**3GPP TSG-CT WG1 Meeting #124-eC1-203662**

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

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **24.301** | **CR** | **3405** | **rev** | **-** | **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:*** | Sending the EPS bearer context status IE in TAU after mobility from N1 mode with local bearer deactivation | | | | | | | | | |
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| ***Source to WG:*** | Samsung | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | 5G\_CIoT | | | | |  | ***Date:*** | | | 2020-05-26 |
|  |  | | | |  | |  | | |  |
| ***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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 1) Dedicated EPS bearers are not supported over NB-S1 mode. After an inter-system change from WB-N1 mode to NB-S1 mode, in idle mode, if the UE deactivated any EPS bearer context, then the UE shall include the EPS bearer context status IE in TRACKING AREA UPDATE REQUEST message.  Note: this is already done for mobility from WB-S1 to NB-S1 as quoted below from section 6.4.2.1:  “*In NB-S1 mode, the dedicated EPS bearer contexts activation procedure is not used. Upon an inter-system mobility from WB-S1 mode to NB-S1 mode in EMM-IDLE mode, if the UE has at least one dedicated EPS bearer context in ESM state BEARER CONTEXT ACTIVE, the UE shall locally deactivate any such dedicated EPS bearer context and shall include the EPS bearer context status IE in TRACKING AREA UPDATE REQUEST message*”.  2) Additionally, a UE from N1 mode (i.e. either NB-N1 or WB-N1) can have multiple PDU sessions even if not all of them have UP resources since 5GS supports selected UP activation. If the UE comes to NB-S1 mode and is using UP CIoT EPS optimization, then it can only have a certain number of active default EPS bearers that cannot exceed the UE’s maximum number of supported DRBs (i.e. 1 or 2 based on the Multiple DRB bit). As such, the UE should locally release some default bearers based on implementation if the number of active default bearers is more than the UE can support in terms of DRBs. | | | | | | | | |
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| ***Summary of change:*** | | 1) Upon inter-system change from WB-N1 mode to NB-S1 mode, if the UE deactives a dedicated EPS bearer context as described in document C1-203661 (i.e. which is supposed to be the section on interworking that is described in TS 24.501), then the UE shall include the EPS bearer context status IE in TRACKING AREA UPDATE REQUEST message.  2) Upon an inter-system change from N1 mode to NB-S1 mode in EMM-IDLE mode for the UE operating in single-registration mode, if:  a) the number of default EPS bearers that are active in the UE is larger than the UE's implementation-specific maximum number of active user plane radio bearers; and  b) the UE is using user plane CIoT EPS optimization;  the UE shall, based on UE implementation, locally deactivate at least one default EPS such that the total number of active default EPS bearers that remain does not exceed the UE's implementation-specific maximum number of active user plane radio bearers. The UE shall then include the EPS bearer context status IE in TRACKING AREA UPDATE REQUEST message. | | | | | | | | |
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| ***Consequences if not approved:*** | | 1) The UE will attempt to transfer dedicated EPS bearers which is not allowed as per the current requirements.  2) The UE will attempt to have UP resources (i.e. DRBs) for a number of radio bearers that is more than it can support. | | | | | | | | |
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| ***Clauses affected:*** | | 5.5.3.2.2, 5.5.3.3.2, 6.4.2.1, 6.5.0 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

\*\*\*\*\*\* NEXT CHANGE \*\*\*\*\*\*

##### 5.5.3.2.2 Normal and periodic tracking area updating procedure initiation

The UE in state EMM-REGISTERED shall initiate the tracking area updating procedure by sending a TRACKING AREA UPDATE REQUEST message to the MME,

a) when the UE detects entering a tracking area that is not in the list of tracking areas that the UE previously registered in the MME, unless the UE is configured for "AttachWithIMSI" as specified in 3GPP TS 24.368 [15A] or 3GPP TS 31.102 [17] and is entering a tracking area in a new PLMN that is neither the registered PLMN nor in the list of equivalent PLMNs;

b) when the periodic tracking area updating timer T3412 expires;

c) when the UE enters EMM-REGISTERED.NORMAL-SERVICE and the UE's TIN indicates "P-TMSI";

d) when the UE performs an inter-system change from S101 mode to S1 mode and has no user data pending;

e) when the UE receives an indication from the lower layers that the RRC connection was released with cause "load balancing TAU required";

f) when the UE deactivated EPS bearer context(s) locally while in EMM-REGISTERED, because it could not establish a NAS signalling connection, and then returns to EMM-REGISTERED.NORMAL-SERVICE and no EXTENDED SERVICE REQUEST message, CONTROL PLANE SERVICE REQUEST message or DETACH REQUEST message with detach type is "EPS detach" or "combined EPS/IMSI detach" is pending to be sent by the UE;

g) when the UE changes the UE network capability information or the MS network capability information or both;

h) when the UE changes the UE specific DRX parameter;

