**3GPP TSG-CT WG1 Meeting #137-eC1-224828**

**E-Meeting, 18th – 26th August 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  | **24.301** | **CR** | **3777** | **rev** | **-** | **Current version:** | **17.7.0** |  |
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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:***  | The UE handling when returning to coverage in EPS |
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| ***Source to WG:*** | vivo |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5GProtoc18 |  | ***Date:*** | 2022-08-05 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-18 |
|  | *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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | TS 23.401 specifies the behaviour of the UE in RM-REGISTERED state enters CM-IDLE state after the expiry of the periodic registration timer as below:*If the UE is out of E-UTRAN coverage* *(including the cases when the UE is camped on GERAN/UTRAN cells) when its periodic TAU timer expires, the UE shall:**….**when EMM-REGISTERED, perform a Tracking Area Update when it next returns to E-UTRAN coverage. For UE using a RAN that provides discontinuous coverage (e.g. for satellite access with discontinuous coverage), if the UE knows how the E-UTRAN coverage varies with time based on information defined in TS 36.331 [37] (e.g. from the ephemeris data of a satellite access system that the UE is using) then the UE may deactivate its Access Stratum functions in order to optimise power consumption until coverage returns. Details are specified in TS 36.304 [34] and TS 24.301 [46].*According to current CT1 specification, the UE enters the EMM-REGISTERED.NO-CELL-AVAILABLE state if the E-UTRA coverage has been lost. The UE shall perform cell selection and choose an appropriate substate when a cell is found. At this moment, the periodic TAU timer expires, periodic TAU is delayed until it is next returns to the coverage. The above UE’s behaviour shall be captured in the CT1 specification to improve the user experience. |
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| ***Summary of change:*** | If the UE in EMM-REGISTERED state moves out of network coverage when its periodic TAU timer expires, the UE shall perform the periodic TAU procedure when it next returns to the coverage. |
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| ***Consequences if not approved:*** | The stage 2 requirement is not implemented and the UE behavior is undetermined. The UE can not use services timely when it returns to E-UTRAN coverage, which degrades the user experience. |
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| ***Clauses affected:*** | 5.3.5 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  |  |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  |  |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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

### 5.3.5 Handling of the periodic tracking area update timer and mobile reachable timer (S1 mode only)

The periodic tracking area updating procedure is used to periodically notify the availability of the UE to the network. The procedure is controlled in the UE by timer T3412. The value of timer T3412 is sent by the network to the UE in the ATTACH ACCEPT message and can be sent in the TRACKING AREA UPDATE ACCEPT message. The UE shall apply this value in all tracking areas of the list of tracking areas assigned to the UE until a new value is received.

If timer T3412 received by the UE in an ATTACH ACCEPT or TRACKING AREA UPDATE ACCEPT message contains an indication that the timer is deactivated or the timer value is zero, then timer T3412 is deactivated and the UE shall not perform the periodic tracking area updating procedure.

Timer T3412 is reset and started with its initial value, when the UE changes from EMM-CONNECTED to EMM-IDLE mode. Timer T3412 is stopped when the UE enters EMM-CONNECTED mode or the EMM-DEREGISTERED state.

If the UE is attached for emergency bearer services, and timer T3412 expires, the UE shall not initiate a periodic tracking area updating procedure, but shall locally detach from the network. When the UE is camping on a suitable cell, it may re-attach to regain normal service.

When a UE is not attached for emergency bearer services, and timer T3412 expires, the periodic tracking area updating procedure shall be started and the timer shall be set to its initial value for the next start.

If the UE is not attached for emergency bearer services, and is in a state other than EMM-REGISTERED.NORMAL-SERVICE when timer T3412 expires, the periodic tracking area updating procedure is delayed until the UE returns to EMM-REGISTERED.NORMAL-SERVICE.

If the UE is not attached for emergency bearer services and moves out of the network coverage when timer T3412 expires, the periodic tracking area updating procedure is delayed until the UE next returns to the network coverage.

NOTE 1: When the UE returns to EMM-REGISTERED.NORMAL-SERVICE and it needs to initiate other EMM procedure than the periodic TAU procedure then, based on UE implementation, the EMM procedure can take precedence.

