**3GPP TSG-CT WG1 Meeting #125-eC1-205XXX**

**Electronic meeting, 20-28 August 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **24.501** | **CR** | **2505** | **rev** | **1** | **Current version:** | **16.5.1** |  |
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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:***  | Handling of 5GSM procedures when fallback is triggered |
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| ***Source to WG:*** | LG Electronics |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5GProtoc17 |  | ***Date:*** | 2020-08-13 |
|  |  |  |  |  |
| ***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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)* |
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| ***Reason for change:*** | 1. Clarification on VoWiFi fallback In RAN#88E meeting, RP-200795 was approved to align with SA2 CR S2-1912644 which added new procedure to transfer PDU session used for IMS voice from non-3GPP access to 5GS. According to RP-200795, when the UE requested to handover an existing PDU session from non-3GPP access to 3GPP access, the NG-RAN may reject the establishment of PDU session due to the trigger EPS fallback or RAT fallback. However the UE and SMF behaviours are not clear for this scenario in TS 24.501. After UE sends the PDU session establishment request message, the UE will wait for the completion or failure of the procedure. But when RAT fallback or EPS fallback is occurred, UE shall wait until the retransmission timer is over and then sends another request message as per current specification. But since this scenario covers the IMS voice case, this latency is unnecessary and inefficient. So it would be better to abort the current procedure when the fallback is initiated (e.g. RRCRelease message including redirectedCarrierInfo indicating redirection to eutra) and then re-initiate the PDU session establishment request procedure when the fallback is completed. After SMF receives n2SmInfo containing reject message with cause “IMS voice EPS fallback or RAT fallback triggered” from NG-RAN, there’s no reason to keep the current procedure and wait until the EPS fallback or RAT fallback is finished. So it is proposed to abort ongoing procedure when the SMF detects EPS fallback or RAT fallback. Then the UE can re-initiate handover an existing PDU session over non-3GPP access to 3GPP access. According to the connected CN type, the UE can send either PDN CONNECTIVITY REQUEST message or PDU SESSION ESTABLISHMENT REQUEST message to request handover of VoWiFi PDU Session.2. Clarification on EPS / RAT fallback In the subclause 6.3.2.5, there are descriptions on the abnormal cases on the NW side for NW initiated PDU session modification procedure. For example, bullet f) specifies the scenario when the RAN cannot forward PDU MODIFICATION COMMAND message due to handover. But there is a case missing when the RAN cannot forward the SM message, which are EPS fallback or RAT fallback for IMS voice.  Both TS 23.502 and TS 38.413 clearly specifie this case, especially TS 38.413 has defined designated cause code “IMS voice EPS fallback or RAT fallback triggered”.  So this CR would like to update bullet f) so that the bullet also covers EPS/RAT fallback scnario. |
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| ***Summary of change:*** | 1. During the PDU session establishment procedure for performing handover an existing PDU session over non-3GPP access to 3GPP access, the SMF abort the procedure, while the UE abort the procedure and re-initiate ther procedure after the completion of fallback.2. During the network-inifiated PDU session modification procedure, the SMF abort the procedure when the NG-RAN rejects the modification request with a cause “IMS voice EPS fallback or RAT fallback triggered”. |
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| ***Consequences if not approved:*** | It is not clear for the UE and the SMF when the 5GSM procedure triggers a RAT fallback or EPS fallback. |
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| ***Clauses affected:*** | 6.3.2.5, 6.4.1.6, 6.4.1.7 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
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| ***This CR's revision history:*** | Changes in revision 1- Release and WI code are updated to Rel-17 and 5GProtoc17 repectively. |

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

#### 6.3.2.5 Abnormal cases on the network side

The following abnormal cases can be identified:

a) Expiry of timer T3591.

 On the first expiry of the timer T3591, the SMF shall resend the PDU SESSION MODIFICATION COMMAND message and shall reset and restart timer T3591. This retransmission is repeated four times, i.e. on the fifth expiry of timer T3591, the SMF shall abort the procedure and enter the state PDU SESSION ACTIVE.

 The SMF may continue to use the previous configuration of the PDU session or initiate the network-requested PDU session release procedure. If the SMF decides to continue to use the previous configuration of the PDU session and

i) the authorized QoS rules IE is included in the PDU SESSION MODIFICATION COMMAND message, the SMF may mark the corresponding authorized QoS rule(s) of the PDU session as to be synchronised with the UE; and

ii) the authorized QoS flow descriptions IE is included in the PDU SESSION MODIFICATION COMMAND message, the SMF may mark the corresponding authorized QoS flow description(s) of the PDU session as to be synchronised with the UE.

b) Invalid PDU session identity.

 Upon receipt of the PDU SESSION MODIFICATION COMMAND REJECT message including 5GSM cause #43 "invalid PDU session identity", the SMF shall release locally the existing PDU session.

