**3GPP TSG-CT WG1 Meeting #130-eC1-21xxxx**

**Electronic meeting, 20-28 May 2021 (was C1-213150)**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **24.301** | **CR** | **3530** | **rev** | **1** | **Current version:** | **17.2.0** |  |
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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 | **X** |

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| ***Title:*** | Collision of TAU procedure for RACS and ESR procedure for CSFB | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Apple | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI17 | | | | |  | ***Date:*** | | | 2021-05-26 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | The following text in subclause 5.5.3.3.2  “…*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…*”  does not consider the scenario of receiving a UE radio capability deletion indication IE in the TAU Accept.  As the network still has stored the UE capabilities, there is no need to perform a second TAU before the service request procedure. | | | | | | | | |
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| ***Summary of change:*** | | Additional text is added to include the scenario of receiving a UE radio capability deletion indication IE in the TAU accept when ESR for CSFB is triggered in subclause 5.5.3.3.2 & 5.6.1.6. In this case the UE shall skip the second TAU and proceed with the service request procedure. | | | | | | | | |
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| ***Consequences if not approved:*** | | The UE would unnesseacarrly delay the Call establishement . | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.5.3.2.4, 5.5.3.3.2, 5.6.1.6 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 \*\*\**

##### 5.5.3.2.4 Normal and periodic tracking area updating procedure accepted by the network

If the tracking area update request has been accepted by the network, the MME shall send a TRACKING AREA UPDATE ACCEPT message to the UE. If the MME assigns a new GUTI for the UE, a GUTI shall be included in the TRACKING AREA UPDATE ACCEPT message. In this case, the MME shall start timer T3450 and enter state EMM-COMMON-PROCEDURE-INITIATED as described in subclause 5.4.1. The MME may include a new TAI list for the UE in the TRACKING AREA UPDATE ACCEPT message. The MME shall not assign a TAI list containing both tracking areas in NB-S1 mode and tracking areas in WB-S1 mode.

NOTE 1: When assigning the TAI list, the MME can take into account the eNodeB's capability of support of CIoT EPS optimization.

If the UE has included the UE network capability IE or the MS network capability IE or both in the TRACKING AREA UPDATE REQUEST message, the MME shall store all octets received from the UE, up to the maximum length defined for the respective information element.

NOTE 2: This information is forwarded to the new MME during inter-MME handover or to the new SGSN during inter-system handover to A/Gb mode or Iu mode.

NOTE 3: For further details concerning the handling of the MS network capability and UE network capability in the MME see also 3GPP TS 23.401 [10].

In NB-S1 mode, if the tracking area update request is accepted by the network, the MME shall set the EMC BS bit to zero in the EPS network feature support IE included in the TRACKING AREA UPDATE ACCEPT message to indicate that support of emergency bearer services in NB-S1 mode is not available.

If a UE radio capability information update needed IE is included in the TRACKING AREA UPDATE REQUEST message, the MME shall delete the stored UE radio capability information or the UE radio capability ID, if any.

If the UE specific DRX parameter was included in the DRX Parameter IE in the TRACKING AREA UPDATE REQUEST message, the network shall replace any stored UE specific DRX parameter with the received parameter and use it for the downlink transfer of signalling and user data in WB-S1 mode.

In NB-S1 mode, if the DRX parameter in NB-S1 mode IE was included in the TRACKING AREA UPDATE REQUEST message, the MME shall provide to the UE the Negotiated DRX parameter in NB-S1 mode IE in the TRACKING AREA UPDATE ACCEPT message. The MME shall replace any stored UE specific DRX parameter in NB-S1 mode with the negotiated DRX parameter and use it for the downlink transfer of signalling and user data in NB-S1 mode.

NOTE 4: In NB-S1 mode, if a DRX parameter was included in the Negotiated DRX parameter in NB-S1 mode IE in the TRACKING AREA UPDATE ACCEPT message, then the UE stores and uses the received DRX parameter in NB-S1 mode (see 3GPP TS 36.304 [21]). If the UE has included the DRX parameter in NB-S1 mode IE in the TRACKING AREA UPDATE REQUEST message, but did not receive a DRX parameter in the Negotiated DRX parameter in NB-S1 mode IE, or if the Negotiated DRX parameter in NB-S1 mode IE was not included in the TRACKING AREA UPDATE ACCEPT message, then the UE uses the cell specific DRX value in NB-S1 mode (see 3GPP TS 36.304 [21]).If the UE requests "control plane CIoT EPS optimization" in the Additional update type IE, indicates support of control plane CIoT EPS optimization in the UE network capability IE and the MME decides to accept the requested CIoT EPS optimization and the tracking area update request, the MME shall indicate "control plane CIoT EPS optimization supported" in the EPS network feature support IE.

