**3GPP TSG-CT WG1 Meeting #133-eC1-216552**

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

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **24.501** | **CR** | **3611** | **rev** | **2** | **Current version:** | **17.4.1** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

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|  |
| ***Title:***  | Optimization of the multicast join procedure |
|  |  |
| ***Source to WG:*** | Qualcomm Incorporated |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5MBS |  | ***Date:*** | 2021-10-27 |
|  |  |  |  |  |
| ***Category:*** | **C** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)...Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | When the UE requests to join a multicast session using the PDU session establishment procedure and the multicast join request is rejected, the PDU session should not be established. Establishing the PDU session in this case would necessitate a PDU session release procedure. From the signalling efficiency point of view, it is preferrable to avoid this additional procedure and reject the PDU session establishment.  |
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| ***Summary of change:*** | Add optional Requested MBS container IE (indicating join reject) in the PDU SESSION ESTABLISHMENT REJECT message. Add new 5GSM cause |
|  |  |
| ***Consequences if not approved:*** | Unnecessary additional signalling to release PDU session may waste the UE and the network resources. |
|  |  |
| ***Clauses affected:*** | 6.4.1.4.1, 8.3.3.1, 8.3.3.x (new), B.1 |
|  |  |
|  | **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:*** | R1: revisions during the CT1#132e meeting (agreed)R2: re-submission to CT1#133e. Added the new 5GSM cause |

\*\*\* first change \*\*\*

#### 6.4.1.4 UE-requested PDU session establishment procedure not accepted by the network

##### 6.4.1.4.1 General

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

The SMF shall set the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message to indicate the reason for rejecting the PDU session establishment.

The 5GSM cause IE typically indicates one of the following SM cause values:

#8 operator determined barring;

#26 insufficient resources;

#27 missing or unknown DNN;

#28 unknown PDU session type;

#29 user authentication or authorization failed;

#31 request rejected, unspecified;

#32 service option not supported;

#33 requested service option not subscribed;

#35 PTI already in use;

#38 network failure;

#39 reactivation requested;

#46 out of LADN service area;

#50 PDU session type IPv4 only allowed;

#51 PDU session type IPv6 only allowed;

#54 PDU session does not exist;

#57: PDU session type IPv4v6 only allowed;

#58: PDU session type Unstructured only allowed;

#61: PDU session type Ethernet only allowed;

#67 insufficient resources for specific slice and DNN;

#68 not supported SSC mode;

#69 insufficient resources for specific slice;

#70 missing or unknown DNN in a slice;

#82 maximum data rate per UE for user-plane integrity protection is too low; or

#95 – 111 protocol errors.

If the PDU SESSION ESTABLISHMENT REQUEST message includes a PDU session type IE set to "IPv6", and the subscription, the SMF configuration, or both, are limited to IPv4 only for the requested DNN, the SMF shall include the 5GSM cause value #50 "PDU session type IPv4 only allowed" in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message.

If the PDU SESSION ESTABLISHMENT REQUEST message includes a PDU session type IE set to "IPv6", and the subscription, the SMF configuration, or both, support none of "IPv4" and "IPv6" PDU session types for the requested DNN, the SMF shall include the 5GSM cause value #28 "unknown PDU session type" in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message.

If the PDU SESSION ESTABLISHMENT REQUEST message includes a PDU session type IE set to "IPv4", and the subscription, the SMF configuration, or both, are limited to IPv6 only for the requested DNN, the SMF shall include the 5GSM cause value #51 "PDU session type IPv6 only allowed" in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message.

If the PDU SESSION ESTABLISHMENT REQUEST message includes a PDU session type IE set to "IPv4", and the subscription, the SMF configuration, or both, support none of "IPv4" and "IPv6" PDU session types for the requested DNN, the SMF shall include the 5GSM cause value #28 "unknown PDU session type" in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message.

If the PDU SESSION ESTABLISHMENT REQUEST message includes a PDU session type IE set to "IPv4v6", and the subscription, the SMF configuration, or both, support none of "IPv4v6", "IPv4" and "IPv6" PDU session types for the requested DNN, the SMF shall include the 5GSM cause value #28 "unknown PDU session type" in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message.

