**3GPP TSG-CT WG1 Meeting #136-eC1-22XXXX**

**E-Meeting, 12th – 20th May 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **24.501** | **CR** | **4217** | **rev** | **3** | **Current version:** | **17.6.1** |  |
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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 |  |

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| ***Title:***  | Collision of UE initiated PDU procedure and UE initiated MUSIM NAS signalling connection release |
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| ***Source to WG:*** | MediaTek Inc. |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | MUSIM |  | ***Date:*** | 2022-05-13 |
|  |  |  |  |  |
| ***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:*** | Because it was observed in some 5G networks that the **network is releasing** the N1 NAS signalling connection quite soon after the completion of the initial registration, so that the initiation of the PDU session then collides with the release of the N1 NAS signalling connection. As a consequence the user may have to wait for additional e.g., up to 16s (T3580), before he can use any PDU service. See example scenario below:To improve this bad user experience (e.g. 16 seconds waiting), as indicated in C1-213928, the intention of 6.4.1.6 g), 6.4.2.5 h) and 6.4.3.5 f) was to allow **immediate retry** (**performance enhancement**) if the **network** **releases** the **NAS signalling connection** at the beginning of the 5GSM procedure.However, with the **MUSIM** features, now it is possible that the **release** is actually **triggered by the UE intentionally**, ex: the network supports the N1 NAS signalling connection release, the UE supports MUSIM is in 5GMM-CONNECTED mode requests the network to release the NAS signalling connection (5.6.1.1 case o)). For such case, such **performance enhancement** should not be used. |
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| ***Summary of change:*** | Restrict 6.4.1.6 h), 6.4.2.5 h) and 6.4.3.5 f) only when the NAS signalling connection release is triggered by NW, not by UE itself. Also propse a more general approach that would apply to other 5GSM messages to suspend 5GSM transmission when MUSIM UE requested to release N1 is ongoing. |
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| ***Consequences if not approved:*** | Meaningless immediate retry on one USIM when UE is busying with another USIM activity and tirgger the connection release intentionally . |
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| ***Clauses affected:*** | 4.2, 6.4.1.6, 6.4.2.5, 6.4.3.5 |
|  |  |
|  | **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 \* \* \* \*

## 4.2 Coordination between the protocols for 5GS mobility management and 5GS session management

A 5GS session management (5GSM) message is piggybacked in specific 5GS mobility management (5GMM) transport messages. To this purpose, the 5GSM messages can be transmitted in an information element in the 5GMM transport messages. In this case, the UE, the AMF and the SMF execute the 5GMM procedure and the 5GSM procedure in parallel. The success of the 5GMM procedure is not dependent on the success of the piggybacked 5GSM procedure.

The UE can only initiate the 5GSM procedure when there is a 5GMM context established at the UE.

During 5GMM procedures, the UE and the AMF shall suspend the transmission of 5GSM messages, except when:

a) the 5GMM procedure is piggybacking 5GSM messages; or

b) the UE is in 5GMM-CONNECTED mode and a service request procedure for re-establishing user-plane resources of PDU session(s) is initiated without including PDU session status IE or Allowed PDU session status IE. In this case, the UE and the AMF need not suspend the transmission of 5GSM messages related to other PDU session(s) than the one(s) for which the user- plane resources re-establishment is requested.

If the UE determines to locally release the N1 NAS signalling connection upon receiving an SOR transparent container during a registration procedure as specified in 3GPP TS 23.122 [5] Annex C.2, the UE shall suspend the transmission of 5GSM messages after sending the REGISTRATION COMPLETE message and until the N1 NAS signalling connection is released to obtain service on a higher priority PLMN, with the exception of the case when the UE has an emergency PDU session.

A 5GMM message piggybacking a 5GSM message for a PDU session shall be delivered via the access associated with the PDU session, if any, with the following exceptions:

a) the AMF shall send, via 3GPP access, a DL NAS TRANSPORT message piggybacking a downlink 5GSM message of a network-requested 5GSM procedure for a PDU session associated with non-3GPP access if the conditions specified in subclause 5.5.1.3.4 or subclause 5.6.1.4 are met;

b) the UE shall send an UL NAS TRANSPORT message piggybacking a response message to the 5GSM message described in a) via either:

1) 3GPP access; or

2) non-3GPP access if the UE is in 5GMM-CONNECTED mode over non-3GPP access; and

NOTE: The interaction between the 5GMM sublayer and the 5GSM sublayer to enable the UE to send the UL NAS TRANSPORT message containing the response message via 3GPP access is required. This is achieved via UE implementation.

c) the UE shall send, via the target access, an UL NAS TRANSPORT message piggybacking a 5GSM message associated with a request type set to "existing PDU session" or "existing emergency PDU session" for handover of an existing PDU session between 3GPP access and non-3GPP access.

