**3GPP TSG-CT WG1 Meeting #124-eC1-203857**

**Electronic meeting, 2-10 June 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **24.501** | **CR** | **2299** | **rev** | **1** | **Current version:** | **16.4.1** |  |
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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:*** | Support for continuity of emergency session upon registration failure | | | | | | | | | |
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| ***Source to WG:*** | BlackBerry UK Ltd. | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5GProtoc16 | | | | |  | ***Date:*** | | | 2020-05-26 |
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| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
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| ***Reason for change:*** | | An ongoing emergency session may be transferred from EPS to 5GS in a network that supports continuity without N26. When the registration fails, it is unclear what happens to the emergency session. Preferably, the UE succeeds somehow at transferring the emergency session.  BlackBerry have reviewed the specification for issues with regards to transfer of emergency session.  BlackBerry found few issues with the specification when the UE performs a normal attach, while intending to transfer an emergency session stand-alone. | | | | | | | | |
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| ***Summary of change:*** | | The TS repeats the same note in many places, leaving it to the upper layers how to initiate a session for emergency services. However, when an emergency session is transferred, the upper layers should not decide to initiate a new emergency call. Rather, the upper layers must prefer to transfer the existing session e.g. to a different IP-CAN (if the IP-CAN or non-3GPP access supports emergency). Transfer procedures are specified also in TS 24.501 (i.e. not limited to IMS-TSes)  Simularly,   * in a shared network, or * when the initial registration for initiating a PDU session for emergency services is not accepted by the network;   the UE must prefer transfering the emergency session to a PLMN or IP-CAN, where transfer is likely to succeed, e.g. an equivalent PLMN. | | | | | | | | |
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| ***Consequences if not approved:*** | | Emergency call failure | | | | | | | | |
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| ***Clauses affected:*** | | 5.5.1.2.6, 5.5.1.2.6A, 5.5.1.2.7 | | | | | | | | |
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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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
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| ***This CR's revision history:*** | | Rev1:  - changes in 5.5.1.2.6  - adds the condition “if emergency services are supported over the non-3GPP access (see EMCN3 …)” prior to the upper layers performing transfer to non-3GPP access  Rev2:  - clarifications | | | | | | | | |

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

##### 5.5.1.2.6 Initial registration for emergency services not accepted by the network

Upon receiving the REGISTRATION REJECT message including 5GMM cause #5 "PEI not accepted", the UE shall enter the state 5GMM-DEREGISTERED.NO-SUPI. If the REGISTRATION REJECT message is received,

- over 3GPP access; or

- over non-3GPP access and is integrity protected;

and the UE also supports the registration procedure over the other access, the UE shall in addition handle 5GMM parameters and 5GMM state for this access, as described for this 5GMM cause value.

Upon receiving the REGISTRATION REJECT message including 5GMM cause value which is not #5 "PEI not accepted", the UE shall perform the actions as described in subclause 5.5.1.2.5 with the following addition: the UE shall inform the upper layers of the failure of the procedure.

NOTE 1: This can result in the upper layers requesting transfer to non-3GPP access (if emergency services are supported over the non-3GPP access (see the emergency service support for non-3GPP access indicator (EMCN3) in subclause 9.11.3.5)) or implementation specific mechanisms, e.g. procedures specified in 3GPP TS 24.229 [14] can result in the emergency call being attempted to another IP-CAN.

If the initial registration request for emergency services fails due to abnormal cases, the UE shall perform the actions as described in subclause 5.5.1.2.7 and inform the upper layers of the failure to access the network or the failure of the procedure.

NOTE 2: This can result in the upper layers requesting transfer to non-3GPP access (if emergency services are supported over the non-3GPP access (see EMCN3 in subclause 9.11.3.5)) or other implementation specific mechanisms, e.g. procedures specified in 3GPP TS 24.229 [14] can result in the emergency call being attempted to another IP-CAN.

