to a dedicated QoS flow for the PDU session, if possible. Otherwise the SMF may bind the service data flows to an existing QoS flow. The SMF shall use only one dedicated QoS flow for traffic segregation. If the UE has requested traffic segregation for multiple service data flows with different QoS handling, the SMF shall bind all these service data flows to a single QoS flow. If the SMF allows traffic segregation for service data flows in a QoS rule, then the SMF shall create a new authorized QoS rule for these service data flows and shall delete packet filters corresponding to these service data flows from the other authorized QoS rules.

If the authorized QoS flow descriptions of the PDU session is modified or is marked as to be synchronised with the UE, the SMF shall set the Authorized QoS flow descriptions IE of the PDU SESSION MODIFICATION COMMAND message to the authorized QoS flow descriptions of the PDU session.

If SMF creates a new authorized QoS rule for a new QoS flow, then SMF shall include the authorized QoS flow description for that QoS flow in the Authorized QoS flow descriptions IE of the PDU SESSION MODIFICATION COMMAND message, if:

a) the newly created authorized QoS rules is for a new GBR QoS flow;

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

c) the new 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 new 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 0: In cases other than above listed cases, it is up to the SMF implementation to include the authorized QoS flow description of the new QoS flow for the new authorized QoS rule in the Authorized QoS flow descriptions IE of the PDU SESSION MODIFICATION COMMAND message.

If the session-AMBR of the PDU session is modified, the SMF shall set the selected Session-AMBR IE of the PDU SESSION MODIFICATION COMMAND message to the session-AMBR of the PDU session.

If interworking with EPS is supported for the PDU session and if the mapped EPS bearer contexts of the PDU session is modified, the SMF shall set the Mapped EPS bearer contexts IE of the PDU SESSION MODIFICATION COMMAND message to the mapped EPS bearer contexts of the PDU session. If the association between a QoS flow and the mapped EPS bearer context is changed, the SMF shall set the EPS bearer identity parameter in Authorized QoS flow descriptions IE of the PDU SESSION MODIFICATION COMMAND message to the new EPS bearer identity associated with the QoS flow.

If the network-requested PDU session modification procedure is triggered by a UE-requested PDU session modification procedure and the PDU SESSION MODIFICATION REQUEST message includes a 5GSM capability IE, the SMF shall:

a) if the RQoS bit is set to:

1) "Reflective QoS supported", consider that the UE supports reflective QoS for this PDU session; or

2) "Reflective QoS not supported", consider that the UE does not support reflective QoS for this PDU session; and;

b) if the MH6-PDU bit is set to:

1) "Multi-homed IPv6 PDU session supported", consider that this PDU session is supported to use multiple IPv6 prefixes; or

2) "Multi-homed IPv6 PDU session not supported", consider that this PDU session is not supported to use multiple IPv6 prefixes.

If the SMF considers that reflective QoS is supported for QoS flows belonging to this PDU session, the SMF may include the RQ timer IE set to an RQ timer value in the PDU SESSION MODIFICATION COMMAND message.

If a port management information container needs to be delivered (see 3GPP TS 23.501 [8] and 3GPP TS 23.502 [9]) and the UE has set the TPMIC bit to "Transport of port management information container supported" in the 5GSM capability IE, the SMF shall include a Port management information container IE in the PDU SESSION MODIFICATION COMMAND message.

For a PDN connection established when in S1 mode, upon the first inter-system change from S1 mode to N1 mode, if the network-requested PDU session modification procedure is triggered by a UE-requested PDU session modification procedure, the PDU session type is "IPv4", "IPv6", "IPv4v6" or "Ethernet" and the PDU SESSION MODIFICATION 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.

For a PDN connection established when in S1 mode, upon the first inter-system change from S1 mode to N1 mode, if the network-requested PDU session modification procedure is triggered by a UE-requested PDU session modification procedure, 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.