A 5GMM message piggybacking a 5GSM message as a response message to a request message associated with an MA PDU session, shall be delivered via the same access that the initial message was received.

The MUSIM UE shall suspend the transmission of 5GSM messages over 3GPP access after sending the request to release the N1 NAS signalling connection until the connection is released.

\* \* \* 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 to perform a 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 to perform a 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 to perform a 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 to perform a 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.

b3) Upon receiving an indication that the 5GSM message was not forwarded because the UE is marked in the UE's 5GMM context that it is not allowed to request UAS services 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 the establishment of 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 to perform a handover of an existing 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) For an MA PDU session has a PDN connection as a user-plane resource, upon receipt of a PDU SESSION ESTABLISHMENT ACCEPT message over non-3GPP 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 mapped value, the UE shall perform a local release of the MA PDU session, perform the registration procedure for mobility and periodic registration update with a REGISTRATION REQUEST message including the PDU session status IE over non-3GPP access, and perform the tracking area updating procedure as specified in clause 5.5.3.2.2 of 3GPP TS 24.301 [15] with a TRACKING AREA UPDATE REQUEST message including EPS bearer context status IE.

g) 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.

h) 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;

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; and

4) the MUSIM UE did not request the network to release the NAS signalling connection (see subclause 5.6.1.1) after the PDU SESSION ESTABLISHMENT REQUEST message was sent over 3GPP access.

i) Collision of UE-requested PDU session establishment procedure and network-requested PDU session modification procedure

 If the UE receives a PDU SESSION MODIFICATION COMMAND message after sending a PDU SESSION ESTABLISHMENT REQUEST message to the network, and the PDU session ID in the PDU SESSION MODIFICATION 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 the establishment of user plane resources on the second access for an MA PDU session established on a first access, the UE shall proceed with both the UE-requested PDU session establishment procedure and the network-requested PDU session modification procedure; or

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 to perform a handover of an existing PDU session between 3GPP access and non-3GPP access, the UE shall proceed with the UE-requested PDU session establishment procedure and abort the network-requested PDU session modification procedure.

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

#### 6.4.2.5 Abnormal cases in the UE

The following abnormal cases can be identified:

a) Expiry of timer T3581.

 The UE shall, on the first expiry of the timer T3581, retransmit the PDU SESSION MODIFICATION REQUEST message and the PDU session information which was transported together with the initial transmission of the PDU SESSION MODIFICATION REQUEST message and shall reset and start timer T3581. This retransmission is repeated four times, i.e. on the fifth expiry of timer T3581, the UE shall abort the procedure and shall release the allocated PTI.

b) Invalid PDU session identity.

 Upon receipt of the PDU SESSION MODIFICATION REJECT message including 5GSM cause #43 "invalid PDU session identity", the UE shall perform a local release of the existing PDU session and shall stop the timer T3581.

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

 If the UE receives a PDU SESSION RELEASE COMMAND message during the UE-requested PDU session modification procedure, and the PDU session indicated in the PDU SESSION RELEASE COMMAND message is the PDU session that the UE had requested to modify, the UE shall abort the PDU session modification procedure and proceed with the network-requested PDU session release procedure.

d) Handling DL user data packets marked with RQI when UE has already revoked the usage of reflective QoS

 If the UE receives a DL user data packet marked with a RQI and the DL user data packet belongs to a PDU session of IPv4, IPv6, IPv4v6 or Ethernet PDU session type for which the UE has already revoked the usage of reflective QoS, then the UE shall ignore the RQI and shall handle the received DL user data packet.

e) Collision of network-requested PDU session modification procedure and UE-requested PDU session modification procedure.

 The handling of the same abnormal case as described in subclause 6.3.2.6 applies.

f) Upon receiving an indication that the 5GSM message was not forwarded due to service area restrictions along with a PDU SESSION MODIFICATION 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 abort the procedure and shall stop the timer T3581.

g) Upon receiving an indication that the 5GSM message was not forwarded due to routing failure along with a PDU SESSION MODIFICATION 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 T3581 and shall abort the procedure.

ga) Upon receiving an indication that the 5GSM message was not forwarded because the UE accessing via a satellite NG-RAN cell is informed that the PLMN is not allowed to operate at the present UE location along with a PDU SESSION MODIFICATION 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 T3581 and shall abort the procedure.

h) Collision of UE-requested PDU session modification procedure and N1 NAS signalling connection release

