**3GPP TSG-CT WG1 Meeting #133-bis-eC1-220319**

**E-meeting, 17-21 January 2022**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **24.501** | **CR** | **3908** | **rev** | **-** | **Current version:** | **17.5.0** |  |
|  | | | | | | | | |
| *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:*** | De-registration handling due to Tsor-cm timer expiry | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Samsung | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eCPSOR\_CON | | | | |  | ***Date:*** | | | 2022-01-10 |
|  |  | | | |  | |  | | |  |
| ***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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | When the last Tsor-cm timer expire, UE shall initiate high priority PLMN search as soon as possible. It is specified that when UE is in the 5GMM-CONNECTED mode and last Tsor timer expires, UE shall perform deregistration procedure and then intiate high priority PLMN search after going to 5GMM-IDLE mode. The pupose of this procedure is to make UE to idle mode to initiate high priority PLMN search.  In the below scenarios, deregistration procedure is re-tried will lead to delay in PLMN search.  f) Change of cell into a new tracking area.  g) Transmission failure of DEREGISTRATION REQUEST message indication with TAI change from lower layers.  and timer T3521 expiry | | | | | | | | |
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| ***Summary of change:*** | | When deregistration is not sucessful, UE shall abort the de-registration prcedure and move to idle mode | | | | | | | | |
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| ***Consequences if not approved:*** | | Camping on high priority PLMN will be delayed. | | | | | | | | |
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| ***Clauses affected:*** | | 5.5.1.3.7,5.5.2.2.6 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 \*\*\*\*\*

##### 5.5.1.3.7 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 mobility and periodic registration update unless:

1) the UE is in 5GMM-CONNECTED mode;

2) the UE received a paging;

3) the UE receives a NOTIFICATION message over non-3GPP access when the UE is in 5GMM-CONNECTED mode over non-3GPP access and in 5GMM-IDLE mode over 3GPP access;

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

5) the UE has an emergency PDU session established or is establishing an emergency PDU session;

6) the UE receives a request from the upper layers to perform emergency services fallback;

7) the UE receives the CONFIGURATION UPDATE COMMAND message as specified in subclause 5.4.4.3;

8) 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"; or

9) the MUSIM capable UE needs to request a new 5G-GUTI assignment.

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 mobility and periodic registration update while timer T3346 is running independent on whether timer T3346 was started due to an abnormal case or a non-successful case.

If the registration procedure for mobility and periodic registration update was initiated for an MO MMTEL voice call (i.e. access category 4), for an MO MMTEL video call (i.e. access category 5), for an MO IMS registration related signalling (i.e. access category 9) or for NAS signalling connection recovery during an ongoing MO MMTEL voice call (i.e. access category 4), or during an MO MMTEL video call (i.e. access category 5) or during an ongoing MO IMS registration related signalling (i.e. access category 9), then a notification that the procedure was not initiated due to network congestion shall be provided to upper layers.

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

The UE shall not start the registration procedure for mobility and periodic registration update. 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 registration procedure for mobility and periodic registration update 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:

1) 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; or

2) access barring is applicable for all access categories except category 0 and the access category with which the access attempt was associated is other than 0.

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 mobility and periodic registration update 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. For additional UE requirements for both cases see subclause 4.5.5.

c) T3510 timeout.

The UE shall abort the registration update procedure and the N1 NAS signalling connection, if any, shall be released locally.

If the UE has initiated the registration procedure in order to enable performing the service request procedure for emergency services fallback,the UE shall inform the upper layers of the failure of the emergency services fallback (see 3GP P TS 24.229 [14]). Otherwise, the UE shall proceed as described below.

d) REGISTRATION REJECT message, other 5GMM cause values than those treated in subclause 5.5.1.3.5, and cases of 5GMM cause values #11, #15, #22, #31, #72, #73, #74, #75, #76, #77 and #78, if considered as abnormal cases according to subclause 5.5.1.3.5.

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, release of the NAS signalling connection received from lower layers or the lower layers indicate that the RRC connection has been suspended without a cell change before the REGISTRATION ACCEPT or REGISTRATION REJECT message is received.

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

f) Change of cell into a new tracking area.