For a PDN connection established when in S1 mode, upon the first inter-system change from S1 mode to N1 mode, if the network-requested PDU session modification procedure is triggered by a UE-requested PDU session modification procedure and the SMF determines, based on local policies or configurations in the SMF and the Always-on PDU session requested IE in the PDU SESSION MODIFICATION REQUEST message (if available), that either:

a) the requested PDU session needs to be an always-on PDU session, the SMF shall include the Always-on PDU session indication IE in the PDU SESSION MODIFICATION COMMAND message and shall set the value to "Always-on PDU session required"; or

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

1) 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 MODIFICATION COMMAND message and shall set the value to "Always-on PDU session not allowed"; or

2) 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 MODIFICATION COMMAND message.

For a PDN connection established when in S1 mode, upon the first inter-system change from S1 mode to N1 mode, if the network-requested PDU session modification procedure is triggered by a UE-requested PDU session modification procedure, the UE supports EDC and the network allows the use of EDC, then the SMF shall include the Extended protocol configuration options IE in the PDU SESSION MODIFICATION COMMAND message with the EDC usage allowed indicator.

For a PDN connection established when in S1 mode, upon the first inter-system change from S1 mode to N1 mode, if the network-requested PDU session modification procedure is triggered by a UE-requested PDU session modification procedure, the UE supports EDC and the network requires the use of EDC, then the SMF shall include the Extended protocol configuration options IE in the PDU SESSION MODIFICATION COMMAND message with the EDC usage required indicator.

If a QoS flow for URLLC is created in a PDU session and the SMF has not provided the Always-on PDU session indication IE with the value set to "Always-on PDU session required" in the UE-requested PDU session establishment procedure or a network-requested PDU session modification procedure for the PDU session, the SMF shall include the Always-on PDU session indication IE in the PDU SESSION MODIFICATION COMMAND message and shall set the value to "Always-on PDU session required".

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 and remove the derived QoS rule(s) associated with the PDU session, if any.

If the network-requested PDU session modification procedure is triggered by a UE-requested PDU session modification procedure, the SMF shall set the PTI IE of the PDU SESSION MODIFICATION COMMAND message to the PTI of the PDU SESSION MODIFICATION REQUEST message received as part of the UE-requested PDU session modification procedure.

If the network-requested PDU session modification procedure is triggered by a UE-requested PDU session modification procedure and the UE has included the Requested MBS container IE in the PDU SESSION MODIFICATION REQUEST message with the MBS operation set to "Join MBS session", the SMF:

a) shall include the TMGI for the 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 MBS session starts, and shall include the MBS security container in each of those Received MBS information if security protection is applied for that MBS session, 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 1: The network determines whether security protection applies or not for the MBS session as specified in 3GPP TS 33.501.

b) shall include the TMGI for MBS session IDs that the UE is rejected 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 "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 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 2: For an MBS multicast 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 MODIFICATION COMMAND message. If the UE has set the Type of MBS session ID to "Source specific IP multicast address" in the Requested MBS container IE for certain MBS session(s) in the PDU SESSION MODIFICATION 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 MBS sessions.

NOTE 3: 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 MBS session ID and the provided TMGI.

NOTE 4: In SNPN, TMGI is used together with NID to identify an MBS Session.

If:

a) the SMF wants to remove joined UE from one or more MBS sessions; or

b) the network-requested PDU session modification procedure is triggered by a UE-requested PDU session modification procedure and the UE has included the Requested MBS container IE in the PDU SESSION MODIFICATION REQUEST message with the MBS operation set to "Leave MBS session",

the SMF shall include the MBS session IDs that the UE is removed from, if any, in the Received MBS container IE in the PDU SESSION MODIFICATION COMMAND message and shall set the MBS decision to "Remove UE from MBS session" for each of those Received MBS information. The SMF may include the updated MBS service area in each of the Received MBS information, if any. The SMF may delete the QoS flows associated for the multicast by including the Authorized QoS flow descriptions IE in the PDU SESSION MODIFICATION COMMAND message. If the UE is removed from MBS session due to the MBS session release, the SMF shall set the Rejection cause to "MBS session is released". The SMF shall include the Rejection cause for each of the Received MBS information, if any, and set its value with the reason of removing the UE from the corresponding MBS session.