In NB-S1 mode, if the UE requested "SMS only" in the Additional update type IE, supports NB-S1 mode only and the MME decides to accept the tracking area update request for EPS services and "SMS only", the MME shall indicate "SMS only" in the Additional update result IE and shall set the EPS update type IE to "TA updating" in the TRACKING AREA UPDATE ACCEPT message.

The MME shall include the extended DRX parameters IE in the TRACKING AREA UPDATE ACCEPT message only if the extended DRX parameters IE was included in the TRACKING AREA UPDATE REQUEST message, and the MME supports and accepts the use of eDRX.

If:

- the UE supports WUS assistance; and

- the MME supports and accepts the use of WUS assistance,

then the MME shall determine the negotiated UE paging probability information for the UE, store it in the EMM context of the UE, and if the UE is not attaching for emergency bearer services, the MME shall include it in the Negotiated WUS assistance information IE in the TRACKING AREA UPDATE ACCEPT message. The MME may take into account the UE paging probability information received in the Requested WUS assistance information IE when determining the negotiated UE paging probability information for the UE.

NOTE 4: Besides the UE paging probability information requested by the UE, the MME can take local configuration or previous statistical information for the UE into account when determining the negotiated UE paging probability information for the UE (see 3GPP TS 23.401 [10]).

If the UE indicates support for EMM-REGISTERED without PDN connection in the TRACKING AREA UPDATE REQUEST message and the MME supports EMM-REGISTERED without PDN connection, the MME shall indicate this in the EPS network feature support IE of the TRACKING AREA UPDATE ACCEPT message. The UE and the MME shall use the information whether the peer entity supports EMM-REGISTERED without PDN connection as specified in the present clause 5 and in clause 6.

If an EPS bearer context status IE is included in the TRACKING AREA UPDATE REQUEST message, the MME shall deactivate all those EPS bearer contexts locally (without peer-to-peer signalling between the MME and the UE) which are in ESM state BEARER CONTEXT ACTIVE or BEARER CONTEXT MODIFY PENDING on the network side, but are indicated by the UE as being in ESM state BEARER CONTEXT INACTIVE. If a default EPS bearer context is marked as inactive in the EPS bearer context status IE included in the TRACKING AREA UPDATE REQUEST message, and this default bearer is not associated with the last remaining PDN connection of the UE in the MME, the MME shall locally deactivate all EPS bearer contexts associated to the PDN connection with the default EPS bearer context without peer-to-peer ESM signalling to the UE. If the default bearer is associated with the last remaining PDN connection of the UE in the MME, and EMM-REGISTERED without PDN connection is supported by the UE and the MME, the MME shall locally deactivate all EPS bearer contexts associated to the PDN connection with the default EPS bearer context without peer-to-peer ESM signalling to the UE.

If the EPS bearer context status IE is included in the TRACKING AREA UPDATE REQUEST, the MME shall include an EPS bearer context status IE in the TRACKING AREA UPDATE ACCEPT message, indicating which EPS bearer contexts are active in the MME except for the case no EPS bearer context exists on the network side.

If the EPS update type IE included in the TRACKING AREA UPDATE REQUEST message indicates "periodic updating", and the UE was previously successfully attached for EPS and non-EPS services, subject to operator policies the MME should allocate a TAI list that does not span more than one location area.

The MME shall indicate "combined TA/LA updated" or "combined TA/LA updated and ISR activated" in the EPS update result IE in the TRACKING AREA UPDATE ACCEPT message, if the following conditions apply:

- the EPS update type IE included in the TRACKING AREA UPDATE REQUEST message indicates "periodic updating" and the UE was previously successfully attached for EPS and non-EPS services; and

- location area updating for non-EPS services as specified in 3GPP TS 29.118 [16A] is successful.

The MME may include T3412 extended value IE in the TRACKING AREA UPDATE ACCEPT message only if the UE indicates support of the extended periodic timer T3412 in the MS network feature support IE in the TRACKING AREA UPDATE REQUEST message.

The MME shall include the T3324 value IE in the TRACKING AREA UPDATE ACCEPT message only if the T3324 value IE was included in the TRACKING AREA UPDATE REQUEST message, and the MME supports and accepts the use of PSM.

If the MME supports and accepts the use of PSM, and the UE included the T3412extended value IE in the TRACKING AREA UPDATE REQUEST message, then the MME shall take into account the T3412 value requested when providing the T3412 value IE and the T3412 extended value IE in the TRACKING AREA UPDATE ACCEPT message.

NOTE 5: Besides the value requested by the MS, the MME can take local configuration or subscription data provided by the HSS into account when selecting a value for T3412 (see 3GPP TS 23.401 [10] subclause 4.3.17.3).