i) when the UE receives an indication of "RRC Connection failure" from the lower layers and has no signalling or user uplink data pending (i.e when the lower layer requests NAS signalling connection recovery);

j) when the UE enters S1 mode after 1xCS fallback or 1xSRVCC;

k) when due to manual CSG selection the UE has selected a CSG cell whose CSG identity and associated PLMN identity are not included in the UE's Allowed CSG list or in the UE's Operator CSG list;

l) when the UE reselects an E-UTRAN cell while it was in GPRS READY state or PMM-CONNECTED mode;

m) when the UE supports SRVCC to GERAN or UTRAN or supports vSRVCC to UTRAN and changes the mobile station classmark 2 or the supported codecs, or the UE supports SRVCC to GERAN and changes the mobile station classmark 3;

n) when the UE changes the radio capability for GERAN, or cdma2000® or both;

o) when the UE's usage setting or the voice domain preference for E-UTRAN change in the UE;

p) when the UE activates mobility management for IMS voice termination as specified in 3GPP TS 24.008 [13], annex P.2, and the TIN indicates "RAT-related TMSI";

q) when the UE performs an inter-system change from A/Gb mode to S1 mode and the TIN indicates "RAT-related TMSI", but the UE is required to perform tracking area updating for IMS voice termination as specified in 3GPP TS 24.008 [13], annex P.4;

r) upon reception of a paging indication using S-TMSI and the UE is in state EMM-REGISTERED.ATTEMPTING-TO-UPDATE;

s) when the UE needs to update the network with EPS bearer context status due to local de-activation of EPS bearer context(s) as specified in subclause 6.5.1.4A;

t) when the UE needs to request the use of PSM or needs to stop the use of PSM;

u) when the UE needs to request the use of eDRX or needs to stop the use of eDRX;

v) when a change in the eDRX usage conditions at the UE requires different extended DRX parameters;

w) when a change in the PSM usage conditions at the UE requires a different timer T3412 value or different timer T3324 value;

NOTE 2: A change in the PSM or eDRX usage conditions at the UE can include e.g. a change in the UE configuration, a change in requirements from upper layers or the battery running low at the UE.

x) when the CIoT EPS optimizations the UE needs to use, change in the UE;

y) when the Default\_DCN\_ID value changes, as specified in 3GPP TS 24.368 [15A] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [17];

NOTE 3: The tracking area updating procedure is initiated after deleting the DCN-ID list as specified in annex C.

z) when the UE performs inter-system change from N1 mode to S1 mode in EMM-IDLE mode, the UE operates in single-registration mode, and conditions specified in 3GPP TS 24.501 [54] apply;

za) when the UE in EMM-IDLE mode changes the radio capability for E-UTRAN;

zb) when the UE needs to request new ciphering keys for ciphered broadcast assistance data;

zc) when the UE in EMM-IDLE mode changes the radio capability for NG-RAN;

zd) when the UE performs inter-system change from N1 mode to S1 mode in EMM-CONNECTED mode;

ze) in WB-S1 mode, when the applicable UE radio capability ID for the current UE radio configuration changes due to a reselection to a new PLMN or a revocation of the network-assigned UE radio capability IDs by the serving PLMN; or

zf) when the UE needs to use the WUS assistance.

Editor's note: Whether the need of initiation of the tracking area updating procedure to stop the use of WUS assistance is FFS.

Editor's note: Whether the need of initiation of the tracking area updating procedure in a change of the WUS assistance usage conditions at the UE is FFS.

For all cases except case b, the UE shall set the EPS update type IE in the TRACKING AREA UPDATE REQUEST message to "TA updating". For case b, the UE shall set the EPS update type IE to "periodic updating".

For cases n, za and zc, the UE shall include a UE radio capability information update needed IE in the TRACKING AREA UPDATE REQUEST message.

If the UE is in the EMM-CONNECTED mode and the UE changes the radio capability for E-UTRAN or for NG-RAN, the UE may locally release the established NAS signalling connection and enter the EMM-IDLE mode. Then, the UE shall initiate the tracking area updating procedure including a UE radio capability information update needed IE in the TRACKING AREA UPDATE REQUEST message.

For case l, if the TIN indicates "RAT-related TMSI", the UE shall set the TIN to "P-TMSI" before initiating the tracking area updating procedure.

For case r, the "active" flag in the EPS update type IE shall be set to 1. If a UE is only using EPS services with control plane CIoT EPS optimization, the "signalling active" flag in the Additional update type IE shall be set to 1.

If the UE is using only control plane CIoT EPS optimization, the case i only applies to the case that the UE has indicated to the network that subsequent to the uplink data transmission a downlink data transmission is expected during the transport of uplink user data via the control plane procedure (see subclause 6.6.4).

If the UE has to request resources for ProSe direct discovery or Prose direct communication (see 3GPP TS 36.331 [22]), then the UE shall set the "active" flag to 1 in the TRACKING AREA UPDATE REQUEST message.