If the PDU SESSION ESTABLISHMENT REQUEST message includes a PDU session type IE set to "Unstructured" or "Ethernet", and the subscription, the SMF configuration, or both, do not support the PDU session type for the requested DNN, the SMF shall include the 5GSM cause value #28 "unknown PDU session type" in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message.

If the PDU SESSION ESTABLISHMENT REQUEST message is to establish an MA PDU session and includes a PDU session type IE set to "Unstructured", and the SMF configuration does not support the PDU session type, the SMF shall include the 5GSM cause value #28 "unknown PDU session type" in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message.

If the PDU SESSION ESTABLISHMENT REQUEST message contains the SSC mode IE indicating an SSC mode not supported by the subscription, the SMF configuration, or both of them, and the SMF decides to rejects the PDU session establishment, the SMF shall include the 5GSM cause value #68 "not supported SSC mode" in the 5GSM cause IE and the SSC modes allowed by SMF in the Allowed SSC mode IE of the PDU SESSION ESTABLISHMENT REJECT message.

If the PDU SESSION ESTABLISHMENT REQUEST message is to establish an MA PDU session and MA PDU session is not allowed due to operator policy and subscription, and the SMF decides to reject the PDU session establishment, the SMF shall include the 5GSM cause value #33 "requested service option not subscribed" in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message.

If the PDU SESSION ESTABLISHMENT REQUEST message is identified to be for C2 communication and does not include the C2 aviation payload, the SMF shall reject the PDU SESSION ESTABLISHMENT REQUEST message by transmitting a PDU SESSION ESTABLISHMENT REJECT message with 5GSM cause IE set to 5GSM cause value #TBD.

Editor's note: Which 5GSM cause value needs to be included in the PDU SESSION ESTABLISHMENT REJECT message, is FFS.

In 3GPP access, if the operator's configuration requires user-plane integrity protection for the PDU session and, the maximum data rate per UE for user-plane integrity protection supported by the UE for uplink or the maximum data rate per UE for user-plane integrity protection supported by the UE for downlink, or both, are lower than required by the operator's configuration, the SMF shall include the 5GSM cause value #82 "maximum data rate per UE for user-plane integrity protection is too low" in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message.

If the UE requests a PDU session establishment for an LADN when the UE is located outside of the LADN service area, the SMF shall include the 5GSM cause value #46 "out of LADN service area" in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message.

If the DN authentication of the UE was performed with the PDU session authentication and authorization procedure and completed unsuccessfully, the SMF shall include the 5GSM cause value #29 "user authentication or authorization failed" in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message and shall set the EAP message IE of the PDU SESSION ESTABLISHMENT REJECT message to an EAP-failure message as specified in IETF RFC 3748 [34], provided by the DN.

If the DN authentication of the UE was performed with the service-level authentication and authorization procedure and completed unsuccessfully, the SMF shall include the 5GSM cause value #29 "user authentication or authorization failed" in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message and shall include the service-level AA response provided by DN in the service-level AA container IE of the PDU SESSION ESTABLISHMENT REJECT message.

Based on the local policy and user's subscription data, if a PDU session is being established with the request type set to "existing PDU session" and the SMF determines the UE has:

a) moved between a tracking area in NB-N1 mode and a tracking area in WB-N1 mode;

b) moved between a tracking area in NB-S1 mode and a tracking area in WB-N1 mode; or

c) moved between a tracking area in WB-S1 mode and a tracking area in NB-N1 mode,

the SMF may reject the PDU SESSION ESTABLISHMENT REQUEST message and:

a) include the 5GSM cause value #39 "reactivation requested" in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message; or

b) include a 5GSM cause value other than #39 "reactivation requested" in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message.

NOTE 1: The included 5GSM cause value is up to the network implementation.

If the PDU session cannot be established due to resource unavailability in the UPF, the SMF shall include the 5GSM cause value #26 "insufficient resources" in the 5GSM cause IE of the PDU SESSION ESTABLISHMENT REJECT message.