If the MME includes the T3324 value IE indicating a value other than deactivated in the TRACKING AREA UPDATE ACCEPT message, then the MME shall indicate in the EPS update result IE in the TRACKING AREA UPDATE ACCEPT message that ISR is not activated.

Also, during the tracking area updating procedure without the "active" flag set, if the MME has deactivated EPS bearer context(s) locally for any reason, the MME shall inform the UE of the deactivated EPS bearer context(s) by including the EPS bearer context status IE in the TRACKING AREA UPDATE ACCEPT message.

Also, during the tracking area updating procedure with the "active" flag set, if the MME has deactivated EPS bearer context(s) associated with control plane only indication locally for any reason, the MME shall inform the UE of the deactivated EPS bearer context(s) by including the EPS bearer context status IE in the TRACKING AREA UPDATE ACCEPT message.

If the TRACKING AREA UPDATE ACCEPT message contains the DCN-ID IE, then the UE shall store the included DCN-ID value together with the PLMN code of the registered PLMN in a DCN-ID list in a non-volatile memory in the ME as specified in annex C.

If due to regional subscription restrictions or access restrictions the UE is not allowed to access the TA, but it has a PDN connection for emergency bearer services established, the MME may accept the TRACKING AREA UPDATE REQUEST message and deactivate all non-emergency EPS bearer contexts by initiating an EPS bearer context deactivation procedure when the tracking area updating procedure is initiated in EMM-CONNECTED mode. When the tracking area updating procedure is initiated in EMM-IDLE mode, the MME locally deactivates all non-emergency EPS bearer contexts and informs the UE via the EPS bearer context status IE in the TRACKING AREA UPDATE ACCEPT message. The MME shall not deactivate the emergency EPS bearer contexts. The network shall consider the UE to be attached for emergency bearer services only and shall indicate in the EPS update result IE in the TRACKING AREA UPDATE ACCEPT message that ISR is not activated.

If a TRACKING AREA UPDATE REQUEST message is received from a UE with a LIPA PDN connection, and if:

- a GW Transport Layer Address IE value identifying a L-GW is provided by the lower layer together with the TRACKING AREA UPDATE REQUEST message, and the P-GW address included in the EPS bearer context of the LIPA PDN Connection is different from the provided GW Transport Layer Address IE value (see 3GPP TS 36.413 [23]); or

- no GW Transport Layer Address is provided together with the TRACKING AREA UPDATE REQUEST message by the lower layer,

then the MME locally deactivates all EPS bearer contexts associated with the LIPA PDN connection. Furthermore, the MME takes one of the following actions:

- if no active EPS bearer contexts remain for the UE, the MME shall not accept the tracking area update request as specified in subclause 5.5.3.2.5;

- if active EPS bearer contexts remain for the UE and the TRACKING AREA UPDATE REQUEST message is accepted, the MME informs the UE via the EPS bearer context status IE in the TRACKING AREA UPDATE ACCEPT message that EPS bearer contexts were locally deactivated.

If a TRACKING AREA UPDATE REQUEST message is received from a UE with a SIPTO at the local network PDN connection, is accepted by the network, the following different cases can be distinguished:

1) If the PDN connection is a SIPTO at the local network PDN connection with collocated L-GW and if:

- a SIPTO L-GW Transport Layer Address IE value identifying a L-GW is provided by the lower layer together with the TRACKING AREA UPDATE REQUEST message, and the P-GW address included in the EPS bearer context of the SIPTO at the local network PDN connection is different from the provided SIPTO L-GW Transport Layer Address IE value (see 3GPP TS 36.413 [23]); or

- no SIPTO L-GW Transport Layer Address is provided together with the TRACKING AREA UPDATE REQUEST message by the lower layer,

2) If the PDN connection is a SIPTO at the local network PDN connection with stand-alone GW and if:

- a LHN-ID value is provided by the lower layer together with the TRACKING AREA UPDATE REQUEST message, and the LHN-ID stored in the EPS bearer context of the SIPTO at the local network PDN connection is different from the provided LHN-ID value (see 3GPP TS 36.413 [23]); or

- no LHN-ID value is provided together with the TRACKING AREA UPDATE REQUEST message by the lower layer,

then the MME takes one of the following actions:

- if the SIPTO at the local network PDN connection is the last remaining PDN connection for the UE, and EMM-REGISTERED without PDN connection is not supported by the UE or the MME, then the MME shall upon completion of the tracking area updating procedure detach the UE by using detach type "re-attach required" (see subclause 5.5.2.3.1);

- if the SIPTO at the local network PDN connection is the last remaining PDN connection for the UE, and EMM-REGISTERED without PDN connection is supported by the UE and the MME, then the MME shall upon completion of the tracking area updating procedure initiate an EPS bearer context deactivation procedure with ESM cause #39 "reactivation requested" for the default EPS bearer context of the SIPTO at the local network PDN connection (see subclause 6.4.4.2); and

- if a PDN connection remains that is not SIPTO at the local network PDN connection, the MME shall upon completion of the tracking area updating procedure initiate an EPS bearer context deactivation procedure with ESM cause #39 "reactivation requested" for the default EPS bearer context of each SIPTO at the local network PDN connection (see subclause 6.4.4.2);

For a SIPTO at the local network PDN connection with stand-alone GW, the conditions to deactivate ISR are specified in 3GPP TS 23.401 [10], subclause 4.3.5.6.

