**3GPP TSG-CT WG1 Meeting #130-eC1-21xxxx**

**Electronic meeting, 20-28 May 2021 (Revision of C1-212941)**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **24.301** | **CR** | **3523** | **rev** | **1** | **Current version:** | **17.2.0** |  |
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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:*** | Retransmission timer starting for T3418 or T3420 with emergency bearer | | | | | | | | | |
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| ***Source to WG:*** | OPPO | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | SAES17 | | | | |  | ***Date:*** | | | 2021-5-6 |
|  |  | | | |  | |  | | |  |
| ***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 can be 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:*** | | Retransmission timers are stopped if the UE receives the first failed AUTHENTICATION REQUEST message.  Later, the retransmission timers are started when UE deems that the authentication procedure is successful.  In clause 5.4.2.7, if UE has the established emergency bearer services or is establishing emergency bearer services, when:  1) T3418 or T3420 expires; or  2) T3418 or T3420 is stopped by receiving the SMC message,  UE will not deem the authentication failure and behaves as if it is emegency attached. Also UE should start the retransmission timer to continue the procedures, e.g. attach procedure.  However, the current context gives a confusion that UE only starts the retransmission timers when T3418 or T3420 expires since the sentence is in the same paragraph with T3418 or T3420 expiring. | | | | | | | | |
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| ***Summary of change:*** | | Separate the UE restarting behaviour as a new paragraph to make it clear that retransmission timers are started for both cases, i.e. 1) T3418 or T3420 expires; 2) T3418 or T3420 is stopped by receiving the SMC message. | | | | | | | | |
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| ***Consequences if not approved:*** | | Wrong understanding that retransmission timer does not restarted when T3418 or T3420 is stopped by receiving the SMC message. | | | | | | | | |
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| ***Clauses affected:*** | | 5.4.2.7 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 \*\*\*\*\*

#### 5.4.2.7 Abnormal cases

a) Lower layer failure:

Upon detection of lower layer failure before the AUTHENTICATION RESPONSE message is received, the network shall abort the procedure.

b) Expiry of timer T3460:

The network shall, on the first expiry of the timer T3460, retransmit the AUTHENTICATION REQUEST message and shall reset and start timer T3460. This retransmission is repeated four times, i.e. on the fifth expiry of timer T3460, the network shall abort the authentication procedure and any ongoing EMM specific procedure and release the NAS signalling connection.

c) Authentication failure (EMM cause #20 "MAC failure"):

The UE shall send an AUTHENTICATION FAILURE message, with EMM cause #20 "MAC failure" according to subclause 5.4.2.6, to the network and start timer T3418 (see example in figure 5.4.2.7.1). Furthermore, the UE shall stop any of the retransmission timers that are running (e.g. T3410, T3417, T3421 or T3430). Upon the first receipt of an AUTHENTICATION FAILURE message from the UE with EMM cause #20 "MAC failure", the network may initiate the identification procedure described in subclause 5.4.4. This is to allow the network to obtain the IMSI from the UE. The network may then check that the GUTI originally used in the authentication challenge corresponded to the correct IMSI. Upon receipt of the IDENTITY REQUEST message from the network, the UE shall send the IDENTITY RESPONSE message.

NOTE 1: Upon receipt of an AUTHENTICATION FAILURE message from the UE with EMM cause #20 "MAC failure", the network may also terminate the authentication procedure (see subclause 5.4.2.5).

If the GUTI/IMSI mapping in the network was incorrect, the network should respond by sending a new AUTHENTICATION REQUEST message to the UE. Upon receiving the new AUTHENTICATION REQUEST message from the network, the UE shall stop the timer T3418, if running, and then process the challenge information as normal. If the GUTI/IMSI mapping in the network was correct, the network should terminate the authentication procedure by sending an AUTHENTICATION REJECT message (see subclause 5.4.2.5).

If the network is validated successfully (an AUTHENTICATION REQUEST message that contains a valid SQN and MAC is received), the UE shall send the AUTHENTICATION RESPONSE message to the network and shall start any retransmission timers (e.g. T3410, T3417, T3421 or T3430) if they were running and stopped when the UE received the first failed AUTHENTICATION REQUEST message.