NOTE 5: based on operator's policy, e.g. after a locally configured time period, the SMF is allowed to trigger the removal of joined UE from an MBS session when the UE moves outside all the MBS service area(s) of that MBS session.

If the SMF wants to update the MBS service area of an MBS session that the UE has joined, the SMF shall include the corresponding MBS session ID and the updated MBS service area in the Received MBS container IE in the PDU SESSION MODIFICATION COMMAND message, and shall set the MBS decision to "MBS service area update" in the Received MBS information.

NOTE 6: The MBS service area of an MBS multicast session is also allowed to be updated to the UE using the MBS service announcement as described in 3GPP TS 23.247 [53], which is out of scope of this specification.

If the SMF wants to update the MBS security information of an MBS session that the UE has joined, the SMF shall include the corresponding MBS session ID and the MBS security container in the Received MBS container IE in the PDU SESSION MODIFICATION COMMAND message, and shall set the MBS Decision to "MBS security information update" in the Received MBS information.

If the network needs to update ATSSS parameters (see subclause 5.2.4 of 3GPP TS 24.193 [13B]), the SMF shall include the ATSSS container IE with the updates of ATSSS parameters in the PDU SESSION MODIFICATION COMMAND message.

If the network-requested PDU session modification procedure is not triggered by a UE-requested PDU session modification procedure, the SMF shall set the PTI IE of the PDU SESSION MODIFICATION COMMAND message to "No procedure transaction identity assigned".

If the selected SSC mode of the PDU session is "SSC mode 3" and the SMF requests the relocation of SSC mode 3 PDU session anchor with multiple PDU sessions as specified in 3GPP TS 23.502 [9], the SMF shall include 5GSM cause #39 "reactivation requested" , in the PDU SESSION MODIFICATION COMMAND message, and may include the PDU session address lifetime in a PDU session address lifetime parameter in the Extended protocol configuration options IE of the PDU SESSION MODIFICATION COMMAND message.

The SMF shall send the PDU SESSION MODIFICATION COMMAND message, and the SMF shall start timer T3591 (see example in figure 6.3.2.2.1).

NOTE 7: If the SMF requests the relocation of SSC mode 3 PDU session anchor with multiple PDU sessions as specified in 3GPP TS 23.502 [9], the reallocation requested indication indicating whether the SMF is to be reallocated or the SMF is to be reused is provided to the AMF.

If the control plane CIoT 5GS optimization is enabled for a PDU session and the IP header compression configuration IE was included in the PDU SESSION ESTABLISHMENT REQUEST message or the PDU SESSION MODIFICATION REQUEST message, and the SMF supports control plane CIoT 5GS optimization and IP header compression for control plane CIoT 5GS optimization, the SMF may include the IP header compression configuration IE in the PDU SESSION MODIFICATION COMMAND message to re-negotiate IP header compression configuration associated to the PDU session.

If the control plane CIoT 5GS optimization is enabled for a PDU session and the Ethernet header compression configuration IE was included in the PDU SESSION ESTABLISHMENT REQUEST message or the PDU SESSION MODIFICATION REQUEST message, and the SMF supports control plane CIoT 5GS optimization and Ethernet header compression for control plane CIoT 5GS optimization, the SMF may include the Ethernet header compression configuration IE in the PDU SESSION MODIFICATION COMMAND message to re-configure Ethernet header compression configuration associated with the PDU session.

If the network-requested PDU session modification procedure is associated with C2 authorization procedure, the SMF shall send the PDU SESSION MODIFICATION COMMAND message by 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 the C2 authorization payload is provided from the UAS-NF, 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"; and

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

NOTE 8: The C2 authorization payload in the service-level-AA payload can include one or both of the C2 session security information and C2 pairing information.