For a shared network, the TAIs included in the TAI list can contain different PLMN identities. The MME indicates the selected core network operator PLMN identity to the UE in the GUTI (see 3GPP TS 23.251 [8B]).

If the "active" flag is set in the TRACKING AREA UPDATE REQUEST message and control plane CIoT EPS optimization is not used by the MME, the MME shall re-establish the radio and S1 bearers for all active EPS bearer contexts. If the "active" flag is set in the TRACKING AREA UPDATE REQUEST message and control plane CIoT EPS optimization is used by the MME, the MME shall re-establish the radio and S1 bearers for all active EPS bearer contexts associated with PDN connections established without Control plane only indication.

If the "signalling active" flag is set in the TRACKING AREA UPDATE REQUEST message and control plane CIoT EPS optimization is used by the MME, the MME shall not immediately release the NAS signalling connection after the completion of the tracking area updating procedure.

If the "active" flag is not set in the TRACKING AREA UPDATE REQUEST message and control plane CIoT EPS optimization is not used by the MME, the MME may also re-establish the radio and S1 bearers for all active EPS bearer contexts due to downlink pending data or downlink pending signalling. If the "active" flag is not set in the TRACKING AREA UPDATE REQUEST message and control plane CIoT EPS optimization is used by the MME, the MME may also re-establish the radio and S1 bearers for all active EPS bearer contexts associated with PDN connections established without Control plane only indication due to downlink pending data or downlink pending signalling.

If the MME supports NB-S1 mode, Non-IP or Ethernet PDN type, inter-system change with 5GS, or the network wants to enforce the use of DNS over (D)TLS (see 3GPP TS 33.501 [24]), then the MME shall support the extended protocol configuration options IE.

NOTE 6: Support of DNS over (D)TLS is based on the informative requirements as specified in 3GPP TS 33.401 [19] and it is implemented based on the operator requirement.

If the MME supports the extended protocol configuration options IE and the UE indicated support of the extended protocol configuration options IE, then the MME shall set the ePCO bit to "extended protocol configuration options supported" in the EPS network feature support IE of the TRACKING AREA UPDATE ACCEPT message.

If the UE indicates support for restriction on use of enhanced coverage in the TRACKING AREA UPDATE REQUEST message, and the network decides to restrict the use of enhanced coverage for the UE, then the MME shall set the RestrictEC bit to "Use of enhanced coverage is restricted" in the EPS network feature support IE of the TRACKING AREA UPDATE ACCEPT message.

The MME may indicate the header compression configuration status IE in the TRACKING AREA UPDATE ACCEPT message for each established EPS bearer context using control plane CIoT EPS optimisation.

If the UE has indicated support for the control plane data back-off timer, and the MME decides to activate the congestion control for transport of user data via the control plane, then the MME shall include the T3448 value IE in the TRACKING AREA UPDATE ACCEPT message.

If the UE indicates support for dual connectivity with NR in the TRACKING AREA UPDATE REQUEST message, and the MME decides to restrict the use of dual connectivity with NR for the UE, then the MME shall set the RestrictDCNR bit to "Use of dual connectivity with NR is restricted" in the EPS network feature support IE of the TRACKING AREA UPDATE ACCEPT message.

If the UE indicates support for N1 mode in the TRACKING AREA UPDATE REQUEST message and the MME supports inter-system interworking with 5GS, the MME may set the IWK N26 bit to either:

- "interworking without N26 interface not supported" if the MME supports N26 interface; or

- "interworking without N26 interface supported" if the MME does not support N26 interface

in the EPS network feature support IE in the TRACKING AREA UPDATE ACCEPT message.

If due to operator policies unsecured redirection to a GERAN cell is not allowed in the current PLMN, the MME shall set the redir-policy bit to "Unsecured redirection to GERAN not allowed" in the Network policy IE of the TRACKING AREA UPDATE ACCEPT message.

If the UE has indicated support for service gap control, a service gap time value is available in the EMM context, the MME may include the T3447 value IE set to the service gap time value in the TRACKING AREA UPDATE ACCEPT message.