If the UE does not have any established PDN connection, the "active" flag in the EPS update type IE shall be set to 0.

When the UE has user data pending and performs an inter-system change from S101 mode to S1 mode to a tracking area included in the TAI list stored in the UE, the UE shall perform a service request procedure instead of a tracking area updating procedure.

When initiating a tracking area updating procedure while in S1 mode, the UE shall use the current EPS NAS integrity key to integrity protect the TRACKING AREA UPDATE REQUEST message, unless the UE is performing inter-system change from N1 mode to S1 mode.

In order to indicate its UE specific DRX parameter while in E-UTRAN coverage, the UE shall send the TRACKING AREA UPDATE REQUEST message containing the UE specific DRX parameter in the DRX parameter IE to the network, with the exception of the case if the UE had indicated its DRX parameter (3GPP TS 24.008 [13]) to the network while in GERAN or UTRAN coverage. In this case, when the UE enters E-UTRAN coverage and initiates a tracking area updating procedure, the UE shall not include the UE specific DRX parameter in the DRX parameter IE in the TRACKING AREA UPDATE REQUEST message.

NOTE 4: The UE specific DRX parameter is not used by the E-UTRAN for paging from NB-IoT cells (see 3GPP TS 23.401 [10] and 3GPP TS 36.304 [21]).

If the UE supports eDRX and requests the use of eDRX, the UE shall include the extended DRX parameters IE in the TRACKING AREA UPDATE REQUEST message.

If the UE supports PSM and requests the use of PSM, the UE shall include the T3324 value IE with a requested timer value in the TRACKING AREA UPDATE REQUEST message. When the UE includes the T3324 value IE and the UE indicates support for extended periodic timer value in the MS network feature support IE, it may also include the T3412 extended value IE to request a particular T3412 value to be allocated.

If a UE supporting CIoT EPS optimizations in NB-S1 mode initiates the tracking area updating procedure for EPS services and "SMS only", the UE shall indicate "SMS only" in the Additional update type IE and shall set the EPS update type IE to "TA updating".

If the UE supports S1-U data transfer and multiple user plane radio bearers (see 3GPP TS 36.306 [44], 3GPP TS 36.331 [22]) in NB-S1 mode, then the UE shall set the Multiple DRB support bit to "Multiple DRB supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message.

If the UE is in NB-S1 mode, then the UE shall set the Control plane CIoT EPS optimization bit to "Control plane CIoT EPS optimization supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message. If the UE is capable of NB-N1 mode, then the UE shall set the Control plane CIoT 5GS optimization bit to "Control plane CIoT 5GS optimization supported" in the N1 UE network capability IE of the TRACKING AREA UPDATE REQUEST message.

If the UE supports control plane MT-EDT, then the UE shall set the CP-MT-EDT bit to "Control plane Mobile Terminated-Early Data Transmission supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message.

If the UE supports user plane MT-EDT, then the UE shall set the UP-MT-EDT bit to "User plane Mobile Terminated-Early Data Transmission supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message.

If the UE has to request resources for V2X communication over PC5 (see 3GPP TS 23.285 [47]), then the UE shall set the "active" flag to 1 in the TRACKING AREA UPDATE REQUEST message.

After sending the TRACKING AREA UPDATE REQUEST message to the MME, the UE shall start timer T3430 and enter state EMM-TRACKING-AREA-UPDATING-INITIATED (see example in figure 5.5.3.2.2.1). If timer T3402 is currently running, the UE shall stop timer T3402. If timer T3411 is currently running, the UE shall stop timer T3411. If timer T3442 is currently running, the UE shall stop timer T3442.

For all cases except cases z and zd:

1) if the UE supports neither A/Gb mode nor Iu mode, the UE shall include a valid GUTI in the Old GUTI IE in the TRACKING AREA UPDATE REQUEST message. In addition, the UE shall include Old GUTI type IE with GUTI type set to "native GUTI"; or

2) if the UE supports A/Gb mode or Iu mode or both, the UE shall handle the Old GUTI IE as follows:

- If the TIN indicates "P-TMSI" and the UE holds a valid P-TMSI and RAI, the UE shall map the P-TMSI and RAI into the Old GUTI IE, and include Old GUTI type IE with GUTI type set to "mapped GUTI". If a P-TMSI signature is associated with the P-TMSI, the UE shall include it in the Old P-TMSI signature IE. Additionally, if the UE holds a valid GUTI, the UE shall indicate the GUTI in the Additional GUTI IE.

NOTE 5: The mapping of the P-TMSI and RAI to the GUTI is specified in 3GPP TS 23.003 [2].

- If the TIN indicates "GUTI" or "RAT-related TMSI" and the UE holds a valid GUTI, the UE shall indicate the GUTI in the Old GUTI IE, and include Old GUTI type IE with GUTI type set to "native GUTI".