If the service-level-AA procedure is triggered for the established PDU session for UAS services with re-authentication purpose, and the SMF is provided by the UAS-NF with the successful UUAA-SM result, the SMF shall transmit a PDU SESSION MODIFICATION COMMAND message to the UE, where the PDU SESSION MODIFICATION COMMAND message shall include the Service-level-AA container IE containing:

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

b) if received the CAA-level UAV ID from the UAS-NF, the service-level device ID with the value set to the CAA-level UAV ID; and

c) if received the UUAA payload from the UAS-NF, the service-level-AA payload with the value set to the UUAA payload.

If the SMF needs to provide new ECS configuration information to the UE and the UE has indicated support for ECS configuration information provisioning in the PDU SESSION ESTABLISHMENT REQUEST message or the PDU SESSION MODIFICATION REQUEST message, then the SMF may include the Extended protocol configuration options IE in the PDU SESSION MODIFICATION COMMAND message with:

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

- at least one associated ECSP identifier;and

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

NOTE 9: 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 or a PDU SESSION MODIFICATION REQUEST message, then the SMF shall include the Extended protocol configuration options IE in the PDU SESSION MODIFICATION COMMAND message with one or more DNS server IPv4 address(es), one or more DNS server IPv6 address(es) or both of them.

If the SMF needs to trigger EAS rediscovery and the UE has indicated support of the EAS rediscovery in the PDU SESSION ESTABLISHMENT REQUEST message or the PDU SESSION MODIFICATION REQUEST message, then the SMF shall include the Extended protocol configuration options IE in the PDU SESSION MODIFICATION COMMAND message:

a) with the EAS rediscovery indication without indicated impact; or

b) with the following:

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

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

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

4) any combination of the above.

When UE has requested P-CSCF IPv6 address or P-CSCF IPv4 address and the SMF has provided P-CSCF address(es) during the PDU session establishment procedure, if the network-requested PDU session modification procedure is triggered for P-CSCF restoration, the SMF shall include the P-CSCF IP address(es) in the Extended protocol configuration options IE in the PDU SESSION MODIFICATION COMMAND message as specified in subclause 5.8.2.2 of 3GPP TS 23.380 [54].



Figure 6.3.2.2.1: Network-requested PDU session modification procedure

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

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

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

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

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

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

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

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

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

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

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

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

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

a) Semantic error in the mapped EPS bearer operation:

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

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

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

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

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

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

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

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

1) Semantic errors in TFT operations:

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

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

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

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

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

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

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

 In case ii, the UE shall:

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

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

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

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

2) Syntactical errors in TFT operations:

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

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

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

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

v) Void.

vi) When there are other types of syntactical errors in the coding of the TFT IE, such as a mismatch between the number of packet filters subfield, and the number of packet filters in the packet filter list when the TFT operation is "delete existing TFT" or "create new TFT", or the number of packet filters subfield is larger than the maximum possible number of packet filters in the packet filter list.

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

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

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

3) Semantic errors in packet filters:

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

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

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

4) Syntactical errors in packet filters:

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

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

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

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

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

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

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

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

If:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2) established over only single access:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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 MODIFICATION COMMAND message contains an EPS bearer identity (EBI), then the UE shall locally remove the EPS bearer identity (EBI) from the parameters list field of such one or more authorized QoS flow descriptions; and

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

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

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

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

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

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

b) otherwise:

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

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

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

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

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

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

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

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

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

e) if the MBS decision is set to "MBS security information update", the UE shall replace the current MBS security information with the MBS security information received in the MBS security container associated with the received TMGI.

If the UE has indicated support for ECS configuration information provisioning, then upon receiving

- one or more ECS IPv4 address(es), ECS IPv6 address(es), ECS FQDN(s);

- one or more associated ECSP identifier(s);and

- optionally spatial validity conditions associated with the ECS address

in the Extended protocol configuration options IE of the PDU SESSION MODIFICATION COMMAND message, then the UE shall pass them to the upper layers..