If the network supports signalling for a maximum number of 15 EPS bearer contexts and the UE indicated support of signalling for a maximum number of 15 EPS bearer contexts in the TRACKING AREA UPDATE REQUEST message, then the MME shall set the 15 bearers bit to "Signalling for a maximum number of 15 EPS bearer contexts supported" in the EPS network feature support IE of the TRACKING AREA UPDATE ACCEPT message.

If the UE requests ciphering keys for ciphered broadcast assistance data in the TRACKING AREA UPDATE REQUEST message and the MME has valid ciphering key data applicable to the UE's subscription, then the MME shall include the ciphering key data in the Ciphering key data IE of the TRACKING AREA UPDATE ACCEPT message.

Upon receiving a TRACKING AREA UPDATE ACCEPT message, the UE shall stop timer T3430, reset the service request attempt counter, tracking area updating attempt counter, enter state EMM-REGISTERED and set the EPS update status to EU1 UPDATED. If the message contains a GUTI, the UE shall use this GUTI as new temporary identity for EPS services and shall store the new GUTI. If no GUTI was included by the MME in the TRACKING AREA UPDATE ACCEPT message, the old GUTI shall be used. If the UE receives a new TAI list in the TRACKING AREA UPDATE ACCEPT message, the UE shall consider the new TAI list as valid and the old TAI list as invalid; otherwise, the UE shall consider the old TAI list as valid.

If the UE receives the TRACKING AREA UPDATE ACCEPT message from a PLMN for which a PLMN-specific attempt counter or PLMN-specific PS-attempt counter is maintained (see subclause 5.3.7b), then the UE shall reset these counters. If the UE maintains a counter for "SIM/USIM considered invalid for GPRS services", then the UE shall reset this counter.

If the TRACKING AREA UPDATE ACCEPT message contains the T3412 extended value IE, then the UE shall use the T3412 extended value IE as periodic tracking area update timer (T3412). If the TRACKING AREA UPDATE ACCEPT contains T3412 value IE, but not T3412 extended value IE, then the UE shall use value in T3412 value IE as periodic tracking area update timer (T3412). If neither T3412 value IE nor T3412 extended value IE is included, the UE shall use the value currently stored, e.g. from a prior ATTACH ACCEPT or TRACKING AREA UPDATE ACCEPT message.

If the TRACKING AREA UPDATE ACCEPT message contains the T3324 value IE, then the UE shall use the timer value for T3324 as specified in 3GPP TS 24.008 [13], subclause 4.7.2.8.

If the UE had initiated the tracking area updating procedure in EMM-IDLE mode to perform an inter-system change from A/Gb mode or Iu mode to S1 mode and the nonceUE was included in the TRACKING AREA UPDATE REQUEST message, the UE shall delete the nonceUE upon receipt of the TRACKING AREA UPDATE ACCEPT message.

If an EPS bearer context status IE is included in the TRACKING AREA UPDATE ACCEPT message, the UE shall deactivate all those EPS bearers contexts locally (without peer-to-peer signalling between the UE and the MME) which are active in the UE, but are indicated by the MME as being inactive. If a default EPS bearer context is marked as inactive in the EPS bearer context status IE included in the TRACKING AREA UPDATE ACCEPT message, and this default bearer is not associated with the last remaining PDN connection in the UE, the UE shall locally deactivate all EPS bearer contexts associated to the PDN connection with the default EPS bearer context without peer-to-peer ESM signalling to the MME. If only the PDN connection for emergency bearer services remains established, the UE shall consider itself attached for emergency bearer services only. If the default bearer is associated with the last remaining PDN connection of the UE in the MME, and EMM-REGISTERED without PDN connection is supported by the UE and the MME, the UE shall locally deactivate all EPS bearer contexts associated to the PDN connection with the default EPS bearer context without peer-to-peer ESM signalling to the UE.

If an EPS bearer context status IE is included in the TRACKING AREA UPDATE ACCEPT message, the UE may choose to ignore all those EPS bearers which are indicated by the MME as being active but are inactive at the UE.

The MME may also include a list of equivalent PLMNs in the TRACKING AREA UPDATE ACCEPT message. Each entry in the list contains a PLMN code (MCC+MNC). The UE shall store the list as provided by the network, and if there is no PDN connection for emergency bearer services or PDN connection for RLOS established, the UE shall remove from the list any PLMN code that is already in the list of "forbidden PLMNs" or in the list of "forbidden PLMNs for GPRS service". If the UE is not attached for emergency bearer services and there is a PDN connection for emergency bearer services established, the UE shall remove from the list of equivalent PLMNs any PLMN code present in the list of forbidden PLMNs or in the list of "forbidden PLMNs for GPRS service" when the PDN connection for emergency bearer services is released. In addition, the UE shall add to the stored list the PLMN code of the registered PLMN that sent the list. The UE shall replace the stored list on each receipt of the TRACKING AREA UPDATE ACCEPT message. If the TRACKING AREA UPDATE ACCEPT message does not contain a list, then the UE shall delete the stored list.