If a UE has established PDN connection(s) and uplink user data pending to be sent via user plane when it initiates the tracking area updating procedure, or uplink signalling not related to the tracking area updating procedure when the UE does not support control plane CIoT EPS optimization, it may set the "active" flag in the TRACKING AREA UPDATE REQUEST message to indicate the request to establish the user plane to the network and to keep the NAS signalling connection after the completion of the tracking area updating procedure.

If a UE is using EPS services with control plane CIoT EPS optimization and has user data pending to be sent via control plane over MME but no user data pending to be sent via user plane, or uplink signalling not related to the tracking area updating procedure, the UE may set the "signalling active" flag in the TRACKING AREA UPDATE REQUEST message to indicate the request to keep the NAS signalling connection after the completion of the tracking area updating procedure.

For all cases except cases z and zd, if the UE has a current EPS security context, the UE shall include the eKSI (either KSIASME or KSISGSN) in the NAS Key Set Identifier IE in the TRACKING AREA UPDATE REQUEST message. Otherwise, the UE shall set the NAS Key Set Identifier IE to the value "no key is available". If the UE has a current EPS security context, the UE shall integrity protect the TRACKING AREA UPDATE REQUEST message with the current EPS security context. Otherwise the UE shall not integrity protect the TRACKING AREA UPDATE REQUEST message.

When the tracking area updating procedure is initiated in EMM-IDLE mode to perform an inter-system change from A/Gb mode or Iu mode to S1 mode and the TIN is set to "P-TMSI", the UE shall include the GPRS ciphering key sequence number applicable for A/Gb mode or Iu mode and a nonceUE in the TRACKING AREA UPDATE REQUEST message.

When the tracking area updating procedure is initiated in EMM-CONNECTED mode to perform an inter-system change from A/Gb mode or Iu mode to S1 mode, the UE shall derive the EPS NAS keys from the mapped K'ASME using the selected NAS algorithms, nonceMME and KSISGSN (to be associated with the mapped K'ASME) provided by lower layers as indicated in 3GPP TS 33.401 [19]. The UE shall reset both the uplink and downlink NAS COUNT counters of the mapped EPS security context which shall be taken into use. If the UE has a non-current native EPS security context, the UE shall include the KSIASME in the Non-current native NAS key set identifier IE and its associated GUTI, as specified above, either in the Old GUTI IE or in the Additional GUTI IE of the TRACKING AREA UPDATE REQUEST message. The UE shall set the TSC flag in the Non-current native NAS key set identifier IE to "native security context".

For the case z, the TRACKING AREA UPDATE REQUEST message shall be integrity protected using the 5G NAS security context available in the UE. The UE shall include a GUTI, mapped from 5G-GUTI (see 3GPP TS 23.501 [58] and 3GPP TS 23.003 [2]), in the Old GUTI IE in the TRACKING AREA UPDATE REQUEST message. In addition, the UE shall include Old GUTI type IE with GUTI set to "Native GUTI", and the UE shall include a UE status IE with a 5GMM registration status set to "UE is in 5GMM-REGISTERED state". Additionally, if the UE holds a valid GUTI, the UE shall indicate the GUTI in the Additional GUTI IE.

For the case zd, the TRACKING AREA UPDATE REQUEST message shall be integrity protected using the mapped EPS security context as derived when triggering the handover to E-UTRAN (see subclause 4.4.2.2). The UE shall include a GUTI, mapped from 5G-GUTI (see 3GPP TS 23.501 [58] and 3GPP TS 23.003 [2]), in the Old GUTI IE in the TRACKING AREA UPDATE REQUEST message. In addition, the UE shall include Old GUTI type IE with GUTI set to "Native GUTI", and the UE shall include a UE status IE with a 5GMM registration status set to "UE is in 5GMM-REGISTERED state". Additionally, if the UE holds a valid GUTI, the UE shall indicate the GUTI in the Additional GUTI IE. If the UE has a non-current native EPS security context, the UE shall include the KSIASME in the Non-current native NAS key set identifier IE of the TRACKING AREA UPDATE REQUEST message. The UE shall set the TSC flag in the Non-current native NAS key set identifier IE to "native security context".

When the tracking area updating procedure is initiated in EMM-IDLE mode, the UE may also include an EPS bearer context status IE in the TRACKING AREA UPDATE REQUEST message, indicating which EPS bearer contexts are active in the UE. The UE shall include the EPS bearer context status IE in TRACKING AREA UPDATE REQUEST message:

a) for the case f;

b) for the case s;

c) for the case z;

d) if the UE has established PDN connection(s) of "non IP" or Ethernet PDN type; and

e) if the UE:

1) locally deactivated at least one dedicated EPS bearer context upon an inter-system mobility from WB-S1 mode to NB-S1 mode in EMM-IDLE mode;

2) locally deactivated at least one dedicated EPS bearer context upon an inter-system change from WB-N1 mode to NB-S1 mode in EMM-IDLE mode for the UE operating in single-registration mode (see subclause 6.4.2.1); or

3) locally deactivated at least one default EPS bearer context upon an inter-system change from N1 mode to NB-S1 mode in EMM-IDLE mode for the UE operating in single-registration mode (see subclause 6.5.0).