If ISR is activated, the UE shall keep both timer T3412 and timer T3312. The two separate timers run in the UE for updating MME and SGSN independently. The UE shall start timer T3423, if timer T3412 expires, and timer T3346 is running or the UE is in one of the following states:

- EMM-REGISTERED.NO-CELL-AVAILABLE;

- EMM-REGISTERED.PLMN-SEARCH;

- EMM-REGISTERED.UPDATE-NEEDED; or

- EMM-REGISTERED.LIMITED-SERVICE.

The UE shall initiate the tracking area updating procedure and stop timer T3423 when it enters state EMM-REGISTERED.NORMAL-SERVICE before timer T3423 expires. After expiry of timer T3423 the UE shall set its TIN to "P-TMSI".

If timer T3423 expires the UE shall memorize that it has to initiate a tracking area updating procedure when it returns to state EMM-REGISTERED.NORMAL-SERVICE.

If the UE is attached to both EPS and non-EPS services, and if timer T3412 expires or timer T3423 expires when the UE is in EMM-REGISTERED.NO-CELL-AVAILABLE state, then the UE shall initiate the combined tracking area updating procedure indicating "combined TA/LA updating with IMSI attach" when the UE returns to EMM-REGISTERED.NORMAL-SERVICE state.

When the network includes T3412 extended value IE in the ATTACH ACCEPT message or TRACKING AREA UPDATE ACCEPT message, the network uses timer T3412 extended value IE as the value of timer T3412.

The network supervises the periodic tracking area updating procedure of the UE by means of the mobile reachable timer.

If the UE is not attached for emergency bearer services, the mobile reachable timer shall be longer than T3412. In this case, by default, the mobile reachable timer is 4 minutes greater than timer T3412.

If ISR is not activated, the network behaviour upon expiry of the mobile reachable timer is network dependent, but typically the network stops sending paging messages to the UE on the first expiry, and may take other appropriate actions.

If the UE is attached for emergency bearer services, the MME shall set the mobile reachable timer with a value equal to timer T3412. When the mobile reachable timer expires, the MME shall locally detach the UE.

The mobile reachable timer shall be reset and started with the value as indicated above, when the MME releases the NAS signalling connection for the UE. The mobile reachable timer shall be stopped when a NAS signalling connection is established for the UE.

Upon expiry of the mobile reachable timer the network shall start the implicit detach timer. The value of the implicit detach timer is network dependent. If ISR is activated, the default value of the implicit detach timer is 4 minutes greater than timer T3423. If the implicit detach timer expires before the UE contacts the network, the network shall implicitly detach the UE. If the MME includes timer T3346 in the TRACKING AREA UPDATE REJECT message or the SERVICE REJECT message and timer T3346 is greater than timer T3412, the MME sets the mobile reachable timer and the implicit detach timer such that the sum of the timer values is greater than timer T3346.

If the network includes the T3324 value IE in the ATTACH ACCEPT message or TRACKING AREA UPDATE ACCEPT message, and if the UE is not attached for emergency bearer services and has no PDN connection for emergency bearer services the MME shall set the active timer to a value equal to the value of timer T3324.

NOTE 2: Timer T3324 is specified in 3GPP TS 24.008 [13].

If the UE has established a PDN connection for emergency services after receiving the timer T3324 value IE in the ATTACH ACCEPT message or the last TRACKING AREA UPDATE ACCEPT message, the active timer shall not be started.

The active timer shall be reset and started with the value as indicated above, when the MME releases the NAS signalling connection for the UE. The active timer shall be stopped when an NAS signalling connection is established for the UE.

The network behaviour upon expiry of the active timer is network dependent, but typically the network stops sending paging messages to the UE on the first expiry, and may take other appropriate actions.

NOTE 3: ISR is not activated when the network includes the T3324 value IE in the ATTACH ACCEPT message or TRACKING AREA UPDATE ACCEPT message.

The implicit detach timer shall be stopped when a NAS signalling connection is established for the UE.

\* \* \* End of Changes \* \* \* \*