**3GPP TSG-CT WG1 Meeting #124-eC1-204053**

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

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **24.301** | **CR** | **3410** | **rev** | **1** | **Current version:** | **16.4.0** |  |
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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:***  | No CSFB following emergency services fallback from 5GS |
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| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | C1 |
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| ***Work item code:*** | 5GProtoc16 |  | ***Date:*** | 2020-05-12 |
|  |  |  |  |  |
| ***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 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)* |
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| ***Reason for change:*** | For the combined attach/TAU successful for EPS services only, the current TS 24.301 specified following handling due to emergency services fallback (ESFB) from 5GS (was added by CR#3224/C1-194751 and CR#3233/C1-196960):"*If, due to emergency services fallback (see 3GPP TS 23.502 [59]), there is:* *- a request for emergency services pending and the emergency bearer services indicator in the EPS network feature support IE indicates "emergency bearer services in S1 mode not supported";**NOTE: See 3GPP TS 24.229 [13D], subclause U.2.2.6.5 for scenarios where a combined attach is invoked due to emergency services fallback.**- a request for CS fallback emergency call pending; or* *-* *a request for CS fallback call pending (see subclause 5.3.7) and the ATTACH ACCEPT is received with EMM cause other than EMM cause #2;**then the UE shall skip the requirements defined below in the present subclause for the receipt of an ATTACH ACCEPT message including an EMM cause value, attempt to select GERAN or UTRAN radio access technology, select a setup message as defined in subclause 5.3.7, proceed with appropriate MM specific procedures, and send the setup message.*"Based on the above pink text, one can see the precondition case is below:1. *The UE was camped on and successfully registered to 5GS, i.e. PS attached = "Y";*
2. *The ESFB was supported by both the UE and the network, i.e. ESFB = "Y";*
3. *The UE was not attached to CS domain as 5GS has no CS domain, i.e. CS attached = "N";*
4. *A request from the upper layers to perform emergency service fallback was received by the UE when camping on 5GS, which means the emergency service over IMS is not supported in 5GS, otherwise, no need to initiate the ESFB, i.e. EMS = "N"; and*
5. *The combined attach/TAU procedure was triggered due to such ESFB from 5GS.*

In the above case, as per specfied SA2 TS 23.502 sub 4.13.4.1:"*The UE shall follow the domain selection rules for emergency session attempts as described in TS 23.167 [28].*"Then as per specified in Table H.1 in TS 23.167 for Domain Selection Rules for emergency session attempts, the above case will only match to the following rule in Table H.1:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | CS Attached | PS Attached | VoIMS | EMS | First EMC Attempt  | Second EMC Attempt |
| C | N | Y | Y or N | N | PS if ESFB is "Y" (NOTE 5).Else CS or PS for another 3GPP RAT with EMS or ESFB set to "Y" if available and supported and if the emergency session includes at least voice.Else PS for another 3GPP RAT with EMS or ESFB set to "Y" if available and supported if the emergency session contains only media other than voice. | PS if first attempt in CSCS if first attempt in PS - NOTE 7) |