If the UE receives the second AUTHENTICATION REQUEST message while T3418 is running, and the MAC value cannot be resolved, the UE shall follow the procedure specified in this subclause, item c, starting again from the beginning, or if the message contains a UMTS authentication challenge, the UE shall follow the procedure specified in item d. If the SQN is invalid, the UE shall proceed as specified in item e.

It can be assumed that the source of the authentication challenge is not genuine (authentication not accepted by the UE) if any of the following occur:

- the timer T3418 expires;

- the UE detects any combination of the authentication failures: EMM causes #20 "MAC failure", #21 "synch failure" or #26 "non-EPS authentication unacceptable", during three consecutive authentication challenges. The authentication challenges shall be considered as consecutive only, if the authentication challenges causing the second and third authentication failure are received by the UE, while the timer T3418 or T3420 started after the previous authentication failure is running.

The UE shall stop timer T3418, if the timer is running and the UE enters EMM-IDLE mode, e.g. upon detection of a lower layer failure, release of the NAS signalling connection, or as the result of an inter-system handover to A/Gb mode, Iu mode or N1 mode.

When it has been deemed by the UE that the source of the authentication challenge is not genuine (i.e. authentication not accepted by the UE), the UE shall proceed as described in item f.



Figure 5.4.2.7.1: Authentication failure procedure (EMM cause #20 "MAC failure" or   
#26 "non-EPS authentication unacceptable")

d) Authentication failure (EMM cause #26 "non-EPS authentication unacceptable"):

The UE shall send an AUTHENTICATION FAILURE message, with EMM cause #26 "non-EPS authentication unacceptable", to the network and start the timer T3418 (see example in figure 5.4.2.7.1). Furthermore, the UE shall stop any of the retransmission timers that are running (e.g. T3410, T3417, T3421 or T3430). Upon the first receipt of an AUTHENTICATION FAILURE message from the UE with EMM cause #26 "non-EPS authentication unacceptable", the network may initiate the identification procedure described in subclause 5.4.4. This is to allow the network to obtain the IMSI from the UE. The network may then check that the GUTI originally used in the authentication challenge corresponded to the correct IMSI. Upon receipt of the IDENTITY REQUEST message from the network, the UE shall send the IDENTITY RESPONSE message.

NOTE 2: Upon receipt of an AUTHENTICATION FAILURE message from the UE with EMM cause #26 "non-EPS authentication unacceptable", the network may also terminate the authentication procedure (see subclause 5.4.2.5).

If the GUTI/IMSI mapping in the network was incorrect, the network should respond by sending a new AUTHENTICATION REQUEST message to the UE. Upon receiving the new AUTHENTICATION REQUEST message from the network, the UE shall stop the timer T3418, if running, and then process the challenge information as normal. If the GUTI/IMSI mapping in the network was correct, the network should terminate the authentication procedure by sending an AUTHENTICATION REJECT message (see subclause 5.4.2.5).

It can be assumed that the source of the authentication challenge is not genuine (authentication not accepted by the UE) if any of the following occur:

- the timer T3418 expires;

- the UE detects any combination of the authentication failures: EMM causes #20 "MAC failure", #21 "synch failure" or #26 "non-EPS authentication unacceptable", during three consecutive authentication challenges. The authentication challenges shall be considered as consecutive only, if the authentication challenges causing the second and third authentication failure are received by the UE, while the timer T3418 or T3420 started after the previous authentication failure is running.

The UE shall stop timer T3418, if the timer is running and the UE enters EMM-IDLE mode, e.g. upon detection of a lower layer failure, release of the NAS signalling connection, or as the result of an inter-system handover to A/Gb mode, Iu mode or N1 mode.