 The UE may immediately retransmit the PDU SESSION MODIFICATION REQUEST message and stop, reset and restart timer T3581, if the following conditions apply:

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

2) the previous transmission of the PDU SESSION MODIFICATION REQUEST message was not initiated due to timer T3581 expiry;

3) no 5GSM message related to the PDU session (e.g. PDU SESSION MODIFICATION REJECT or PDU SESSION RELEASE COMMAND message, see item c)) or indication that the 5GSM message was not forwarded (see item f) and g)) was received after the PDU SESSION MODIFICATION REQUEST message was transmitted; and

4) the MUSIM UE did not request the network to release the NAS signalling connection (see subclause 5.6.1.1) after the PDU SESSION MODIFICATION REQUEST message was sent over 3GPP access.

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

#### 6.4.3.5 Abnormal cases in the UE

The following abnormal cases can be identified:

a) Expiry of timer T3582.

 The UE shall, on the first expiry of the timer T3582, retransmit the PDU SESSION RELEASE REQUEST message and the PDU session information which was transported together with the initial transmission of the PDU SESSION RELEASE REQUEST message and shall reset and start timer T3582. This retransmission is repeated four times, i.e. on the fifth expiry of timer T3582, the UE shall abort the procedure, release the allocated PTI, perform a local release of the PDU session, and perform the registration procedure for mobility and periodic registration update by sending a REGISTRATION REQUEST message including the PDU session status IE over each access that user plane resources have been established if the PDU session is an MA PDU session, or over the access the PDU session is associated with if the PDU session is a single access PDU session. If there is one or more MBS multicast sessions associated with the PDU session, the UE shall locally leave the associated MBS multicast sessions.

b) Collision of UE-requested PDU session release procedure and network-requested PDU session modification procedure.

 When the UE receives a PDU SESSION MODIFICATION COMMAND message during the UE-requested PDU session release procedure, and the PDU session indicated in PDU SESSION MODIFICATION COMMAND message is the PDU session that the UE had requested to release, the UE shall ignore the PDU SESSION MODIFICATION COMMAND message and proceed with the PDU session release procedure.

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

 When the UE receives a PDU SESSION RELEASE COMMAND message with the PTI IE set to "No procedure transaction identity assigned" during the UE-requested PDU session release procedure, the PDU session indicated in the PDU SESSION RELEASE COMMAND message is the same as the PDU session that the UE requests to release:

- if the Access type IE is included in the PDU SESSION RELEASE COMMAND message and the PDU session is an MA PDU session and having user-plane resources established on the access different from the access indicated in the Access type IE in the PDU SESSION RELEASE COMMAND message, the UE shall proceed both the UE-requested PDU session release procedure and network-requested PDU session release procedure; or

- otherwise, the UE shall abort the UE-requested PDU session release procedure and shall stop the timer T3582 and proceed with the network-requested PDU session release procedure.

d) Receipt of an indication that the 5GSM message was not forwarded due to routing failure

 Upon receiving an indication that the 5GSM message was not forwarded due to routing failure along with a PDU SESSION RELEASE 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 T3582, abort the procedure, release the allocated PTI, perform a local release of the PDU session, and perform the registration procedure for mobility and periodic registration update by sending a REGISTRATION REQUEST message including the PDU session status IE over each access that user plane resources have been established if the PDU session is an MA PDU session, or over the access the PDU session is associated with if the PDU session is a single access PDU session. If there is one or more MBS multicast sessions associated with the released PDU session, the UE shall locally leave the associated MBS multicast sessions.

e) PDU session release signalling restricted due to service area restriction

 The UE may delay the release of the PDU session until the UE is not restricted by service area restrictions, or it may release the allocated PTI, perform a local release of the PDU session, and include the PDU session status IE over each access that user plane resources have been established if the PDU session is an MA PDU session, or over the access the PDU session is associated with if the PDU session is a single access PDU when performing the next registration procedure.

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

 The UE may immediately retransmit the PDU SESSION RELEASE REQUEST message and stop, reset and restart timer T3582, if the following conditions apply:

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

2) the previous transmission of the PDU SESSION RELEASE REQUEST message was not initiated due to timer T3582 expiry;

3) no 5GSM message related to the PDU session (e.g. PDU SESSION RELEASE REJECT message) or indication that the 5GSM message was not forwarded (see item d) was received after the PDU SESSION RELEASE REQUEST message was transmitted; and

4) the MUSIM UE did not request the network to release the NAS signalling connection (see subclause 5.6.1.1) after the PDU SESSION RELEASE REQUEST message was sent over 3GPP access.

\* \* \* End of Changes \* \* \* \*