If the UE is neither attached for emergency bearer services nor attached for access to RLOS, and if the PLMN identity of the registered PLMN is a member of the list of "forbidden PLMNs" or the list of "forbidden PLMNs for GPRS service", any such PLMN identity shall be deleted from the corresponding list(s).

The network may also indicate in the EPS update result IE in the TRACKING AREA UPDATE ACCEPT message that ISR is active. If the UE is attached for emergency bearer services, the network shall indicate in the EPS update result IE in the TRACKING AREA UPDATE ACCEPT message that ISR is not activated. If the TRACKING AREA UPDATE ACCEPT message contains:

i) no indication that ISR is activated, the UE shall set the TIN to "GUTI" and shall stop the periodic routing area update timer T3312 or T3323, if running;

ii) an indication that ISR is activated, then:

- if the UE is required to perform routing area updating for IMS voice termination as specified in 3GPP TS 24.008 [13], annex P.5, the UE shall set the TIN to "GUTI" and shall stop the periodic routing area update timer T3312 or T3323, if running;

- if the UE had initiated the tracking area updating procedure due to a change in UE network capability or change in DRX parameters, the UE shall set the TIN to "GUTI" and shall stop the periodic routing area update timer T3312 or T3323, if running;

- if the UE had initiated the tracking area updating procedure due to a change in the UE's usage setting or the voice domain preference for E-UTRAN, the UE shall set the TIN to "GUTI" and shall stop the periodic routing area update timer T3312 or T3323, if running; or

- the UE shall regard a previously assigned P-TMSI and RAI as valid and registered with the network. If the TIN currently indicates "P-TMSI" and the periodic routing area update timer T3312 is running or is deactivated, the UE shall set the TIN to "RAT-related TMSI". If the TIN currently indicates "P-TMSI" and the periodic routing area update timer T3312 has already expired, the UE shall set the TIN to "GUTI".

The network informs the UE about the support of specific features, such as IMS voice over PS session, location services (EPC-LCS, CS-LCS), emergency bearer services, or CIoT EPS optimizations, in the EPS network feature support information element. In a UE with IMS voice over PS capability, the IMS voice over PS session indicator and the emergency bearer services indicator shall be provided to the upper layers. The upper layers take the IMS voice over PS session indicator into account as specified in 3GPP TS 23.221 [8A], subclause 7.2a and subclause 7.2b, when selecting the access domain for voice sessions or calls. When initiating an emergency call, the upper layers also take both the IMS voice over PS session indicator and the emergency bearer services indicator into account for the access domain selection. When the UE determines via the IMS voice over PS session indicator that the network does not support IMS voice over PS sessions in S1 mode, then the UE shall not locally release any persistent EPS bearer context. When the UE determines via the emergency bearer services indicator that the network does not support emergency bearer services in S1 mode, then the UE shall not locally release any emergency EPS bearer context if there is a radio bearer associated with that context. In a UE with LCS capability, location services indicators (EPC-LCS, CS-LCS) shall be provided to the upper layers. When MO-LR procedure is triggered by the UE's application, those indicators are taken into account as specified in 3GPP TS 24.171 [13C].

If the RestrictDCNR bit is set to "Use of dual connectivity with NR is restricted" in the EPS network feature support IE of the TRACKING AREA UPDATE ACCEPT message, the UE shall provide the indication that dual connectivity with NR is restricted to the upper layers.

The UE supporting N1 mode shall operate in the mode for inter-system interworking with 5GS as follows:

- if the IWK N26 bit in the EPS network feature support IE is set to "interworking without N26 interface not supported", the UE shall operate in single-registration mode;

- if the IWK N26 bit in the EPS network feature support IE is set to "interworking without N26 interface supported" and the UE supports dual-registration mode, the UE may operate in dual-registration mode; or

NOTE 7: The registration mode used by the UE is implementation dependent.

- if the IWK N26 bit in the EPS network feature support IE is set to "interworking without N26 interface supported" and the UE only supports single-registration mode, the UE shall operate in single-registration mode.

The UE shall treat the interworking without N26 interface indicator as valid in the entire PLMN and equivalent PLMNs. The interworking procedures required for coordination between 5GMM and EMM without N26 interface are specified in 3GPP TS 24.501 [54].