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

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

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

 If the network receives a PDU SESSION MODIFICATION REQUEST message during the network-requested PDU session modification procedure, and the PDU session indicated in the PDU SESSION MODIFICATION REQUEST message is the PDU session that the network had requested to modify, the network shall ignore the PDU SESSION MODIFICATION REQUEST message received in the state PDU SESSION MODIFICATION PENDING. The network shall proceed with the network-requested PDU session modification procedure as if no PDU SESSION MODIFICATION REQUEST message was received from the UE.

e) 5G access network cannot forward the message.

 If the SMF determines based on content of the n2SmInfo attribute specified in 3GPP TS 29.502 [20A] that the DL NAS TRANSPORT message carrying the PDU SESSION MODIFICATION COMMAND message was not forwarded to the UE by the 5G access network, then the SMF shall abort the procedure and enter the state PDU SESSION ACTIVE.

f) 5G access network cannot forward the message due to handover, EPS fallback or RAT fallback.

 If the SMF determines based on content of the n2SmInfo attribute specified in 3GPP TS 29.502 [20A] that the DL NAS TRANSPORT message carrying the PDU SESSION MODIFICATION COMMAND message was not forwarded to the UE by the 5G access network due to handover, or EPS fallback or RAT fallback for IMS voice, then the SMF shall abort the procedure and enter the state PDU SESSION ACTIVE.

 The SMF may re-initiate, up to a pre-configured number of times, the network-requested PDU session modification procedure when the SMF detects that the handover, or EPS fallback or RAT fallback for IMS voice is completed successfully or has failed or at the expiry of the configured guard timer as specified in 3GPP TS 23.502 [9].

\*\*\*\*\* 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: 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.

- 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.

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 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.

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.

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

x) EPS fallback or RAT fallback triggered during UE-requested PDU session establishment procedure.

 If UE-requested PDU session establishment procedure is triggered for handover of an existing PDU session from non-3GPP access to 3GPP access, and the EPS fallback or RAT fallback is triggered by the NG-RAN before PDU SESSION ESTABLISHMENT ACCEPT is received, the UE shall abort the procedure, stop timer T3580, and notify the upper layer of the handover failure.

NOTE: This can result in the upper layer requesting re-initiation of handover from non-3GPP access to 3GPP access after EPS fallback or RAT fallback is completed, if still required.

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

#### 6.4.1.7 Abnormal cases on the network side

The following abnormal cases can be identified:

a) If the received request type is "initial emergency request" and there is already another emergency PDU session for the UE, the SMF shall reject the PDU SESSION ESTABLISHMENT REQUEST message with 5GSM cause #31 "request rejected, unspecified" or release locally the existing emergency PDU session and proceed the new PDU SESSION ESTABLISHMENT REQUEST message

b) The information for the PDU session authentication and authorization by the external DN in PDU DN request container is not compliant with local policy and user's subscription data

 If the PDU session being established is a non-emergency PDU session, the request type is not set to "existing PDU session", the PDU session authentication and authorization by the external DN is required due to local policy and user's subscription data and the information for the PDU session authentication and authorization by the external DN in the SM PDU DN request container IE is not compliant with the local policy and user's subscription data, the SMF shall reject the PDU session establishment request including the 5GSM cause #29 "user authentication or authorization failed", in the PDU SESSION ESTABLISHMENT REJECT message.

c) UE-requested PDU session establishment with request type set to "initial request" or "initial emergency request" for an existing PDU session:

 If the SMF receives a PDU SESSION ESTABLISHMENT REQUEST message with a PDU session ID identical to the PDU session ID of an existing PDU session and with request type set to "initial request" or "initial emergency request", the SMF shall release locally the existing PDU session and proceed with the PDU session establishment procedure.

d) UE-requested PDU session establishment with request type "existing PDU session" or "existing emergency PDU session" for a PDU session that does not exist:

 If the SMF receives a PDU SESSION ESTABLISHMENT REQUEST message with request type set to "existing PDU session" or "existing emergency PDU session", and the SMF does not have any information about that PDU session, then the SMF shall reject the PDU session establishment procedure with the 5GSM cause set to #54 "PDU session does not exist" in the PDU SESSION ESTABLISHMENT REJECT message.

e) 5G access network cannot forward the message:

 If the SMF determines based on content of the n2SmInfo attribute specified in 3GPP TS 29.502 [20A] that the DL NAS TRANSPORT message carrying the PDU SESSION ESTABLISHMENT ACCEPT was not forwarded to the UE by the 5G access network, then the SMF shall reject the PDU session establishment procedure with the 5GSM cause set to #26 "insufficient resources" in the PDU SESSION ESTABLISHMENT REJECT message.

x) 5G access network cannot forward the message due to EPS fallback or RAT fallback:

 If the SMF determines based on content of the n2SmInfo attribute specified in 3GPP TS 29.502 [20A] that the DL NAS TRANSPORT message carrying the PDU SESSION ESTABLISHMENT ACCEPT was not forwarded to the UE by the 5G access network due to EPS fallback or RAT fallback for IMS voice, then the SMF shall abort the procedure and enter the state PDU SESSION ACTIVE.

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