If a cell change into a new tracking area occurs before the registration procedure for mobility and periodic registration update is completed, the registration procedure for mobility and periodic registration update shall be aborted and re-initiated immediately. The UE shall set the 5GS update status to 5U2 NOT UPDATED.

g) Registration procedure for mobility and periodic registration update and de-registration procedure collision.

If the UE receives a DEREGISTRATION REQUEST message without 5GMM cause value #11, #12, #13 or #15 before the registration procedure for mobility and periodic registration update has been completed, the registration procedure for mobility and periodic registration update shall be aborted and the de-registration procedure shall be progressed.

If the UE receives a DEREGISTRATION REQUEST message with 5GMM cause value #11, #12, #13 or #15 before the registration procedure for mobility and periodic registration update has been completed, the registration procedure for mobility and periodic registration update shall be progressed and the de-registration procedure shall be aborted.

NOTE 2: The registration procedure for mobility and periodic registration update shall be aborted only if the DEREGISTRATION REQUEST message indicates in the access type that the access in which the registration procedure for mobility and periodic registration update was attempted shall be de-registered. Otherwise both the procedures shall be progressed.

h) Void

i) Transmission failure of REGISTRATION REQUEST message indication from the lower layers or the lower layers indicate that the RRC connection has been suspended with a cell change.

The registration procedure for mobility and periodic registration update shall be aborted and re-initiated immediately. The UE shall set the 5GS update status to 5U2 NOT UPDATED.

j) 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 mobility and periodic registration update shall be aborted and re-initiated immediately. The UE shall set the 5GS update status to 5U2 NOT UPDATED.

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.

k) 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.

l) UE-initiated de-registration required.

De-registration due to removal of USIM or entry update in the "list of subscriber data" or due to switch off:

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

De-registration not due to removal of USIM or entry update in the "list of subscriber data" and not due to switch off:

the UE initiated de-registration procedure shall be initiated after successful completion of the registration procedure for mobility and periodic registration update.

m) Timer T3447 is running

The UE shall not start any mobility and periodic registration update procedure with Uplink data status IE or Follow-on request indicator set to "Follow-on request pending" unless:

- the UE received a paging;

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

- the UE has an emergency PDU session established or is establishing an emergency PDU session;

- the UE receives a request from the upper layers to perform emergency services fallback; or

- the MUSIM capable UE needs to request a new 5G-GUTI assignment.

The UE stays in the current serving cell and applies the normal cell reselection process. The mobility and periodic registration update procedure is started, if still necessary, when timer T3447 expires or timer T3447 is stopped.

n) Timer T3448 is running

The UE in 5GMM-IDLE mode shall not start any mobility and periodic registration update procedure 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;

2) the UE which is only using 5GS services with control plane CIoT 5GS optimization received a paging request; or

3) 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]).

The UE stays in the current serving cell and applies the normal cell reselection process. The mobility and periodic registration update procedure is started, if still necessary, when timer T3448 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 not for initiating an emergency PDU session, 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 TAI of the current serving cell is not included in the TAI list or the 5GS update status is different to 5U1 UPDATED or if the registration procedure was triggered due to cases c, g, n, v in subclause 5.5.1.3.2, the UE shall start timer T3511, shall set the 5GS update status to 5U2 NOT UPDATED and change to state 5GMM-REGISTERED.ATTEMPTING-REGISTRATION-UPDATE. When timer T3511 expires, the registration update procedure is triggered again.

- if the TAI of the current serving cell is included in the TAI list, the 5GS update status is equal to 5U1 UPDATED, and the UE is not performing the registration procedure after an inter-system change from S1 mode to N1 mode, the UE shall keep the 5GS update status to 5U1 UPDATED and enter state 5GMM-REGISTERED.NORMAL-SERVICE or 5GMM-REGISTERED.NON-ALLOWED-SERVICE (as described in subclause 5.3.5.2). The UE shall start timer T3511. If in addition the REGISTRATION REQUEST message did not include the MICO indication IE or the Extended DRX IE, and:

- the REGISTRATION REQUEST message indicated "periodic registration updating";

- the registration procedure was initiated to recover the NAS signalling connection due to "RRC Connection failure" from the lower layers; or

- the registration procedure was initiated by the UE in 5GMM-CONNECTED mode with RRC inactive indication entering a cell in the current registration area belonging to an equivalent PLMN of the registered PLMN and not belonging to the registered PLMN,

and none of the other reasons for initiating the registration updating procedure listed in subclause 5.5.1.3.2 was applicable, the timer T3511 may be stopped when the UE enters 5GMM-CONNECTED mode.