If the UE initiates the first tracking area updating procedure following an attach in A/Gb mode or Iu mode, the UE shall include a UE radio capability information update needed IE in the TRACKING AREA UPDATE REQUEST message.

If the UE initiates the first tracking area updating procedure following an initial registration in N1 mode and the UE is operating in the single-registration mode, the UE shall include a UE radio capability information update needed IE in the TRACKING AREA UPDATE REQUEST message.

For all cases except case b, if the UE supports SRVCC to GERAN/UTRAN, the UE shall set the SRVCC to GERAN/UTRAN capability bit in the MS network capability IE to "SRVCC from UTRAN HSPA or E-UTRAN to GERAN/UTRAN supported".

For all cases except case b, if the UE supports vSRVCC from S1 mode to Iu mode, then the UE shall set the H.245 after handover capability bit in the UE network capability IE to "H.245 after SRVCC handover capability supported" and additionally set the SRVCC to GERAN/UTRAN capability bit in the MS network capability IE to "SRVCC from UTRAN HSPA or E-UTRAN to GERAN/UTRAN supported" in the TRACKING AREA UPDATE REQUEST message.

For all cases except case b, if the UE supports ProSe direct discovery, then the UE shall set the ProSe bit to "ProSe supported" and set the ProSe direct discovery bit to "ProSe direct discovery supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message.

For all cases except case b, if the UE supports ProSe direct communication, then the UE shall set the ProSe bit to "ProSe supported" and set the ProSe direct communication bit to "ProSe direct communication supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message.

For all cases except case b, if the UE supports acting as a ProSe UE-to-network relay, then the UE shall set the ProSe bit to "ProSe supported" and set the ProSe UE-to-network relay bit to "acting as a ProSe UE-to-network relay supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message.

If the UE supports NB-S1 mode, Non-IP or Ethernet PDN type, or N1 mode, then the UE shall support the extended protocol configuration options IE.

For all cases except case b, if the UE supports the extended protocol configuration options IE, then the UE shall set the ePCO bit to "extended protocol configuration options supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message.

For all cases except case b, if the UE supports V2X communication over PC5, then the UE shall set the V2X PC5 bit to "V2X communication over PC5 supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message.

For all cases except case b, if the UE supports the restriction on use of enhanced coverage, then the UE shall set the RestrictEC bit to "Restriction on use of enhanced coverage supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message.

For all cases except case b, if the UE supports the control plane data back-off timer T3448, the UE shall set the CP backoff bit to "backoff timer for transport of user data via the control plane supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message.

For all cases except case b, if the UE supports dual connectivity with NR, then the UE shall set the DCNR bit to "dual connectivity with NR supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message and shall include the UE additional security capability IE in the TRACKING AREA UPDATE REQUEST message.

For all cases except case b, if the UE supports SGC, then the UE shall set the SGC bit to "service gap control supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message.

For all cases except case b, if the UE supports signalling for a maximum number of 15 EPS bearer contexts, then the UE shall set the 15 bearers bit to "Signalling for a maximum number of 15 EPS bearer contexts supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message.

For all cases except cases b and zb, if the UE supports ciphered broadcast assistance data and the UE needs to obtain new ciphering keys, the UE shall include the Additional information requested IE with the CipherKey bit set to "ciphering keys for ciphered broadcast assistance data requested" in the TRACKING AREA UPDATE REQUEST message.

For case ee, the UE shall include the Additional information requested IE with the CipherKey bit set to "ciphering keys for ciphered broadcast assistance data requested" in the TRACKING AREA UPDATE REQUEST message.

For case a, if the UE supports ciphered broadcast assistance data and the UE detects entering a tracking area for which one or more ciphering keys stored at the UE is not applicable, the UE should include the Additional information requested IE with the CipherKey bit set to "ciphering keys for ciphered broadcast assistance data requested" in the TRACKING AREA UPDATE REQUEST message.

For case b, if the UE supports ciphered broadcast assistance data and the remaining validity time for one or more ciphering keys stored at the UE is less than timer T3412, the UE should include the Additional information requested IE with the CipherKey bit set to "ciphering keys for ciphered broadcast assistance data requested" in the TRACKING AREA UPDATE REQUEST message.

For all cases except case b, if the UE supports N1 mode, the UE shall set the N1mode bit to "N1 mode supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message and shall include the UE additional security capability IE in the TRACKING AREA UPDATE REQUEST message.

For all cases except case b, in WB-S1 mode, if the UE supports RACS the UE shall set the RACS bit to "RACS supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message.