In a shared network, upon receiving the REGISTRATION REJECT message, the UE shall perform the actions as described in subclause 5.5.1.2.5, and shall:

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

NOTE 3: The upper layers can request transfer to non-3GPP access (if emergency services are supported over the non-3GPP access (see EMCN3 in subclause 9.11.3.5)) or implementation specific mechanisms, e.g. procedures specified in 3GPP TS 24.229 [14] that can result in the emergency call being attempted to another IP-CAN.

b) attempt to perform a PLMN selection in the shared network and, if an initial registration for emergency services was not already attempted with the selected PLMN and the REGISTRATION REQUEST message, for which the REGISTRATION REJECT message was received, is:

- not for sending a PDU SESSION ESTABLISHMENT message with request type set to "existing emergency PDU session", initiate an initial registration for emergency services with the selected PLMN; or

- for sending a PDU SESSION ESTABLISHMENT message with request type set to "existing emergency PDU session", and:

i) the selected PLMN is an equivalent PLMN, initiate an initial registration for emergency services with the selected PLMN; and

ii) the selected PLMN is not an equivalent PLMN, perform a PLMN selection and initiate an initial registration for emergency services with the selected PLMN if an initial registration for emergency services was not already attempted with the selected PLMN.

In a shared network, if the initial registration request for emergency services fails due to abnormal cases, the UE shall perform the actions as described in subclause 5.5.1.2.7 and shall:

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

NOTE 4: The upper layers can request transfer to non-3GPP access (if emergency services are supported over the non-3GPP access (see EMCN3 in subclause 9.11.3.5)) or implementation specific mechanisms, e.g. procedures specified in 3GPP TS 24.229 [14] that can result in the emergency call being attempted to another IP-CAN.

b) attempt to perform a PLMN selection in the shared network and, if an initial registration for emergency services was not already attempted with the selected PLMN and the REGISTRATION REQUEST message is:

- not for sending a PDU SESSION ESTABLISHMENT message with request type set to "existing emergency PDU session", initiate an initial registration for emergency services with the selected PLMN; or

- for sending a PDU SESSION ESTABLISHMENT message with request type set to "existing emergency PDU session", and:

i) the selected PLMN is an equivalent PLMN, initiate an initial registration for emergency services with the selected PLMN; and

ii) the selected PLMN is not an equivalent PLMN, perform a PLMN selection and initiate an initial registration for emergency services with the selected PLMN if an initial registration for emergency services was not already attempted with the selected PLMN.

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

##### 5.5.1.2.6A Initial registration for initiating a PDU session for emergency services not accepted by the network

If the network cannot accept initial registration request for sending a PDU SESSION ESTABLISHMENT message with request type set to "initial emergency request"with 5GS registration type IE set to "initial registration", the UE shall perform the procedures as described in subclause 5.5.1.2.5. Then if the UE is in the same selected PLMN where the last initial registration request was attempted, the UE shall:

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

NOTE 1: This can result in the upper layers requesting implementation specific mechanisms, e.g. procedures specified in 3GPP TS 24.229 [14] can result in the emergency call being attempted to another IP-CAN.

b) attempt initial registration for emergency services.

If the network cannot accept initial registration request for establishing a PDU session for emergency services with 5GS registration type IE set to "initial registration" and the PDU session needs to be established due to handover of an existing PDN connection for emergency bearer services, the UE shall perform the procedures as described in subclause 5.5.1.2.5. Then if the UE is in the same selected PLMN or equivalent PLMN where the last initial registration request was attempted, the UE shall attempt initial registration for emergency services.

If the initial registration request for initiating a PDU session for emergency services with 5GS registration type IE set to "initial registration" fails due to abnormal case b) in subclause 5.5.1.2.7, the UE shall perform the actions as described in subclause 5.5.1.2.7 and inform the upper layers of the failure to access the network.