When it has been deemed by the UE that the source of the authentication challenge is not genuine (i.e. authentication not accepted by the UE), the UE shall proceed as described in item f.

e) Authentication failure (EMM cause #21 "synch failure"):

The UE shall send an AUTHENTICATION FAILURE message, with EMM cause #21 "synch failure", to the network and start the timer T3420 (see example in figure 5.4.2.7.2). Furthermore, the UE shall stop any of the retransmission timers that are running (e.g. T3410, T3417, T3421 or T3430). Upon the first receipt of an AUTHENTICATION FAILURE message from the UE with the EMM cause #21 "synch failure", the network shall use the returned AUTS parameter from the authentication failure parameter IE in the AUTHENTICATION FAILURE message, to re-synchronise. The re-synchronisation procedure requires the MME to delete all unused authentication vectors for that IMSI and obtain new vectors from the HSS. When re-synchronisation is complete, the network shall initiate the authentication procedure. Upon receipt of the AUTHENTICATION REQUEST message, the UE shall stop the timer T3420, if running.

NOTE 3: Upon receipt of two consecutive AUTHENTICATION FAILURE messages from the UE with EMM cause #21 "synch failure", the network may terminate the authentication procedure by sending an AUTHENTICATION REJECT message.

If the network is validated successfully (a new AUTHENTICATION REQUEST message is received which contains a valid SQN and MAC) while T3420 is running, the UE shall send the AUTHENTICATION RESPONSE message to the network and shall start any retransmission timers (e.g. T3410, T3417, T3421 or T3430), if they were running and stopped when the UE received the first failed AUTHENTICATION REQUEST message.

If the UE receives the second AUTHENTICATION REQUEST message while T3420 is running, and the MAC value cannot be resolved, the UE shall follow the procedure specified in item c or if the message contains a UMTS authentication challenge, the UE shall proceed as specified in item d; if the SQN is invalid, the UE shall follow the procedure specified in this subclause, item e, starting again from the beginning.

The UE shall deem that the network has failed the authentication check and proceed as described in item f if any of the following occurs:

- the timer T3420 expires;

- the UE detects any combination of the authentication failures: EMM cause #20 "MAC failure", #21 "synch failure", or #26 "non-EPS authentication unacceptable", during three consecutive authentication challenges. The authentication challenges shall be considered as consecutive only if the authentication challenges causing the second and third authentication failure are received by the UE while the timer T3418 or T3420 started after the previous authentication failure is running.

When it has been deemed by the UE that the source of the authentication challenge is not genuine (i.e. authentication not accepted by the UE), the UE shall proceed as described in item f.



Figure 5.4.2.7.2: Authentication failure procedure (EMM cause #21 "synch failure")

Upon receipt of an AUTHENTICATION REJECT message, the UE shall perform the actions as specified in subclause 5.4.2.5.

f) Network failing the authentication check:

If the UE deems that the network has failed the authentication check, then it shall request RRC to locally release the RRC connection and treat the active cell as barred (see 3GPP TS 36.304 [21]). The UE shall start any retransmission timers (e.g. T3410, T3417, T3421 or T3430), if they were running and stopped when the UE received the first AUTHENTICATION REQUEST message containing an incorrect authentication challenge data causing the authentication failure.

g) Transmission failure of AUTHENTICATION RESPONSE message or AUTHENTICATION FAILURE message indication from lower layers (if the authentication procedure is triggered by a tracking area updating procedure)

The UE shall stop any of the timers T3418 and T3420, if running, and re-initiate the tracking area updating procedure.

h) Transmission failure of AUTHENTICATION RESPONSE message or AUTHENTICATION FAILURE message indication with TAI change from lower layers (if the authentication procedure is triggered by a service request procedure)

The UE shall stop any of the timers T3418 and T3420, if running.

If the current TAI is not in the TAI list, the authentication procedure shall be aborted and a tracking area updating procedure shall be initiated.

If the current TAI is still part of the TAI list, it is up to the UE implementation how to re-run the ongoing procedure that triggered the authentication procedure.

i) Transmission failure of AUTHENTICATION RESPONSE message or AUTHENTICATION FAILURE message indication without TAI change from lower layers (if the authentication procedure is triggered by a service request procedure)

The UE shall stop any of the timers T3418 and T3420, if running. It is up to the UE implementation how to re-run the ongoing procedure that triggered the authentication procedure.

j) Lower layers indication of non-delivered NAS PDU due to handover

If the AUTHENTICATION REQUEST message could not be delivered due to an intra MME handover and the target TA is included in the TAI list, then upon successful completion of the intra MME handover the MME shall retransmit the AUTHENTICATION REQUEST message. If a failure of handover procedure is reported by the lower layer and the S1 signalling connection exists, the MME shall retransmit the AUTHENTICATION REQUEST message.

k) Change of cell into a new tracking area

If a cell change into a new tracking area that is not in the TAI list occurs before the AUTHENTICATION RESPONSE message is sent, the UE may discard sending the AUTHENTICATION RESPONSE message to the network and continue with the initiation of tracking area updating procedure as described in subclause 5.5.3.