For cases n, za and zc, in WB-S1 mode, if the UE supports RACS and the UE has an applicable UE radio capability ID for the new UE radio configuration in the selected PLMN, the UE shall set the URCIDA bit to "UE radio capability ID available" in the UE radio capability ID availability IE of the TRACKING AREA UPDATE REQUEST message.

For all cases except cases b, n, za and zc, in WB-S1 mode, if the UE has an applicable UE radio capability ID for the current UE radio configuration in the selected PLMN, the UE shall set the URCIDA bit to "UE radio capability ID available" in the UE radio capability ID availability IE of the TRACKING AREA UPDATE REQUEST message.

For all cases except case b, if the UE supports WUS assistance, then the UE shall set the WUSA bit to "WUS assistance supported" in the UE network capability IE, and may include its UE paging probability information in the Requested WUS assistance information IE in the TRACKING AREA UPDATE REQUEST message.



Figure 5.5.3.2.2.1: Tracking area updating procedure

\*\*\*\*\*\* NEXT CHANGE \*\*\*\*\*\*

##### 5.5.3.3.2 Combined tracking area updating procedure initiation

The UE operating in CS/PS mode 1 or CS/PS mode 2, in state EMM-REGISTERED, shall initiate the combined tracking area updating procedure:

a) when the UE that is attached for both EPS and non-EPS services detects entering a tracking area that is not in the list of tracking areas that the UE previously registered in the MME, unless the UE is configured for "AttachWithIMSI" as specified in 3GPP TS 24.368 [15A] or 3GPP TS 31.102 [17] and is entering a tracking area in a new PLMN that is neither the registered PLMN nor in the list of equivalent PLMNs;

b) when the UE that is attached for EPS services wants to perform an attach for non-EPS services. In this case the EPS update type IE shall be set to "combined TA/LA updating with IMSI attach";

c) when the UE performs an intersystem change from A/Gb mode to S1 mode and the EPS services were previously suspended in A/Gb mode;

d) when the UE performs an intersystem change from A/Gb or Iu mode to S1 mode, and the UE previously either performed a combined GPRS attach procedure, an IMSI attach procedure, a location area updating procedure or a combined routing area updating procedure, in A/Gb or Iu mode, or moved to A/Gb or Iu mode from S1 mode through an SRVCC handover or moved to Iu mode from S1 mode through an vSRVCC handover. In this case the EPS update type IE shall be set to "combined TA/LA updating with IMSI attach";

e) when the UE enters EMM-REGISTERED.NORMAL-SERVICE and the UE's TIN indicates "P-TMSI";

f) when the UE receives an indication from the lower layers that the RRC connection was released with cause "load balancing TAU required";

g) when the UE deactivated EPS bearer context(s) locally while in EMM-REGISTERED, because it was not able or not allowed to establish a NAS signalling connection, and then returns to EMM-REGISTERED.NORMAL-SERVICE and no EXTENDED SERVICE REQUEST message, CONTROL PLANE SERVICE REQUEST message or DETACH REQUEST message is pending to be sent by the UE;

h) when the UE changes the UE network capability information or the MS network capability information or both;

i) when the UE changes the UE specific DRX parameter;

j) when the UE receives an indication of "RRC Connection failure" from the lower layers and has no signalling or user uplink data pending (i.e when the lower layer requests NAS signalling connection recovery);

k) when due to manual CSG selection the UE has selected a CSG cell whose CSG identity and associated PLMN identity are not included in the UE's Allowed CSG list or in the UE's Operator CSG list;

l) when the UE reselects an E-UTRAN cell while it was in GPRS READY state or PMM-CONNECTED mode;

m) when the UE supports SRVCC to GERAN or UTRAN or supports vSRVCC to UTRAN, and changes the mobile station classmark 2 or the supported codecs, or the UE supports SRVCC to GERAN and changes the mobile station classmark 3;

n) when the UE changes the radio capability for GERAN or cdma2000® or both;

o) when the UE's usage setting or the voice domain preference for E-UTRAN change in the UE;

p) when the UE activates mobility management for IMS voice termination as specified in 3GPP TS 24.008 [13], annex P.2, and the TIN indicates "RAT-related TMSI";

q) when the UE performs an intersystem change from A/Gb mode to S1 mode and the TIN indicates "RAT-related TMSI", but the UE is required to perform tracking area updating for IMS voice termination as specified in 3GPP TS 24.008 [13], annex P.4;

r) upon reception of a paging indication, if the UE is in state EMM-REGISTERED.ATTEMPTING-TO-UPDATE and the paging indication uses S-TMSI or it uses IMSI with domain indicator set to ″CS″;

s) when the UE needs to update the network with EPS bearer context status due to local de-activation of EPS bearer context(s) as specified in subclause 6.5.1.4A;

t) when the UE performs an intersystem change from A/Gb or Iu mode to S1 mode, and the UE has previously performed the MM connection establishment for CS fallback emergency calls (see 3GPP TS 24.008 [13], subclause 4.5.1.5a) without performing a location area updating procedure or combined routing area updating procedure while camping on a location area which is different from the stored location area. In this case, the EPS update type IE shall be set to "combined TA/LA updating with IMSI attach";

u) when the UE performs an intersystem change from A/Gb or Iu mode to S1 mode, and the MM update status is U2 NOT UPDATED. In this case the EPS update type IE shall be set to "combined TA/LA updating with IMSI attach";

v) when the UE needs to request the use of PSM or needs to stop the use of PSM;

w) when the UE needs to request the use of eDRX or needs to stop the use of eDRX;

x) when a change in the eDRX usage conditions at the UE requires different extended DRX parameters;

y) when a change in the PSM usage conditions at the UE requires a different timer T3412 value or different timer T3324 value;