If the redir-policy bit is set to "Unsecured redirection to GERAN not allowed" in the Network policy IE of the TRACKING AREA UPDATE ACCEPT message, the UE shall set the network policy on unsecured redirection to GERAN for the current PLMN to "Unsecured redirection to GERAN not allowed" and indicate to the lower layers that unsecured redirection to a GERAN cell is not allowed. If the redir-policy bit is set to "Unsecured redirection to GERAN allowed" or if the Network policy IE is not included in the TRACKING AREA UPDATE ACCEPT message, the UE shall set the network policy on unsecured redirection to GERAN for the current PLMN to "Unsecured redirection to GERAN allowed" and indicate to the lower layers that unsecured redirection to a GERAN cell is allowed. The UE shall set the network policy on unsecured redirection to GERAN to "Unsecured redirection to GERAN not allowed" and indicate this to the lower layers when any of the following events occurs:

- the UE initiates an EPS attach or tracking area updating procedure in a PLMN different from the PLMN where the UE performed the last successful EPS attach or tracking area updating procedure;

- the UE is switched on; or

- the UICC containing the USIM is removed.

If the UE has initiated the tracking area updating procedure due to manual CSG selection and receives a TRACKING AREA UPDATE ACCEPT message, and the UE sent the TRACKING AREA UPDATE REQUEST message in a CSG cell, the UE shall check if the CSG ID and associated PLMN identity of the cell where the UE has sent the TRACKING AREA UPDATE REQUEST message are contained in the Allowed CSG list. If not, the UE shall add that CSG ID and associated PLMN identity to the Allowed CSG list and the UE may add the HNB Name (if provided by lower layers) to the Allowed CSG list if the HNB Name is present in neither the Operator CSG list nor the Allowed CSG list.

If the TRACKING AREA UPDATE ACCEPT message contained a GUTI, the UE shall return a TRACKING AREA UPDATE COMPLETE message to the MME to acknowledge the received GUTI.

If the UE which was previously successfully attached for EPS and non-EPS services receives the TRACKING AREA UPDATE ACCEPT message with EPS update result IE indicating "combined TA/LA updated" or "combined TA/LA updated and ISR activated" as the response of the TRACKING AREA UPDATE REQUEST message with EPS update type IE indicating "periodic updating", the UE shall behave as follows:

- If the TRACKING AREA UPDATE ACCEPT message contains an IMSI, the UE is not allocated any TMSI, and shall delete any old TMSI accordingly.

- If the TRACKING AREA UPDATE ACCEPT message contains a TMSI, the UE shall use this TMSI as new temporary identity. The UE shall delete its old TMSI and shall store the new TMSI. In this case, a TRACKING AREA UPDATE COMPLETE message is returned to the network to confirm the received TMSI.

- If neither a TMSI nor an IMSI has been included by the network in the TRACKING AREA UPDATE ACCEPT message, the old TMSI, if any is available, shall be kept.

If the header compression configuration status is included in the TRACKING AREA UPDATE ACCEPT message, the UE shall stop using header compression and decompression for those EPS bearers using Control plane CIoT EPS optimisation for which the MME indicated that the header compression configuration is not used.

If the T3448 value IE is present in the received TRACKING AREA UPDATE ACCEPT message, the UE shall:

- stop timer T3448 if it is running; and

- start timer T3448 with the value provided in the T3448 value IE.

If the UE is using EPS services with control plane CIoT EPS optimization, the T3448 value IE is present in the TRACKING AREA UPDATE ACCEPT message and the value indicates that this timer is either zero or deactivated, the UE shall consider this case as an abnormal case and proceed as if the T3448 value IE is not present.

If the UE in EMM-IDLE mode initiated the tracking area updating procedure and the TRACKING AREA UPDATE ACCEPT message does not include the T3448 value IE and if timer T3448 is running, then the UE shall stop timer T3448.

If the UE has indicated "service gap control supported" in the TRACKING AREA UPDATE REQUEST message and:

- the TRACKING AREA UPDATE ACCEPT message contains the T3447 value IE, then the UE shall store the new T3447 value, erase any previous stored T3447 value if exists and use the new T3447 value with the T3447 timer next time it is started; or

- the TRACKING AREA UPDATE ACCEPT message does not contain the T3447 value IE, then the UE shall erase any previous stored T3447 value if exists and stop the T3447 timer if running.

Upon receiving a TRACKING AREA UPDATE COMPLETE message, the MME shall stop timer T3450 and change to state EMM-REGISTERED. The GUTI, if sent in the TRACKING AREA UPDATE ACCEPT message, shall be considered as valid.

NOTE 8: Upon receiving a TRACKING AREA UPDATE COMPLETE message, if a new TMSI was included in the TRACKING AREA UPDATE ACCEPT message, the MME sends an SGsAP-TMSI-REALLOCATION-COMPLETE message as specified in 3GPP TS 29.118 [16A].