- if the TAI of the current serving cell is included in the TAI list, the 5GS update status is equal to 5U1 UPDATED and the UE is performing the registration procedure after an inter-system change from S1 mode to N1 mode, the UE shall change the 5GS update status to 5U2 NOT UPDATED and enter state 5GMM-REGISTERED.ATTEMPTING-REGISTRATION-UPDATE. The UE shall start timer T3511.

- If the procedure is performed via 3GPP access and the UE is operating in single-registration mode, the UE shall in addition handle the EPS update status as specified in 3GPP TS 24.301 [15] for the abnormal cases when a normal or periodic tracking area updating procedure fails and the tracking area attempt counter is less than 5 and the EPS update status is different from EU1 UPDATED.

If the registration attempt counter is equal to 5

- the UE shall start timer T3502, shall set the 5GS update status to 5U2 NOT UPDATED.

- the UE shall delete the list of equivalent PLMNs (if any) and shall change to state 5GMM-REGISTERED.ATTEMPTING-REGISTRATION-UPDATE or optionally to 5GMM-REGISTERED.PLMN-SEARCH in order to perform a PLMN selection, SNPN selection or SNPN selection for onboarding services 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 EPS update status as specified in 3GPP TS 24.301 [15] for the abnormal cases when a normal or periodic tracking area updating procedure fails and the tracking area attempt counter is equal to 5; and

- if the UE does not change to state 5GMM-REGISTERED.PLMN-SEARCH, the UE shall attempt to select E-UTRAN radio access technology. The UE may disable the N1 mode capability as specified in subclause 4.9.

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

##### 5.5.2.2.6 Abnormal cases in the UE

The following abnormal cases can be identified:

a) Lower layer failure or release of the N1 NAS signalling connection before reception of DEREGISTRATION ACCEPT message.

The de-registration procedure shall be aborted and the UE proceeds as follows:

1) if the de-registration procedure was performed due to disabling of 5GS services, the UE shall enter the 5GMM-NULL state; or

2) if the de-registration type "normal de-registration" was requested for reasons other than disabling of 5GS services, the UE shall enter the 5GMM-DEREGISTERED state.

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

The UE shall not start the de-registration signalling 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 UE may perform a local de-registration either immediately or after an implementation-dependent time.

The de-registration signalling 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:

1) 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; or

2) access barring is applicable for all access categories except category 0 and the access category with which the access attempt was associated is other than 0.

If the DEREGISTRATION REQUEST message has not been sent, the UE shall proceed as specified for case b. If the DEREGISTRATION REQUEST message has been sent, the UE shall proceed as specified for case a.

c) T3521 timeout.

If de-registration procedure was performed based on conditions as specified in 3GPP TS 23.122 [5] annex C, on the expiry of timer T3521 the de-registration procedure shall be aborted and the UE shall localy release the established N1 NAS signalling connection and enter the 5GMM-DEREGISTERED state.

otherwise, on the first four expiries of the timer, the UE shall retransmit the DEREGISTRATION REQUEST message and shall reset and restart timer T3521. On the fifth expiry of timer T3521, the de-registration procedure shall be aborted and the UE proceeds as follows:

1) if the de-registration procedure was performed due to disabling of 5GS services, the UE shall enter the 5GMM-NULL state; or

2) if the de-registration type "normal de-registration" was requested for reasons other than disabling of 5GS services, the UE shall enter the 5GMM-DEREGISTERED state.

d) De-registration procedure collision.

De-registration containing de-registration type "switch off":

- If the UE receives a DEREGISTRATION REQUEST message before the UE-initiated de-registration procedure has been completed, this message shall be ignored and the UE-initiated de-registration procedure shall continue.