NOTE 1: A change in the PSM or eDRX usage conditions at the UE can include e.g. a change in the UE configuration, a change in requirements from upper layers or the battery running low at the UE.

z) when the CIoT EPS optimizations the UE needs to use, change in the UE;

za) when the Default\_DCN\_ID value changes, as specified in 3GPP TS 24.368 [15A] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [17];

NOTE 2: The tracking area updating procedure is initiated after deleting the DCN-ID list as specified in annex C.

zb) when the UE performs inter-system change from N1 mode to S1 mode in EMM-IDLE mode, the UE operates in single-registration mode, and conditions specified in 3GPP TS 24.501 [54] apply;

zc) when the UE in EMM-IDLE mode changes the radio capability for E-UTRAN;

zd) when the UE performs inter-system change from N1 mode to S1 mode in EMM-CONNECTED mode;

ze) when the UE in EMM-IDLE mode changes the radio capability for NG-RAN; or

zf) in WB-S1 mode, when the applicable UE radio capability ID for the current UE radio configuration changes due to a reselection to a new PLMN or a revocation of the network-assigned UE radio capability IDs by the serving PLMN.

For case c, if the TIN indicates "RAT-related TMSI" and the EPS services were not resumed before returning to S1 mode, the UE shall set the TIN to "P-TMSI" before initiating the combined tracking area updating procedure.

For cases n, zc, ze and zf, the UE shall include a UE radio capability information update needed IE in the TRACKING AREA UPDATE REQUEST message.

If the UE is in the EMM-CONNECTED mode and the UE changes the radio capability for E-UTRAN or for NG-RAN, the UE may locally release the established NAS signalling connection and enter the EMM-IDLE mode. Then, the UE shall initiate the combined tracking area updating procedure including a UE radio capability information update needed IE in the TRACKING AREA UPDATE REQUEST message.

For case l, if the TIN indicates "RAT-related TMSI", the UE shall set the TIN to "P-TMSI" before initiating the combined tracking area updating procedure.

For case r, the "active" flag in the EPS update type IE shall be set to 1. If the paging is received for CS fallback, the UE shall send the EXTENDED SERVICE REQUEST message to the MME by using the existing NAS signalling connection after the completion of the tracking area updating procedure.

To initiate a combined tracking area updating procedure the UE sends the message TRACKING AREA UPDATE REQUEST to the network, starts timer T3430 and changes to state EMM-TRACKING-AREA-UPDATING-INITIATED. The value of the EPS update type IE in the message shall indicate "combined TA/LA updating" unless explicitly specified otherwise.

If the UE initiates the combined tracking area updating procedure for EPS services and "SMS only", the UE shall indicate "SMS only" in the additional update type IE.

The UE shall include the TMSI status IE if no valid TMSI is available. Furthermore, if the UE has stored a valid location area identification, the UE shall include it in the Old location area identification IE in the TRACKING AREA UPDATE REQUEST message.

If the UE has stored a valid TMSI, the UE shall include the TMSI based NRI container IE in the TRACKING AREA UPDATE REQUEST message.

The UE shall include the EPS bearer context status IE in TRACKING AREA UPDATE REQUEST message:

a) for the case g;

b) for the case s;

c) for the case zb;

d) if the UE has established PDN connection(s) of "non IP" or Ethernet PDN type; and

e) if the UE:

1) locally deactivated at least one dedicated EPS bearer context upon an inter-system mobility from WB-S1 mode to NB-S1 mode in EMM-IDLE mode;

2) locally deactivated at least one dedicated EPS bearer context upon an inter-system change from WB-N1 mode to NB-S1 mode in EMM-IDLE mode for the UE operating in single-registration mode (see subclause 6.4.2.1); or

3) locally deactivated at least one default EPS bearer context upon an inter-system change from N1 mode to NB-S1 mode in EMM-IDLE mode for the UE operating in single-registration mode (see subclause 6.5.0).

In WB-S1 mode, if the UE supports RACS the UE shall set the RACS bit to "RACS supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message.

For cases n, zc and ze, in WB-S1 mode, if the UE supports RACS and the UE has an applicable UE radio capability ID for the new UE radio configuration in the selected PLMN, the UE shall set the URCIDA bit to "UE radio capability ID available" in the UE radio capability ID availability IE of the TRACKING AREA UPDATE REQUEST message.