Based on above rule, only PS domain will be selected as the First EMC Attempt, i.e. CS domain will never be selected in above case. Hence, there is no chance for the UE to receive any "*a request for CS fallback emergency call*" or "*a request for CS fallback call*" from upper layers in above case.Hence, in above case, only first bullet (green bullet) can happen while 2nd and 3rd bullets (yellow bullets) cannot happen.One may argue that as per specified in TS 24.229 in following NOTEs (informative text) that the use of CS domain is not precluded:"*U.2.2.6.4 Emergency services in single-registration mode**NOTE: This subclause covers only the case where the UE selects the IM CN subsystem in accordance with the conventions and rules specified in 3GPP TS 23.167 [4B] and describes the IP-CAN specific procedure. It does not preclude the use of CS domain. When a CS system based on 3GPP TS 24.008 [8] is to be used, clause B.5 applies.*""*U.2.2.6.5 Emergency services in dual registration mode**NOTE 1: This subclause covers only the case where the UE selects the IM CN subsystem in accordance with the conventions and rules specified in 3GPP TS 23.167 [4B] and describes the IP-CAN specific procedure. It does not preclude the use of CS domain. When a CS system based on 3GPP TS 24.008 [8] is to be used, clause B.5 applies.*"However, as also indicated in above NOTEs, once the CS domain was selected, clause B.5 applies. And then seeing TS 24.229 B.5:"*B.5 Use of circuit-switched domain**When an emergency call is to be set up over the CS domain, the UE shall attempt it according to the procedures described in 3GPP TS 24.008 [8].**NOTE: 3GPP TS 24.301 [8J] specifies additional requirements for the UE in determining the type of setup message the UE sends to the network when an emergency call is to be set up over the CS domain.*"Hence, one can see even though the CS domain was selected, the UE will directly try to select CS domain of 2G/3G and then the UE will not initiate the ESFB in 5GS. Howevever, above 2nd and 3rd bullets (yellow bullets) is sticked to the above case (*due to emergency services fallback*), which is conflicting with the UE behaviour (TS 24.229 B.5) in case of CS domain was selectedAll in all, above 2nd and 3rd bullets (yellow bullets) cannot happen in the above case (*due to emergency services fallback*).Finally, for below NOTE in sub 5.5.1.3.4.3, cannot find anything in TS 24.229 sub U.2.2.6.5 for combined attach trigger. Note that this NOTE was not in the sub 5.5.3.3.4.3 for combined TAU trigger. Hence, below NOTE needs to be removed."*NOTE: See 3GPP TS 24.229 [13D], subclause U.2.2.6.5 for scenarios where a combined attach is invoked due to emergency services fallback.*" |
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| ***Summary of change:*** | It proposes to remove the pending CSFB emergency call and pending CSFB call in case of ESFB from 5GS. |
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| ***Consequences if not approved:*** | An impossible case remains in the protocol which cannot happen: "*a request for CS fallback emergency call*" or "*a request for CS fallback call*" is pending in case of ESFB from 5GS. |
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| ***Clauses affected:*** | 5.5.1.3.4.3, 5.5.3.3.4.3 |
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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:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\* \* \* First Change \* \* \* \*

###### 5.5.1.3.4.3 Combined attach successful for EPS services only

Apart from the actions on the tracking area updating attempt counter, the description for attach for EPS services as specified in subclause 5.5.1.2.4 shall be followed. In addition, the following description for attach for non-EPS services applies.

If, due to emergency services fallback (see 3GPP TS 23.502 [59], subclause 4.13.4), there is a request for emergency services pending and the emergency bearer services indicator in the EPS network feature support IE indicates "emergency bearer services in S1 mode not supported", then the UE shall skip the requirements defined below in the present subclause for the receipt of an ATTACH ACCEPT message including an EMM cause value, attempt to select GERAN or UTRAN radio access technology, select a setup message as defined in subclause 5.3.7, proceed with appropriate MM specific procedures, and send the setup message.

The UE receiving the ATTACH ACCEPT message takes one of the following actions depending on the EMM cause value:

#2 (IMSI unknown in HSS)

 The UE shall stop T3410 if still running and shall reset the tracking area updating attempt counter. The UE shall set the update status to U3 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number. The UE shall enter state EMM-REGISTERED.NORMAL-SERVICE. The new MM state is MM IDLE. The USIM shall be considered as invalid for non-EPS services until switching off or the UICC containing the USIM is removed.or the timer T3245 expires as described in subclause 5.3.7a. If the UE maintains a counter for "SIM/USIM considered invalid for non-GPRS services", then the UE shall set this counter to UE implementation-specific maximum value.

 If, due to emergency services fallback (see 3GPP TS 23.502 [59]), there is a request for CS fallback call pending (see subclause 5.3.7), the UE shall attempt to select GERAN or UTRAN radio access technology and attempt emergency call setup.