Otherwise:

- If the UE receives a DEREGISTRATION REQUEST message before the UE-initiated de-registration procedure has been completed, it shall treat the message as specified in subclause 5.5.2.3.2 with the following modification:

- If the DEREGISTRATION REQUEST message received by the UE contains de-registration type "re-registration required", and the UE-initiated de-registration procedure is with de-registration type "normal de-registration", the UE need not initiate the registration procedure for initial registration.

e) De-registration and 5GMM common procedure collision.

De-registration containing de-registration type "switch off":

- If the UE receives a message used in a 5GMM common procedure before the de-registration procedure has been completed, this message shall be ignored and the de-registration procedure shall continue.

Otherwise:

- If the UE receives a message used in a 5GMM common procedure before the de-registration procedure has been completed, both the 5GMM common procedure and the de-registration procedure shall continue; or

- If the UE receives a DL NAS TRANSPORT message containing payload container type "Service-level-AA container" before the de-registration procedure has been completed, this message shall be ignored and the de-registration procedure shall continue.

f) Change of cell into a new tracking area.

If a cell change into a new tracking area that is not in the stored TAI list occurs before the UE-initiated de-registration procedure is completed, the UE proceeds as follows:

1) if the de-registration procedure was initiated for reasons other than removal of the USIM, the UE is to be switched off or due to the last Tsor-cm timer expiry or stopped (see 3GPP TS 23.122 [5]), the de-registration procedure shall be aborted and re-initiated after successfully performing a registration procedure for mobility or periodic update used for mobility (i.e. the 5GS registration type IE set to "mobility registration updating" in the REGISTRATION REQUEST message); or

2) if the de-registration procedure was initiated due to removal of the USIM or the UE is to be switched off or due to the last Tsor-cm timer expiry or stopped (see 3GPP TS 23.122 [5]), the UE shall abort the de-registration procedure, perform a local de-registration and enter the state 5GMM-DEREGISTERED.

g) Transmission failure of DEREGISTRATION REQUEST message indication with TAI change from lower layers.

If the current TAI is not in the TAI list, the UE proceeds as follows:

1) if the de-registration procedure was initiated for reasons other than removal of the USIM ,the UE is to be switched off or due to the Tsor-cm timer expiry (see 3GPP TS 23.122 [5]), the de-registration procedure shall be aborted and re-initiated after successfully performing a registration procedure for mobility or periodic update; or

2) if the de-registration procedure was initiated due to removal of the USIM or the UE is to be switched off or due to the Tsor-cm timer expiry (see 3GPP TS 23.122 [5]), the UE shall abort the de-registration procedure, perform a local de-registration and enter the state 5GMM-DEREGISTERED.

If the current TAI is still part of the TAI list, the UE shall restart the de-registration procedure.

h) Transmission failure of DEREGISTRATION REQUEST message indication without TAI change from lower layers.

The UE shall restart the de-registration procedure.

i) The lower layers indicate that the RRC connection has been suspended.

De-registration containing de-registration type "switch off":

- The UE may perform a local de-registration either immediately or after an implementation-dependent time.

Otherwise:

- The UE shall wait for an implementation-dependent time and shall restart the de-registration procedure, if still needed, upon expiry of the implementation-dependent time.

For the cases a, f, g and i:

- Timer T3521 shall be stopped if still running.

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

\*\*\* Alternative text proposal for 23.122 \*\*\*

### C.4.2 Applying SOR-CMCI in the UE

During SOR procedure and while applying SOR-CMCI, the UE shall determine the time to release the PDU session(s) or the services as follows:

- If the UE encounters SOR security check not successful on the received steering of roaming information, and a matching criterion "SOR security check not successful" is included in the SOR-CMCI stored in the non-volatile memory of the ME, then the UE shall:

- if the timer value is not zero, start an associated Tsor-cm timer with the value included in the SOR-CMCI;

- stop all other running Tsor-cm timers, if any; and

- not start any new Tsor-cm timer while Tsor-cm timer associated with "SOR security check not successful" criterion is running;