Based on the user's subscription data and the operator policy, if the SMF determines that the UUAA-SM procedure needs to be performed for a UE but the SMF does not receives the Service-level device ID set to the CAA-level UAV ID in the Service-level-AA container IE of the PDU SESSION ESTABLISHMENT REQUEST message from the UE, the SMF shall send the PDU SESSION ESTABLISHMENT REJECT message to the UE.

Editor's note: Which 5GSM cause value needs to be included in the PDU SESSION ESTABLISHMENT REJECT message and how to inform the UE about need to provide the CAA-level UAV ID is FFS.

If the PDU SESSION ESTABLISHMENT REQUEST message contains the Requested MBS container IE and the SMF determines that the request to join MBS session needs to be rejected for all MBS sessions listed in Requested MBS container IE, the SMF may send the PDU SESSION ESTABLISHMENT REJECT message to the UE. In that case, the SMF shall include:

- 5GSM cause value #xx "All associated MBS sessions released or rejected" in the 5GSM cause IE; and

- Received MBS container IE. The MBS Decision shall be set to "MBS join is rejected" with an appropriate rejection cause for each rejected MBS session.

NOTE 2: The SMF rejects the PDU SESSION ESTABLISHMENT REQUEST message if the SMF is able to decide that the PDU session is not needed for any other purposes.

The network may include a Back-off timer value IE in the PDU SESSION ESTABLISHMENT REJECT message.

If the 5GSM cause value is #26 "insufficient resources", #67 "insufficient resources for specific slice and DNN", or #69 "insufficient resources for specific slice" and the PDU SESSION ESTABLISHMENT REQUEST message was received from a UE configured for high priority access in selected PLMN or the request type provided during the PDU session establishment is set to "initial emergency request" or "existing emergency PDU session", the network shall not include a Back-off timer value IE.

If the 5GSM cause value is #29 "user authentication or authorization failed ", the network should include a Back-off timer value IE.

If the Back-off timer value IE is included and the 5GSM cause value is different from #26 "insufficient resources", #28 "unknown PDU session type", #46 "out of LADN service area", "#50 "PDU session type IPv4 only allowed", #51 "PDU session type IPv6 only allowed", #54 "PDU session does not exist", #57 "PDU session type IPv4v6 only allowed", #58 "PDU session type Unstructured only allowed", #61 "PDU session type Ethernet only allowed", #67 "insufficient resources for specific slice and DNN", #68 "not supported SSC mode", and #69 "insufficient resources for specific slice", the network may include the Re-attempt indicator IE to indicate whether the UE is allowed to attempt a PDN connectivity procedure in the PLMN for the same DNN in S1 mode, and whether another attempt in S1 mode or in N1 mode is allowed in an equivalent PLMN.

If the 5GSM cause value is #50 "PDU session type IPv4 only allowed", #51 "PDU session type IPv6 only allowed", #57 "PDU session type IPv4v6 only allowed", #58 "PDU session type Unstructured only allowed", or #61 "PDU session type Ethernet only allowed", the network may include the Re-attempt indicator IE without Back-off timer value IE to indicate whether the UE is allowed to attempt a PDU session establishment procedure in an equivalent PLMN in N1 mode using the same PDU session type for 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).

The SMF shall send the PDU SESSION ESTABLISHMENT REJECT message.

Upon receipt of a PDU SESSION ESTABLISHMENT REJECT 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 not established.

If the PDU SESSION ESTABLISHMENT REQUEST message was sent with request type set to "initial emergency request" or "existing emergency PDU session" and the UE receives a PDU SESSION ESTABLISHMENT REJECT message, then the UE may:

a) inform the upper layers of the failure of the procedure; or

NOTE 3: This can result in the upper layers requesting another emergency call attempt using domain selection as specified in 3GPP TS 23.167 [6].

b) de-register locally, if not de-registered already, attempt initial registration for emergency services.