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

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

If the UE supports the EAS rediscovery and receives:

a) the EAS rediscovery indication without indicated impact; or

b) the following:

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

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

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

4) any combination of the above;

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

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

Upon receipt of PDU SESSION MODIFICATION COMMAND message, if the network-requested PDU session modification procedure is triggered by a UE-requested PDU session modification procedure, the Service-level-AA container IE is included, then the UE shall forward the service-level-AA contents of the Service-level-AA container IE to the upper layers.

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

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

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

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

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

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

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

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

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

#### 8.3.9.16 Received MBS container

The network shall include this IE if:

- the UE has requested to join or leave one or more MBS sessions;

- the network wants to remove joined UE from one or more MBS sessions;

- the network wants to update the MBS service area of MBS session that the UE has joined; or

- the network wants to update the MBS security information of MBS session that the UE has joined.

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

#### 9.11.4.31 Received MBS container

The purpose of the Received MBS container information element is to indicate to the UE the information of the MBS sessions that the network accepts or rejects the UE to join, the information of the MBS sessions that the UE is removed from, or the information of the updated MBS service area.

The Received MBS container information element is coded as shown in figure 9.11.4.31.1, figure 9.11.4.31.2, figure 9.11.4.31.3, figure 9.11.4.31.4, figure 9.11.4.31.5, figure 9.11.4.31.6, figure 9.11.4.31.7, figure 9.11.4.31.8, figure 9.11.4.31.9, figure 9.11.4.31.10 and table 9.11.4.31.1.

The Received MBS container is a type 6 information element with a minimum length of 9 octets and a maximum length of 65538 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Received MBS container IEI | octet 1 |
| Length of Received MBS container contents | octet 2octet 3 |
| Received MBS information 1 | octet 4octet i |
| Received MBS information 2 | octet i+1\*octet l\* |
| … | octet l+1\*octet m\* |
| Received MBS information p | octet m+1\*octet n\* |

Figure 9.11.4.31.1: Received MBS container information element

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Rejection cause | MSAI | MD | octet 4 |
| 0 | 0 | 0 | 0 | MSCI | MTI | IPAE | octet 5 |
| spare |  |  |
| TMGI | octet 6octet j |
| Source IP address information | octet j+1\*octet v\* |
| Destination IP address information | octet v+1\*octet k\* |
| MBS service area | octet k+1\*octet s\* |
| MBS timers | octet s+1\*octet i\* |
| MBS security container | octet i+1\*octet e\* |

Figure 9.11.4.31.2: Received MBS information

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| MBS TAI list  | octet k+1\*octet i\* |

Figure 9.11.4.31.3: MBS service area for MBS service area indication = "MBS service area included as MBS TAI list"

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| NR CGI list | octet k+1\*octet i\* |

Figure 9.11.4.31.4: MBS service area for MBS service area indication = "MBS service area included as NR CGI list"

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| MBS TAI list  | octet k+1\*octet y\* |
| NR CGI list | octet y+1\*octet i\* |

Figure 9.11.4.31.5: MBS service area for MBS service area indication = "MBS service area included as MBS TAI list and NR CGI list"

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of NR CGI list contents | octet k+1\* |
| NR CGI 1 | octet k+2\*octet k+9\* |
| NR CGI 2 | octet k+10\*octet k+17\* |
| … | octet k+18\*octet c\* |
| NR CGI w | octet c+1\*octet s\* |

Figure 9.11.4.31.6: NR CGI list

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| NR Cell ID | octet k+1\* |
| octet k+5\* |
| MCC digit 2  | MCC digit 1 | octet k+6\* |
| MNC digit 3 | MCC digit 3 | octet k+7\* |
| MNC digit 2 | MNC digit 1 | octet k+8\* |