- If one or more SOR-CMCI rules are included in SOR-CMCI, where for each criterion:

a) DNN of the PDU session:

the UE shall check whether it has a PDU session with a DNN matching to the DNN included in SOR-CMCI, and if any, the UE shall, if the timer value is not zero, start an associated Tsor-cm timer with the value included in the SOR-CMCI;

b) S-NSSAI SST of the PDU session:

the UE shall check whether it has a PDU session with a S-NSSAI SST matching the S-NSSAI SST included in SOR-CMCI, and if any, the UE shall, if the timer value is not zero, start an associated Tsor-cm timer with the value included in the SOR-CMCI;

b1) S-NSSAI SST and SD of the PDU session:

the UE shall check whether it has a PDU session with a S-NSSAI SST and SD matching the S-NSSAI SST and SD included in SOR-CMCI, and if any, the UE shall, if the timer value is not zero, start an associated Tsor-cm timer with the value included in the SOR-CMCI;

c) IMS registration related signalling:

the UE shall check whether IMS registration related signalling is ongoing as specified in 3GPP TS 24.501 [64], and if it is ongoing, the UE shall, if the timer value is not zero, start an associated Tsor-cm timer with the value included in the SOR-CMCI;

d) MMTEL voice call:

the UE shall check whether MMTEL voice call is ongoing as specified in 3GPP TS 24.501 [64], and if it is ongoing, the UE shall, if the timer value is not zero, start an associated Tsor-cm timer with the value included in the SOR-CMCI;

e) MMTEL video call:

the UE shall check whether MMTEL video call is ongoing as specified in 3GPP TS 24.501 [64], and if it is ongoing, the UE shall, if the timer value is not zero, start an associated Tsor-cm timer with the value included in the SOR-CMCI;

f) SMS over NAS or SMSoIP:

the UE shall check whether SMS over NAS or SMSoIP services is ongoing as specified in TS 24.501 [64], and if it is ongoing, the UE shall, if the timer value is not zero, start an associated Tsor-cm timer with the value included in the SOR-CMCI; or

g) match all:

the UE shall check whether there are any PDU sessions or services for which there is no matching criterion in a) to f) above. If such PDU session or service exists, then for each of these PDU sessions or services, the UE shall, if the timer value is not zero, start an associated Tsor-cm timer with the value included in the SOR-CMCI.

If the SOR-CMCI is available, and:

- the SOR-CMCI used is in the USIM, contains no SOR-CMCI rule;

- there are one or more SOR-CMCI rules but there is no criterion matched with any ongoing PDU session or service; or

- there are one or more SOR-CMCI rules and there is one or more criteria matched with an ongoing PDU session or service, but the highest Tsor-cm timer value associated with the matched criteria is equal to zero;

then there is no Tsor-cm timer started for any PDU session or service.

While one or more Tsor-cm timers are running, the UE shall check the newly established PDU session or service for a matching criterion in the SOR-CMCI:

- If a matching criterion is found and the applicable Tsor-cm timer indicated the value "infinity" then the UE shall start the Tsor-cm timer associated to the newly established PDU session or service with the value set to infinity; or

- For all other cases, if a matching criterion is found and the timer value is not zero then the UE shall start the Tsor-cm timer associated to the newly established PDU session or service with the value included in the SOR-CMCI, with the exception that if the value of the Tsor-cm timer included in the SOR-CMCI exceeds the highest value among the current values of all running Tsor-cm timers, then the value of the Tsor-cm timer for the newly established PDU session or service shall be set to the highest value among the current values of all running Tsor-cm timers.

NOTE 1: For newly established PDU session or service as described above, the timer is set irrespective of whether other ongoing PDU sessions or services that match the same criteria exist and for which corresponding Tsor-cm timers are running.

NOTE 2: NAS 5GMM layer will receive an explicit indication from the upper layers that a service is started or stopped. When a service is started, it is handled as a new service in the procedures described in this clause.

NOTE 3: While one or more Tsor-cm timers are running, the UE can trigger any 5GSM procedure or start new services.