NOTE 2: This can result in the upper layers requesting transfer to non-3GPP access (if emergency services are supported over the non-3GPP access (see EMCN3 in subclause 9.11.3.5)) or implementation specific mechanisms, e.g. procedures specified in 3GPP TS 24.229 [14] can result in the emergency call being attempted to another IP-CAN.

If the initial registration request for initiating a PDU session for emergency services with 5GS registration type IE set to "initial registration" fails due to abnormal cases c), d) or e) in subclause 5.5.1.2.7, the UE shall perform the actions as described in subclause 5.5.1.2.7. Then if the UE is in:

a) the same selected PLMN where the last initial registration request was attempted and the PDU session does not need to be established due to handover of an existing PDN connection for emergency bearer services, the UE shall:

- inform the upper layers of the failure of the procedure; or

NOTE 3: This can result in the upper layers requesting implementation specific mechanisms, e.g. procedures specified in 3GPP TS 24.229 [14] can result in the emergency call being attempted to another IP-CAN.

- attempt initial registration for emergency services; or

b) the same selected PLMN or equivalent PLMN where the last initial registration request was attempted and the PDU session needs to be established due to handover of an existing PDN connection for emergency bearer services, attempt initial registration for emergency services.

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

##### 5.5.1.2.7 Abnormal cases in the UE

The following abnormal cases can be identified:

a) Timer T3346 is running.

The UE shall not start the registration procedure for initial registration unless:

1) the UE is a UE configured for high priority access in selected PLMN;

2) the UE needs to perform the registration procedure for initial registration for emergency services;

3) the UE receives a DEREGISTRATION REQUEST message with the "re-registration required" indication; or

4) the UE in NB-N1 mode is requested by the upper layer to transmit user data related to an exceptional event and:

- the UE is allowed to use exception data reporting (see the ExceptionDataReportingAllowed leaf of the NAS configuration MO in 3GPP TS 24.368 [17] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [22]); and

- timer T3346 was not started when N1 NAS signalling connection was established with RRC establishment cause set to "mo-ExceptionData".

The UE stays in the current serving cell and applies the normal cell reselection process.

NOTE 1: It is considered an abnormal case if the UE needs to initiate a registration procedure for initial registration while timer T3346 is running independent on whether timer T3346 was started due to an abnormal case or a non-successful case.

b) The lower layers indicate that the access attempt is barred.

The UE shall not start the initial registration procedure. The UE stays in the current serving cell and applies the normal cell reselection process. Receipt of the access barred indication shall not trigger the selection of a different core network type (EPC or 5GCN).

The initial registration procedure is started, if still needed, when the lower layers indicate that the barring is alleviated for the access category with which the access attempt was associated.

ba) The lower layers indicate that access barring is applicable for all access categories except categories 0 and 2 and the access category with which the access attempt was associated is other than 0 and 2.

If the REGISTRATION REQUEST message has not been sent, the UE shall proceed as specified for case b. If the REGISTRATION REQUEST message has been sent, the UE shall proceed as specified for case e and, additionally, the registration procedure for initial registration is started, if still needed, when the lower layers indicate that the barring is alleviated for the access category with which the access attempt was associated.

c) T3510 timeout.

The UE shall abort the registration procedure for initial registration and the NAS signalling connection, if any, shall be released locally if the initial registration request is neither for emergency services nor for initiating a PDU session for emergency services with request type set to "existing emergency PDU session". The UE shall proceed as described below.

d) REGISTRATION REJECT message, other 5GMM cause values than those treated in subclause 5.5.1.2.5, and cases of 5GMM cause values #11, #22, #31, #72, #73, #74, #75, #76 and #77, if considered as abnormal cases according to subclause 5.5.1.2.5.

If the registration request is neither an initial registration request for emergency services nor an initial registration request for initiating a PDU session for emergency services with request type set to "existing emergency PDU session", upon reception of the 5GMM causes #95, #96, #97, #99 and #111 the UE should set the registration attempt counter to 5.