Figure 9.11.4.31.7: NR CGI

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| MBS start time | octet s+1\*octet s+6\* |

Figure 9.11.4.31.8: MBS timers for MBS timer indication = "MBS start time"

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| MBS back-off timer | octet s+1\* |

Figure 9.11.4.31.9: MBS timers for MBS timer indication = "MBS back-off timer"

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| MSK ID | octet i+1\*octet i+4\* |
| MSK | octet i+5\*octet i+20\* |
| MTK ID | octet i+21\*octet i+22\* |
| Encrypted MTK | octet i+23\*octet i+38\* |

Figure 9.11.4.31.12: MBS security container

**Table 9.11.4.31.1: Received MBS container information element**

|  |
| --- |
| MBS decision (MD) (bits 1 to 3 of octet 4)  |
| The MD indicates the network decision of the join requested by the UE, the network request to remove the UE from the MBS session or the network request to update the MBS service area or the security information of MBS multicast session. |
| Bits |
| **3** | **2** | **1** |  |
| 0 | 0 | 1 | MBS service area update |
| 0 | 1 | 0 | MBS join is accepted |
| 0 | 1 | 1 | MBS join is rejected |
| 1 | 0 | 0 | Remove UE from MBS session |
| 1 | 0 | 1 | MBS security information update |
| All other values are unused in this version of the specification and interpreted as 000 if received. |
|  |
| If MD is set to "MBS join is rejected" or “Remove UE from MBS session”, bits 6 to 8 of octet 4 shall contain the Rejection cause which indicates the reason of rejecting the MBS join request or the reason of removing the UE from MBS session, respectively, otherwise bits 6 to 8 of octet 4 are spare and shall be coded as zero. |
|  |
| MBS service area indication (MSAI) (bits 4 and 5 of octet 4) |
| The MSAI indicates whether and how the MBS service area is included in the IE. |
| Bits |
| **5** | **4** |  |
| 0 | 0 | MBS service area not included |
| 0 | 1 | MBS service area included as MBS TAI list |
| 1 | 0 | MBS service area included as NR CGI list |
| 1 | 1 | MBS service area included as MBS TAI list and NR CGI list |
|  |
| Rejection cause (bits 6 to 8 of octet 4) |
| The Rejection cause indicates the reason of rejecting the join request or the reason of removing the UE from the MBS session. |
| Bits |
| **8** | **7** | **6** |  |  |
| 0 | 0 | 0 |  | No additional information provided |
| 0 | 0 | 1 |  | Insufficient resources |
| 0 | 1 | 0 |  | User is not authorized to use MBS service  |
| 0 | 1 | 1 |  | MBS session has not started or will not start soon |
| 1 | 0 | 0 |  | User is outside of local MBS service area |
| 1 | 0 | 1 |  | Session context not found |
| 1 | 1 | 0 |  | MBS session is released |
| All other values are unused in this version of the specification and interpreted as 000 if received. |
|  |
| IP address existence (IPAE) (bit1 of octet 5) |
| The IPAE indicates whether the Source IP address information and Destination IP address information are included in the IE or not. |
| Bit |
| **1** |  |  |
| 0 |  | Source and destination IP address information not included |
| 1 |  | Source and destination IP address information included |
|  |
| If IPAE is set to "Source and destination IP address information included", Source IP address information and Destination IP address information shall be included in the IE, otherwise Source IP address information and Destination IP address information shall not be included in the IE. |
|  |
| MBS timer indication (MTI) (bits 2 and 3 of octet 5) |
| The MTI indicates whether there is MBS timer included in the IE or not. |
| Bit |
| **3** | **2** |  |
| 0 | 0 | No MBS timers included |
| 0 | 1 | MBS start time included |
| 1 | 0 | MBS back-off timer included |