#16 (MSC temporarily not reachable); or

#17 (Network failure)

 The UE shall stop timer T3410 if still running, and shall enter state MM IDLE. The tracking area updating attempt counter shall be incremented, unless it was already set to 5.

 If the tracking area updating attempt counter is less than 5:

- the UE shall start timer T3411, shall set the EPS update status to EU1 UPDATED and shall enter state EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM. When timer T3411 expires the combined tracking area updating procedure indicating "combined TA/LA updating with IMSI attach" is triggered.

 If the tracking area updating attempt counter is equal to 5:

- a UE operating in CS/PS mode 2 of operation and a UE operating in CS/PS mode 1 of operation with "IMS voice available" shall start timer T3402, shall set the EPS update status to EU1 UPDATED and shall enter state EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM. When timer T3402 expires the combined tracking area updating procedure indicating "combined TA/LA updating with IMSI attach" is triggered;

- a UE operating in CS/PS mode 1 of operation with "IMS voice not available" shall attempt to select GERAN or UTRAN radio access technology and proceed with appropriate MM or GMM specific procedures and disable the E-UTRA capability (see subclause 4.5).

#18 (CS domain not available)

 The UE shall stop timer T3410 if still running, shall reset the tracking area updating attempt counter, shall set the EPS update status to EU1 UPDATED and shall enter state EMM-REGISTERED.NORMAL-SERVICE.

 The UE shall enter state MM IDLE and shall set the update status to U2 NOT UPDATED.

 A UE in CS/PS mode 1 of operation with "IMS voice not available" shall attempt to select GERAN or UTRAN radio access technology and disable the E-UTRA capability (see subclause 4.5).

 A UE in CS/PS mode 2 of operation and a UE operating in CS/PS mode 1 of operation with "IMS voice available" may provide a notification to the user or the upper layers that the CS domain is not available.

 The UE shall not attempt combined attach or combined tracking area update procedure with current PLMN until switching off the UE or the UICC containing the USIM is removed.

#22 (Congestion)

 The UE shall stop the timer T3410 if still running. The tracking area updating attempt counter shall be set to 5. The UE shall start the timer T3402, shall set the EPS update status to EU1 UPDATED, shall enter state EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM, and shall enter state MM IDLE.

Other EMM cause values and the case that no EMM cause IE was received are considered as abnormal cases. The combined attach procedure shall be considered as failed for non-EPS services. The behaviour of the UE in those cases is specified in subclause 5.5.1.3.6.

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

###### 5.5.3.3.4.3 Combined tracking area updating successful for EPS services only

Apart from the actions on the tracking area updating attempt counter, the description for tracking area for EPS services as specified in subclause 5.5.3.2.4 shall be followed. In addition, the following description for location updating for non-EPS services applies.

If, due to emergency services fallback (see 3GPP TS 23.502 [59], subclause 4.13.4), there is a request for emergency services pending and the emergency bearer services indicator in the EPS network feature support IE indicates "emergency bearer services in S1 mode not supported", then the UE shall skip the requirements defined below in the present subclause for the receipt of a TRACKING AREA UPDATE ACCEPT message including an EMM cause value, attempt to select GERAN or UTRAN radio access technology, select a setup message as defined in subclause 5.3.7, proceed with appropriate MM specific procedures, and send the setup message.

The UE receiving the TRACKING AREA UPDATE ACCEPT message takes one of the following actions depending on the EMM cause value:

#2 (IMSI unknown in HSS)

 The UE shall stop T3430 if still running and shall reset the tracking area updating attempt counter. The UE shall set the update status to U3 ROAMING NOT ALLOWED and shall delete any TMSI, LAI and ciphering key sequence number. The UE shall enter state EMM-REGISTERED.NORMAL-SERVICE. The new MM state is MM IDLE. The USIM shall be considered as invalid for non-EPS services until switching off or the UICC containing the USIM is removed or the timer T3245 expires as described subclause 5.3.7a. If the UE maintains a counter for "SIM/USIM considered invalid for non-GPRS services", then the UE shall set this counter to UE implementation-specific maximum value.