The UE shall proceed as described below.

e) Lower layer failure or release of the NAS signalling connection received from lower layers before the REGISTRATION ACCEPT or REGISTRATION REJECT message is received.

The UE shall abort the registration procedure for initial registration and proceed as described below.

f) UE initiated de-registration required.

The registration procedure for initial registration shall be aborted, and the UE initiated de-registration procedure shall be performed.

g) De-registration procedure collision.

If the UE receives a DEREGISTRATION REQUEST message from the network in state 5GMM-REGISTERED-INITIATED the de-registration procedure shall be aborted and the initial registration procedure shall be progressed.

NOTE 2: The above collision case is valid if the DEREGISTRATION REQUEST message indicates the access type over which the initial registration procedure is attempted otherwise both the procedures are progressed.

h) Change of cell into a new tracking area.

If a cell change into a new tracking area occurs before the registration procedure for initial registration is completed, the registration procedure for initial registration shall be aborted and re-initiated immediately. If the REGISTRATION COMPLETE message needs to be sent and a tracking area border is crossed when the REGISTRATION ACCEPT message has been received but before a REGISTRATION COMPLETE message is sent, the registration procedure for initial registration shall be re-initiated. If a 5G-GUTI was allocated during the registration procedure, this 5G-GUTI shall be used in the registration procedure.

i) Transmission failure of REGISTRATION COMPLETE message indication with TAI change from lower layers.

If the current TAI is not in the TAI list, the registration procedure for initial registration shall be aborted and re-initiated immediately.

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.

j) Transmission failure of REGISTRATION COMPLETE message indication without TAI change from lower layers.

It is up to the UE implementation how to re-run the ongoing procedure.

k) Transmission failure of REGISTRATION REQUEST message indication from the lower layers.

The registration procedure for initial registration shall be aborted and re-initiated immediately.

l) Timer T3447 is running.

The UE shall not start the registration procedure for initial registration with Follow-on request indicator set to "Follow-on request pending" unless:

1) the UE is a UE configured for high priority access in selected PLMN; or

2) the UE needs to perform the registration procedure for initial registration for emergency services.

The UE stays in the current serving cell and applies the normal cell reselection process. The registration procedure for initial registration is started, if still necessary, when timer T3447 expires.

For the cases c, d and e, the UE shall proceed as follows:

Timer T3510 shall be stopped if still running.

If the registration procedure is neither an initial registration for emergency services nor for establishing an emergency PDU session with registration type not set to "emergency registration", the registration attempt counter shall be incremented, unless it was already set to 5.

If the registration attempt counter is less than 5:

- if the initial registration request is not for emergency services, timer T3511 is started and the state is changed to 5GMM-DEREGISTERED.ATTEMPTING-REGISTRATION. When timer T3511 expires the registration procedure for initial registration shall be restarted, if still required.

If the registration attempt counter is equal to 5

- the UE shall delete 5G-GUTI, TAI list, last visited registered TAI, list of equivalent PLMNs (if any), and ngKSI, start timer T3502 and shall set the 5GS update status to 5U2 NOT UPDATED. The state is changed to 5GMM-DEREGISTERED.ATTEMPTING-REGISTRATION or optionally to 5GMM-DEREGISTERED.PLMN-SEARCH in order to perform a PLMN selection or SNPN selection according to 3GPP TS 23.122 [5].

- if the procedure is performed via 3GPP access and the UE is operating in single-registration mode:

- the UE shall in addition handle the EMM parameters EPS update status, EMM state, 4G-GUTI, TAI list, last visited registered TAI, list of equivalent PLMNs and eKSI as specified in 3GPP TS 24.301 [15] for the abnormal cases when an EPS attach procedure fails and the attach attempt counter is equal to 5; and

- the UE shall attempt to select E-UTRAN radio access technology and proceed with appropriate EMM specific procedures. Additionally, The UE may disable the N1 mode capability as specified in subclause 4.9.

\*\*\* No more changes \*\*\*