If the PDU SESSION ESTABLISHMENT REJECT message includes 5GSM cause #39 "reactivation requested" and the PDU session is being transferred from EPS to 5GS and established with the request type set to "existing PDU session", the UE should re-initiate the UE-requested PDU session establishment procedure as specified in subclause 6.4.1 for:

a) the PDU session type associated with the transferred PDU session;

b) the SSC mode associated with the transferred PDU session;

c) the DNN associated with the transferred PDU session; and

d) 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 transferred PDU session.

\*\*\* next change \*\*\*

#### 6.4.1.6 Abnormal cases in the UE

The following abnormal cases can be identified:

a) Expiry of timer T3580

 The UE shall, on the first expiry of the timer T3580:

- if the PDU SESSION ESTABLISHMENT REQUEST message was sent with request type set to "initial emergency request" or "existing emergency PDU session", then the UE may:

a) inform the upper layers of the failure of the procedure; or

NOTE 1: This can result in the upper layers requesting another emergency call attempt using domain selection as specified in 3GPP TS 23.167 [6].

b) de-register locally, if not de-registered already, attempt initial registration for emergency services.

 If the UE sent the PDU SESSION ESTABLISHMENT REQUEST message in order for the handover of an existing emergency PDU session between 3GPP access and non-3GPP access, the UE shall consider that the emergency PDU session is associated with the source access type.

- otherwise, retransmit the PDU SESSION ESTABLISHMENT REQUEST message and the PDU session information which was transported together with the initial transmission of the PDU SESSION ESTABLISHMENT REQUEST message and shall reset and start timer T3580, if still needed. This retransmission can be repeated up to four times, i.e. on the fifth expiry of timer T3580, the UE shall abort the procedure, release the allocated PTI and enter the state PROCEDURE TRANSACTION INACTIVE. If the UE sent the PDU SESSION ESTABLISHMENT REQUEST message in order for the handover of an existing non-emergency PDU session between 3GPP access and non-3GPP access, the UE shall consider that the PDU session is associated with the source access type.

b) Upon receiving an indication that the 5GSM message was not forwarded due to routing failure along with a PDU SESSION ESTABLISHMENT REQUEST message with the PDU session ID IE set to the same value as the PDU session ID that was sent by the UE, the UE shall stop timer T3580 and shall abort the procedure. If the UE sent the PDU SESSION ESTABLISHMENT REQUEST message in order for the handover of an existing PDU session between 3GPP access and non-3GPP access, the UE shall consider that the PDU session is associated with the source access type.

b1) Upon receiving an indication that the 5GSM message was not forwarded due to service area restrictions along with a PDU SESSION ESTABLISHMENT REQUEST message with the PDU session ID IE set to the same value as the PDU session ID that was sent by the UE, the UE shall stop timer T3580 and shall abort the procedure. If the UE sent the PDU SESSION ESTABLISHMENT REQUEST message in order for the handover of an existing PDU session between 3GPP access and non-3GPP access, the UE shall consider that the PDU session is associated with the source access type.

b2) Upon receiving an indication that the 5GSM message was not forwarded because the UE is registered to a PLMN via a satellite NG-RAN cell that is not allowed to operate at the present UE location along with a PDU SESSION ESTABLISHMENT REQUEST message with the PDU session ID IE set to the same value as the PDU session ID that was sent by the UE, the UE shall stop timer T3580 and shall abort the procedure. The UE shall not trigger the PDU session establishment procedure until the UE is deregistered from the PLMN.

c) Collision of UE-requested PDU session establishment procedure and network-requested PDU session release procedure.