For items c, d, and e:

1) Depending on local requirements or operator preference for emergency bearer services, if the UE has a PDN connection for emergency bearer services established or is establishing a PDN connection for emergency bearer services, the MME need not follow the procedures specified for the authentication failure specified in the present subclause. The MME may respond to the AUTHENTICATION FAILURE message by initiating the security mode control procedure selecting the "null integrity protection algorithm" EIA0, "null ciphering algorithm" EEA0 or may abort the authentication procedure and continue using the current security context, if any. The MME shall deactivate all non-emergency EPS bearer contexts, if any, by initiating an EPS bearer context deactivation procedure. If there is an ongoing PDN connectivity procedure, the MME shall deactivate all non-emergency EPS bearer contexts upon completion of the PDN connectivity procedure. The network shall consider the UE to be attached for emergency bearer services only.

If a UE has a PDN connection for emergency bearer services established or is establishing a PDN connection for emergency bearer services and sends an AUTHENTICATION FAILURE message to the MME with the EMM cause appropriate for these cases (#20, #21, or #26, respectively) and receives the SECURITY MODE COMMAND message before the timeout of timer T3418 or T3420, the UE shall deem that the network has passed the authentication check successfully, stop timer T3418 or T3420, respectively, and execute the security mode control procedure.

If a UE has a PDN connection for emergency bearer services established or is establishing a PDN connection for emergency bearer services when timer T3418 or T3420 expires, the UE shall not deem that the network has failed the authentication check and not behave as described in item f. Instead the UE shall continue using the current security context, if any, deactivate all non-emergency EPS bearer contexts, if any, by initiating UE requested PDN disconnect procedure. If there is an ongoing PDN connectivity procedure, the UE shall deactivate all non-emergency EPS bearer contexts upon completion of the PDN connectivity procedure.

The UE shall start any retransmission timers (e.g. T3410, T3417, T3421 or T3430) if:

- they were running and stopped when the UE received the AUTHENTICATION REQUEST message and detected an authentication failure; and

- the procedures associated with these timers have not yet been completed.

The UE shall consider itself to be attached for emergency bearer services only.

2) Depending on local regulation and operator policy, if the UE has a PDN connection for RLOS established or is establishing a PDN connection for RLOS, the MME need not follow the procedures specified for the authentication failure specified in the present subclause. The MME may respond to the AUTHENTICATION FAILURE message by initiating the security mode control procedure selecting the "null integrity protection algorithm" EIA0, "null ciphering algorithm" EEA0 or may abort the authentication procedure and continue using the current security context, if any. The network shall consider the UE to be attached for access to RLOS.

If a UE has a PDN connection for RLOS established or is establishing a PDN connection for RLOS and sends an AUTHENTICATION FAILURE message to the MME with the EMM cause appropriate for these cases (#20, #21, or #26, respectively) and receives the SECURITY MODE COMMAND message before the timeout of timer T3418 or T3420, the UE shall deem that the network has passed the authentication check successfully, stop timer T3418 or T3420, respectively, and execute the security mode control procedure.

If a UE has a PDN connection for RLOS established or is establishing a PDN connection for RLOS when timer T3418 or T3420 expires, the UE shall not deem that the network has failed the authentication check and not behave as described in item f. Instead the UE shall continue using the current security context, if any.

The UE shall start any retransmission timers (e.g. T3410, T3417, T3421 or T3430) if:

- they were running and stopped when the UE received the AUTHENTICATION REQUEST message and detected an authentication failure; and

- the procedures associated with these timers have not yet been completed.

The UE shall consider itself to be attached for access to RLOS.

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