 If, due to emergency services fallback (see 3GPP TS 23.502 [59]), there is a request for CS fallback call pending (see subclause 5.3.7), the UE shall attempt to select GERAN or UTRAN radio access technology and attempt emergency call setup.

#16 (MSC temporarily not reachable); or

#17 (Network failure)

 The UE shall stop timer T3430 if still running, and shall enter state MM IDLE. The tracking area updating attempt counter shall be incremented, unless it was already set to 5.

 If the tracking area updating attempt counter is less than 5:

- the UE shall start timer T3411, shall set the EPS update status to EU1 UPDATED and shall enter state EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM. When timer T3411 expires the combined tracking area updating procedure indicating "combined TA/LA updating with IMSI attach" is triggered again.

 If the tracking area updating attempt counter is equal to 5:

- a UE operating in CS/PS mode 2 of operation and a UE operating in CS/PS mode 1 of operation with "IMS voice available" shall start timer T3402, shall set the EPS update status to EU1 UPDATED and shall enter state EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM. When timer T3402 expires the combined tracking area updating procedure indicating "combined TA/LA updating with IMSI attach" is triggered again;

- a UE operating in CS/PS mode 1 of operation with "IMS voice not available" without a persistent EPS bearer context shall attempt to select GERAN or UTRAN radio access technology and proceed with appropriate MM or GMM specific procedures and disable the E-UTRA capability (see subclause 4.5);

- a UE operating in CS/PS mode 1 of operation with "IMS voice not available" and with a persistent EPS bearer context shall start timer T3402, shall set the EPS update status to EU1 UPDATED and shall enter state EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM. When timer T3402 expires the combined tracking area updating procedure indicating "combined TA/LA updating with IMSI attach" is triggered again. When the radio bearer associated with the persistent EPS bearer context has been released and the UE is registered for EPS services only, operating in CS/PS mode 1 of operation with "IMS voice not available", then the UE shall stop timer T3402, if already running, attempt to select GERAN or UTRAN radio access technology and proceed with appropriate MM or GMM specific procedures and disable the E-UTRA capability (see subclause 4.5).

#18 (CS domain not available)

 The UE shall stop timer T3430 if still running, shall reset the tracking area updating attempt counter, shall set the EPS update status to EU1 UPDATED and shall enter state EMM-REGISTERED.NORMAL-SERVICE.

 The UE shall enter state MM IDLE and shall set the update status to U2 NOT UPDATED.

 A UE in CS/PS mode 1 of operation with "IMS voice not available" without a persistent EPS bearer context shall attempt to select GERAN or UTRAN radio access technology rather than E-UTRAN for the registered PLMN or equivalent PLMN and disable the E-UTRA capability (see subclause 4.5).

 A UE in CS/PS mode 1 of operation with "IMS voice not available" and with a persistent EPS bearer context shall, after the radio bearer associated with the persistent EPS bearer context has been released, attempt to select GERAN or UTRAN radio access technology rather than E-UTRAN for the registered PLMN or equivalent PLMN and disable the E-UTRA capability (see subclause 4.5).

 A UE in CS/PS mode 2 of operation and a UE operating in CS/PS mode 1 of operation with "IMS voice available" may provide a notification to the user or the upper layers that the CS domain is not available.

 The UE shall not attempt combined attach or combined tracking area updating procedure with current PLMN until switching off the UE or the UICC containing the USIM is removed.

#22 (Congestion)

 The UE shall stop timer T3430 if still running. The tracking area updating attempt counter shall be set to 5. The UE shall start timer T3402, shall set the EPS update status to EU1 UPDATED, shall enter state EMM-REGISTERED.ATTEMPTING-TO-UPDATE-MM, shall enter state MM IDLE.

Other EMM cause values and the case that no EMM cause IE was received are considered as abnormal cases. The combined tracking area updating procedure shall be considered as failed for non-EPS services. The behaviour of the UE in those cases is specified in subclause 5.5.3.3.6.

\* \* \* End of Change \* \* \* \*