 If the UE receives a PDU SESSION RELEASE COMMAND message after sending a PDU SESSION ESTABLISHMENT REQUEST message to the network, and the PDU session ID in the PDU SESSION RELEASE COMMAND message is the same as the PDU session ID in the PDU SESSION ESTABLISHMENT REQUEST message:

i) if the UE-requested PDU session establishment procedure was to request to establish user plane resources on the second access for an MA PDU session established on a first access and the Access type IE is not included in PDU SESSION RELEASE COMMAND or the Access type IE included in PDU SESSION RELEASE COMMAND indicates the first access, the UE shall proceed with the network-requested PDU session release procedure, abort the UE-requested PDU session establishment procedure, stop timer T3580, release the allocated PTI and enter the state PROCEDURE TRANSACTION INACTIVE;

ii) if the PDU SESSION ESTABLISHMENT REQUEST message was sent with request type set to "existing PDU session" or "existing emergency PDU session" in order for the handover of an existing non-emergency PDU session between 3GPP access and non-3GPP access, the UE shall abort the PDU session establishment procedure and proceed with the network-requested PDU session release procedure; or

iii) otherwise, the UE shall ignore the PDU SESSION RELEASE COMMAND message and proceed with the UE-requested PDU session establishment procedure.

d) Inter-system change from N1 mode to S1 mode triggered during UE-requested PDU session establishment procedure.

 If the UE-requested PDU session establishment procedure is triggered for handover of an existing PDU session from non-3GPP access to 3GPP access, and the inter-system change from N1 mode to S1 mode is triggered by the NG-RAN and the UE did not receive response to PDU session establishment request, then the UE shall abort the procedure, stop timer T3580, and notify the upper layer of the handover failure.

NOTE 2: This can result in the upper layer requesting re-initiation of handover from non-3GPP access to 3GPP access after the inter-system change is completed, if still required.

e) For an MA PDU session established on a single access, upon receipt of a PDU SESSION ESTABLISHMENT ACCEPT message over the other access, if any value of the selected PDU session type, selected SSC mode, 5GSM cause, PDU address, S-NSSAI, DNN IEs in the PDU SESSION ESTABLISHMENT ACCEPT message is different from the corresponding stored value, the UE shall perform a local release of the MA PDU session, and perform the registration procedure for mobility and periodic registration update with a REGISTRATION REQUEST message including the PDU session status IE over both accesses.

f) Collision of UE-requested PDU session establishment procedure initiated to perform handover of an existing PDU session from non-3GPP access to 3GPP access and a notification from the network with access type indicating non-3GPP access.

 If the UE receives a notification from the network with access type indicating non-3GPP access after sending a PDU SESSION ESTABLISHMENT REQUEST message to perform handover of an existing PDU session from non-3GPP access to 3GPP access, the UE shall abort the PDU session establishment procedure, stop timer T3580, proceed with the service request procedure to perform handover of existing PDU session(s) from non-3GPP access to 3GPP access.

g) Collision of UE-requested PDU session establishment procedure and N1 NAS signalling connection release

 The UE may immediately retransmit the PDU SESSION ESTABLISHMENT REQUEST message and stop, reset and restart timer T3580, if the following conditions apply:

1) The original UE-requested PDU session establishment procedure was initiated over an existing N1 NAS signalling connection;

2) the previous transmission of the PDU SESSION ESTABLISHMENT REQUEST message was not initiated due to timer T3580 expiry; and

3) no 5GSM message related to the PDU session (e.g. PDU SESSION ESTABLISHMENT REJECT or PDU SESSION AUTHENTICATION COMMAND message) or indication that the 5GSM message was not forwarded (see item b) and b1)) was received after the PDU SESSION ESTABLISHMENT REQUEST message was transmitted.

h) PDU SESSION ESTABLISHMENT REQUEST message included a Requested MBS container including join request for one or more MBS sessions and the PDU SESSION ESTABLISHMENT REJECT message does not contain a Received MBS container

The UE shall consider that the join request has been rejected for all the respective MBS sessions.

\*\*\* next change \*\*\*

### 8.3.3 PDU session establishment reject

#### 8.3.3.1 Message definition

The PDU SESSION ESTABLISHMENT REJECT message is sent by the SMF to the UE in response to PDU SESSION ESTABLISHMENT REQUEST message and indicates unsuccessful establishment of a PDU session. See table 8.3.3.1.1.