For all cases except cases n, zc and ze, in WB-S1 mode, if the UE has an applicable UE radio capability ID for the current UE radio configuration in the selected PLMN, the UE shall set the URCIDA bit to "UE radio capability ID available" in the UE radio capability ID availability IE of the TRACKING AREA UPDATE REQUEST message.

\*\*\*\*\*\* NEXT CHANGE \*\*\*\*\*\*

#### 6.4.2.1 General

The purpose of the dedicated EPS bearer context activation procedure is to establish an EPS bearer context with specific QoS and TFT between the UE and the EPC.

In WB-S1 mode, the dedicated EPS bearer context activation procedure is initiated by the network, but may be requested by the UE by means of the UE requested bearer resource allocation procedure (see subclause 6.5.3) or the UE requested bearer resource modification procedure (see subclause 6.5.4). The dedicated bearer context activation procedure can be part of the attach procedure or be initiated together with the default EPS bearer context activation procedure when the UE initiated stand-alone PDN connectivity procedure. If the attach procedure or the default EPS bearer context activation procedure fails, the UE shall consider that the dedicated bearer activation has implicitly failed. The network may initiate the dedicated EPS bearer context activation procedure together with the completion of the service request procedure.

In NB-S1 mode, the dedicated EPS bearer contexts activation procedure is not used.

Upon an inter-system mobility from WB-S1 mode to NB-S1 mode in EMM-IDLE mode, if the UE has at least one dedicated EPS bearer context in ESM state BEARER CONTEXT ACTIVE, the UE shall locally deactivate any such dedicated EPS bearer context and shall include the EPS bearer context status IE in TRACKING AREA UPDATE REQUEST message.

Upon an inter-system change from WB-N1 mode to NB-S1 mode in EMM-IDLE mode for the UE operating in single-registration mode, the UE shall set each mapped dedicated EPS bearer context, if any, to ESM state BEARER CONTEXT INACTIVE and shall then include the EPS bearer context status IE in TRACKING AREA UPDATE REQUEST message.

NOTE: 3GPP TS 23.060 [74] subclause 9.3 specifies that a packet filter applicable for the downlink direction is not mandatory in a TFT.

\*\*\*\*\*\* NEXT CHANGE \*\*\*\*\*\*

### 6.5.0 General

The UE's maximum number of active EPS bearer contexts in a PLMN is determined by whichever is the lowest of the maximum number of EPS bearer identities allowed by the protocol (as specified in 3GPP TS 24.007 [12] subclause 11.2.3.1.5), the PLMN's maximum number of EPS bearer contexts in S1 mode and the UE's implementation-specific maximum number of EPS bearer contexts.

NOTE 1: Subclauses 6.5.1.4 and 6.5.3.4 specify how the UE determines the PLMN's maximum number of EPS bearer contexts in S1 mode.

In earlier versions of the protocol, the maximum number of simultaneously active EPS bearer contexts was limited by lower layer protocols to 8.

In the present version of the protocol, the UE and the network may support a maximum number of 15 EPS bearer contexts.

A UE supporting signalling for a maximum number of 15 EPS bearer contexts shall support the extended range or EPS bearer identities from 0 to 15 (as specified in 3GPP TS 24.007 [12] subclause 11.2.3.1.5). The UE indicates support of signalling for a maximum number of 15 EPS bearer contexts by setting the 15 bearers bit in the UE Network Capability IE.

A network supporting signalling for a maximum number of 15 EPS bearer contexts shall support the extended range or EPS bearer identities from 0 to 15 (as specified in 3GPP TS 24.007 [12] subclause 11.2.3.1.5). The network indicates support of signalling for a maximum number of 15 EPS bearer contexts by setting the 15 bearers bit in the EPS network feature support IE.

NOTE 2: A UE and a network not supporting signalling for a maximum number of 15 EPS bearer contexts will treat the EPS bearer identity values 1 to 4 as 'reserved' values.

For a UE in NB-S1 mode, the UE's implementation-specific maximum number of active user plane radio bearers is 2 (as defined in 3GPP TS 36.300 [20]) when the UE sets the Multiple DRB support bit to "Multiple DRB supported" during attach or tracking area update procedures, and 1 otherwise.

Upon an inter-system change from N1 mode to NB-S1 mode in EMM-IDLE mode for the UE operating in single-registration mode, if:

a) the number of active default EPS bearer contexts in the UE is larger than the UE's implementation-specific maximum number of active user plane radio bearers; and

b) the UE is using user plane CIoT EPS optimization;

the UE shall, based on UE implementation, locally deactivate at least one default EPS bearer context such that the total number of active default EPS bearer contexts remained does not exceed the UE's implementation-specific maximum number of active user plane radio bearers. The UE shall then include the EPS bearer context status IE in TRACKING AREA UPDATE REQUEST message.