While one or more Tsor-cm timers are running, upon receiving a new SOR-CMCI as described in annex C.4.3, the UE shall check if there is a matching criterion found for any ongoing PDU session or service in the new SOR-CMCI:

- if a matching criterion is found and the value of Tsor-cm timer in the new SOR-CMCI indicates the value "infinity", then:

a) if the Tsor-cm timer associated to the PDU session or service is not running, then the UE shall start the Tsor-cm timer associated to the PDU session or service with the value set to infinity; or

b) if the Tsor-cm timer associated to the PDU session or service is already running, then the UE shall set the value of the Tsor-cm timer associated to the PDU session or service to infinity without stopping and restarting the timer;

- if a matching criterion is found and the value of Tsor-cm timer in the new SOR-CMCI is other than infinity and is smaller than the current value of the running Tsor-cm timer for the associated PDU session or service, then the Tsor-cm timer value for the associated PDU session or service shall be replaced with the value in the new SOR-CMCI without stopping and restarting the timer; or

- for all other cases, the running Tsor-cm timers for the associated PDU sessions or services are kept unchanged.

The Tsor-cm timer shall be stopped when the associated PDU session is released or the associated service is stopped.

If the UE, while one or more Tsor-cm timers are running:

a) enters idle mode not due to lower layer failure (see 3GPP TS 24.501 [64]);

b) is not able to successfully recover the N1 NAS signalling connection (see 3GPP TS 24.501 [64]); or

c) enters 5GMM-CONNECTED mode with RRC inactive indication (see 3GPP TS 24.501 [64]);

then the UE shall stop the timer(s). In these cases, if:

a) the UE has a list of available and allowable PLMNs or SNPNs in the area and based on this list or any other implementation specific means, the UE determines that there is a higher priority PLMN or SNPN than the selected VPLMN or non-subscribed SNPN; or

b) the UE does not have a list of available and allowable PLMNs or SNPNs in the area and is unable to determine whether there is a higher priority PLMN or SNPN than the selected VPLMN or non-subscribed SNPN using any other implementation specific means;

then the UE shall attempt to obtain service on a higher priority PLMN or SNPN as specified in clause 4.4.3.3 by acting as if timer T that controls periodic attempts has expired or as specified in clause 4.9.3.

NOTE 4: When the UE enters idle mode due to lower layer failure while one or more Tsor-cm timers are running, then the UE does not stop Tsor-cm timer(s) as recovery of NAS signalling connection is possible (see 3GPP TS 24.501 [64]).

When the UE determines that no Tsor-cm timer is started for any PDU session or service, the last running Tsor-cm timer is stopped due to release of the associated PDU sessions or stop of the associated services, or the last running Tsor-cm timer expires, if:

i) the UE has a list of available and allowable PLMNs or SNPNs in the area and based on this list or any other implementation specific means, the UE determines that there is a higher priority PLMN or SNPN than the selected VPLMN or non-subscribed SNPN; or

ii) the UE does not have a list of available and allowable PLMNs or SNPNs in the area and is unable to determine whether there is a higher priority PLMN or SNPN than the selected VPLMN or non-subscribed SNPNusing any other implementation specific means;

then if the UE is in 5GMM-CONNECTED mode, the UE shall perform the deregistration procedure (see clause 4.2.2.3 of 3GPP TS 23.502 [63]) that releases all the established PDU sessions and services, if any, and if the deregistration procedure is completed successfully, once the UE enters idle mode it shall attempt to obtain service on a higher priority PLMN or SNPN as specified in clause 4.4.3.3 by acting as if timer T that controls periodic attempts has expired or as specified in clause 4.9.3. If the deregistration procedure is not successful, i.e. any abnormal case occurs, the UE may abort the de-registration procedure, release the current N1 NAS signalling connection locally and attempt to obtain service on a higher priority PLMN or SNPN as specified in clause 4.4.3.3 by acting as if timer T that controls periodic attempts has expired or as specified in clause 4.9.3.

NOTE 5: The list of available and allowable PLMNs or SNPNs in the area is implementation specific.

The UE which has an emergency PDU session, receives a request from the upper layers to establish an emergency PDU session or perform emergency services fallback, registers for emergency services, or is configured for high priority access in the selected PLMN or SNPN is not required to enter idle mode if the last running Tsor-cm timer for any PDU session or service stops or expires. In this case, the UE shall attempt to perform the PLMN or SNPN selection after the emergency PDU session or the high priority service is released and after the UE enters idle mode or 5GMM-CONNECTED mode with RRC inactive indication (see 3GPP TS 24.501 [64]).