Message type: PDU SESSION ESTABLISHMENT REJECT

Significance: dual

Direction: network to UE

Table 8.3.3.1.1: PDU SESSION ESTABLISHMENT REJECT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Extended protocol discriminator | Extended protocol discriminator9.2 | M | V | 1 |
|  | PDU session ID | PDU session identity9.4 | M | V | 1 |
|  | PTI | Procedure transaction identity9.6 | M | V | 1 |
|  | PDU SESSION ESTABLISHMENT REJECT message identity | Message type9.7 | M | V | 1 |
|  | 5GSM cause | 5GSM cause9.11.4.2 | M | V | 1 |
| 37 | Back-off timer value | GPRS timer 39.11.2.5 | O | TLV | 3 |
| F- | Allowed SSC mode | Allowed SSC mode9.11.4.5 | O | TV | 1 |
| 78 | EAP message | EAP message9.11.2.2 | O | TLV-E | 7-1503 |
| 61 | 5GSM congestion re-attempt indicator | 5GSM congestion re-attempt indicator9.11.4.21 | O | TLV | 3 |
| 7B | Extended protocol configuration options | Extended protocol configuration options9.11.4.6 | O | TLV-E | 4-65538 |
| 1D | Re-attempt indicator | Re-attempt indicator9.11.4.17 | O | TLV | 3 |
| 1D | Service-level AA container | Service-level AA container9.11.2.10 | O | TLV-E | 6-n |
| xy | Received MBS container | Received MBS container9.11.4.31 | O | TLV | TBD |

\*\*\* next change \*\*\*

#### 8.3.3.X Received MBS container

This IE is included if the network wants to reject all the MBS join requests associated with the PDU session indicated in the PDU session ID IE.

\*\*\* next change \*\*\*

## B.1 Causes related to nature of request

Cause #8 – Operator Determined Barring

 This 5GSM cause is used by the network to indicate that the requested service was rejected by the SMF due to Operator Determined Barring.

Cause #26 – Insufficient resources

 This 5GSM cause is used by the UE or by the network to indicate that the requested service cannot be provided due to insufficient resources.

Cause #27 – Missing or unknown DNN

 This 5GSM cause is used by the network to indicate that the requested service was rejected by the external DN because the DNN was not included although required or if the DNN could not be resolved.

Cause #28 – Unknown PDU session type

 This 5GSM cause is used by the network to indicate that the requested service was rejected by the external DN because the requested PDU session type could not be recognised or is not allowed.

Cause #29 – User authentication or authorization failed

 This 5GSM cause is used by the network to indicate that the requested service was rejected by the external DN due to a failed user authentication, revoked by the external DN, or rejected by 5GCN due to a failed user authentication or authorization.

Cause #31 – Request rejected, unspecified

 This 5GSM cause is used by the network or by the UE to indicate that the requested service or operation or the request for a resource was rejected due to unspecified reasons.

Cause #32 – Service option not supported

 This 5GSM cause is used by the network when the UE requests a service which is not supported by the PLMN.

Cause #33 – Requested service option not subscribed

 This 5GSM cause is sent when the UE requests a service option for which it has no subscription.

Cause #35 – PTI already in use

 This 5GSM cause is used by the network to indicate that the PTI included by the UE is already in use by another active UE requested procedure for this UE.

Cause #36 – Regular deactivation

 This 5GSM cause is used to indicate a regular UE or network initiated release of PDU session resources.

Cause #37 – 5GS QoS not accepted

 This 5GSM cause is used by the network if the new 5GS QoS that was indicated in the UE request cannot be accepted.

Cause #38 – Network failure

 This 5GSM cause is used by the network to indicate that the requested service was rejected due to an error situation in the network.

Cause #39 – Reactivation requested

 This 5GSM cause is used by the network to request a PDU session reactivation.

Cause #41 – Semantic error in the TFT operation

 This 5GSM cause is used by the UE to indicate a semantic error in the TFT operation included in the request.

Cause #42 – Syntactical error in the TFT operation

 This 5GSM cause is used by the UE to indicate a syntactical error in the TFT operation included in the request.

Cause #43 – Invalid PDU session identity

 This 5GSM cause is used by the network or the UE to indicate that the PDU session identity value provided to it is not a valid value or the PDU session identified by the PDU session identity IE in the request or the command is not active.