| All other values are unused in this version of the specification and interpreted as 00 if received |
|  |
| MBS security container indication (MSCI) (bit 4 of octet 5) |
| The MSCI indicates whether the MBS security container is included in the IE or not |
| Bit |
| **4** |
| 0 | MBS security container not included |
| 1 | MBS security container included |
| Bits 5 to 8 of octet 5 are spare and shall be coded as zero. |
| TMGI (octets 6 to j) |
| The TMGI is coded as described in subclause 10.5.6.13 in 3GPP TS 24.008 [12] starting from octet 2. |
|  |
| Source IP address information (octet j+1 to v) |
| This field contains the IP unicast address used as source address in IP packets for identifying the source of the multicast service. The value of this field is copied from the corresponding source IP address information in the requested MBS container. |
|  |
| Destination IP address information (octet v+1 to k) |
| This field contains the IP multicast address used as destination address in related IP packets for identifying a multicast service associated with the source. The value of this field is copied from the corresponding destination IP address information in the requested MBS container. |
|  |
| MBS service area (octet k+1 to s) |
| The MBS service area contains the MBS TAI list, the NR CGI list or both, that identifies the service area(s) for a local MBS service. |
|  |
| MBS TAI list (octet k+1 to s) |
| The MBS TAI list is coded as octet 2 and above of the 5GS tracking area identity list IE defined in subclause 9.11.3.9. |
|  |
| NR CGI (octet k+2 to k+9) |
| The NR CGI globally identifies an NR cell. It contains the NR Cell ID and the PLMN ID of that cell. |
|  |
| NR Cell ID (octet k+2 to k+6) |
| The NR Cell ID consists of 36 bits identifying an NR Cell ID as specified in subclause 9.3.1.7 of 3GPP TS 38.413 [31], in hexadecimal representation. Bit 8 of octet y+1 is the most significant bit and bit 5 of octet y+5 is the least significant bit. Bits 1 to 4 of octet y+5 are spare and shall be coded as zero. |
| MCC, Mobile country code (octet k+6 and bits 1 to 4 octet k+7)The MCC field is coded as in ITU-T Recommendation E.212 [42], annex A. |
|  |
| MNC, Mobile network code (bits 5 to 8 of octet k+7 and octet k+8)The coding of this field is the responsibility of each administration but BCD coding shall be used. The MNC shall consist of 2 or 3 digits. If a network operator decides to use only two digits in the MNC, bits 5 to 8 of octet k+7 shall be coded as "1111". |
|  |
| The MCC and MNC digits are coded as octets 6 to 8 of the Temporary mobile group identity IE in figure 10.5.154 of 3GPP TS 24.008 [12]. |
|  |
| MBS start time (octets s+1 to s+6) |
| The MBS start time is coded as described in subclause 10.5.3.9 in 3GPP TS 24.008 [12] starting from octet 2 till octet 7. |
|  |
| MBS back-off timer (octet s+1) |
| The MBS back-off timer is coded as octet 3 described in subclause 10.5.7.4a in 3GPP TS 24.008 [12]. |
|  |
| MBS Service Key Identifier (MSK ID) (octets i+1 to i+4) |
| The MSK ID is 4 bytes long and is defined in 3GPP TS 33.246 [57]. |
|  |
| MBS Service Key (MSK) (octets i+5 to i+20) |
| The MSK is 16 bytes long and is defined in 3GPP TS 33.246 [57]. |
|  |
| MBS Traffic Key Identifier (MTK ID) (octets i+21 to i+22) |
| The MTK ID is 2 bytes long and is defined in 3GPP TS 33.246 [57]. |
|  |
| Encrypted MBS Traffic Key (Encrypted MTK) (octets i+23 to i+38) |
| The Encrypted MTK is 16 bytes long and contains the encrypted version of MTK using MSK as defined in 3GPP TS 33.246 [57]. |
|  |
| NOTE: The IPAE bit is not expected to be set to "Source and destination IP address information included" when the MBS decision (MD) indicates "Remove UE from MBS session". |

\*\*\*\*\* End of changes \*\*\*\*\*