Cause #44 – Semantic errors in packet filter(s)

 This 5GSM cause is used by the network or the UE to indicate that the requested service was rejected due to one or more semantic errors in packet filter(s) of the QoS rule included in the request.

Cause #45 – Syntactical error in packet filter(s)

 This 5GSM cause is used by the network or the UE to indicate that the requested service was rejected due to one or more syntactical errors in packet filter(s) of the QoS rule included in the request.

Cause #46 – Out of LADN service area

 This 5GSM cause is used by the network to indicate the UE is out of the LADN service area.

Cause #47 – PTI mismatch

 This 5GSM cause is used by the network or UE to indicate that the PTI provided to it does not match any PTI in use.

Cause #50 – PDU session type IPv4 only allowed

 This 5GSM cause is used by the network to indicate that only PDU session type IPv4 is allowed for the requested IP connectivity.

Cause #51 – PDU session type IPv6 only allowed

 This 5GSM cause is used by the network to indicate that only PDU session type IPv6 is allowed for the requested IP connectivity.

Cause #54 – PDU session does not exist

 This 5GSM cause is used by the network at handover of a PDU session between non-3GPP access and 3GPP access, or at interworking of a PDN connection from non-3GPP access network connected to EPC or from E-UTRAN connected to EPC to a PDU session, to indicate that the network does not have any information about the requested PDU session.

Cause #57 – PDU session type IPv4v6 only allowed

 This 5GSM cause is used by the network to indicate that only PDU session types IPv4, IPv6 or IPv4v6 are allowed for the requested IP connectivity.

Cause #58 – PDU session type Unstructured only allowed

 This 5GSM cause is used by the network to indicate that only PDU session type Unstructured is allowed for the requested DN connectivity.

Cause #59 – Unsupported 5QI value

 This 5GSM cause is used by the network if the 5QI indicated in the UE request cannot be supported.

Cause #61 – PDU session type Ethernet only allowed

 This 5GSM cause is used by the network to indicate that only PDU session type Ethernet is allowed for the requested DN connectivity.

Cause #67 – Insufficient resources for specific slice and DNN

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

Cause #68 – Not supported SSC mode

 This 5GSM cause is used by the network to indicate that the requested SSC mode is not supported.

Cause #69 – Insufficient resources for specific slice

 This 5GSM cause is used by the network to indicate that the requested service cannot be provided due to insufficient resources for specific slice or maximum number of PDU sessions on a specific slice has been already reached.

Cause #70 – Missing or unknown DNN in a slice

 This 5GSM cause is used by the network to indicate that the requested service was rejected by the external DN because the DNN was not included although required or if the DNN could not be resolved, in the slice.

Cause #81 – Invalid PTI value

 This 5GSM cause is used by the network or UE to indicate that the PTI provided to it is invalid for the specific 5GSM message.

Cause #82 – Maximum data rate per UE for user-plane integrity protection is too low

 This 5GSM cause is used by the network to indicate that the requested service cannot be provided because the maximum data rate per UE for user-plane integrity protection is too low.

Cause #83 – Semantic error in the QoS operation

 This 5GSM cause is used by the network or the UE to indicate that the requested service was rejected due to a semantic error in the QoS operation included in the request.

Cause #84 – Syntactical error in the QoS operation

 This 5GSM cause is used by the network or the UE to indicate that the requested service was rejected due to a syntactical error in the QoS operation included in the request.

Cause #85 – Invalid mapped EPS bearer identity

 This 5GSM cause is used by the network or the UE to indicate that the mapped EPS bearer identity value provided to it is not a valid value or the mapped EPS bearer identified by the mapped EPS bearer identity does not exist.

Cause #xx – All associated MBS sessions released or rejected.

 This 5GSM cause is used by the network to indicate that the PDU session is released because all the associated MBS sessions are released or to indicate that the PDU session establishment request is rejected because the request to join MBS session is rejected for all the associated MBS session(s).

\*\*\* no more changes \*\*\*