For inter-system change from A/Gb mode to S1 mode or Iu mode to S1 mode in EMM-IDLE mode, if the UE has included an eKSI in the NAS Key Set Identifier IE indicating a current EPS security context in the TRACKING AREA UPDATE REQUEST message by which the TRACKING AREA UPDATE REQUEST message is integrity protected, the MME shall take one of the following actions:

- if the MME retrieves the current EPS security context as indicated by the eKSI and GUTI sent by the UE, the MME shall integrity check the TRACKING AREA UPDATE REQUEST message using the current EPS security context and integrity protect the TRACKING AREA UPDATE ACCEPT message using the current EPS security context;

- if the MME cannot retrieve the current EPS security context as indicated by the eKSI and GUTI sent by the UE, and if the UE has included a valid GPRS ciphering key sequence number, the MME shall create a new mapped EPS security context as specified in 3GPP TS 33.401 [19], and then perform a security mode control procedure to indicate the use of the new mapped EPS security context to the UE (see subclause 5.4.3.2); or

- if the UE has not included an Additional GUTI IE, the MME may treat the TRACKING AREA UPDATE REQUEST message as in the previous item, i.e. as if it cannot retrieve the current EPS security context.

NOTE 9: The handling described above at failure to retrieve the current EPS security context or if no Additional GUTI IE was provided does not preclude the option for the MME to perform an EPS authentication procedure and create a new native EPS security context.

For inter-system change from A/Gb mode to S1 mode or Iu mode to S1 mode in EMM-IDLE mode, if the UE has not included a valid eKSI in the NAS Key Set Identifier IE and has included a valid GPRS ciphering key sequence number in the TRACKING AREA UPDATE REQUEST message, the MME shall create a new mapped EPS security context as specified in 3GPP TS 33.401 [19], and then perform a security mode control procedure to indicate the use of the new mapped EPS security context to the UE (see subclause 5.4.3.2).

NOTE 10: This does not preclude the option for the MME to perform an EPS authentication procedure and create a new native EPS security context.

For inter-system change from N1 mode to S1 mode in EMM-IDLE mode, if the UE has included an eKSI in the NAS Key Set Identifier IE indicating a 5G NAS security context in the TRACKING AREA UPDATE REQUEST message by which the TRACKING AREA UPDATE REQUEST message is integrity protected, the MME shall take actions as specified in subclause 4.4.2.3.

For inter-system change from A/Gb mode to S1 mode or Iu mode to S1 mode in EMM-CONNECTED mode, the MME shall integrity check TRACKING AREA UPDATE REQUEST message using the current K'ASME as derived when triggering the handover to E-UTRAN (see subclause 4.4.2.2). The MME shall verify the received UE security capabilities in the TRACKING AREA UPDATE REQUEST message. The MME shall then take one of the following actions:

- if the TRACKING AREA UPDATE REQUEST does not contain a valid KSIASME in the Non-current native NAS key set identifier IE, the MME shall remove the non-current native EPS security context, if any, for any GUTI for this UE. The MME shall then integrity protect and cipher the TRACKING AREA UPDATE ACCEPT message using the security context based on K'ASME and take the mapped EPS security context into use; or

- if the TRACKING AREA UPDATE REQUEST contains a valid KSIASME in the Non-current native NAS key set identifier IE, the MME may initiate a security mode control procedure to take the corresponding native EPS security context into use.

For inter-system change from N1 mode to S1 mode in EMM-CONNECTED mode, the MME shall integrity check TRACKING AREA UPDATE REQUEST message using the current K'ASME as derived when triggering the handover to E-UTRAN (see subclause 4.4.2.2). The MME shall verify the received UE security capabilities in the TRACKING AREA UPDATE REQUEST message. The MME shall then take one of the following actions:

- if the TRACKING AREA UPDATE REQUEST does not contain a valid KSIASME in the Non-current native NAS key set identifier IE, the MME shall remove the non-current native EPS security context, if any, for any GUTI for this UE. The MME shall then integrity protect and cipher the TRACKING AREA UPDATE ACCEPT message using the security context based on K'ASME and take the mapped EPS security context into use; or

- if the TRACKING AREA UPDATE REQUEST contains a valid KSIASME in the Non-current native NAS key set identifier IE, the MME may initiate a security mode control procedure to take the corresponding native EPS security context into use.

In WB-S1 mode, if the UE has set the RACS bit to "RACS supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message, the MME may include a UE radio capability ID IE or a UE radio capability ID deletion indication IE in the TRACKING AREA UPDATE ACCEPT message. In this case the MME shall enter state EMM-COMMON-PROCEDURE-INITIATED as described in subclause 5.4.1.

In WB-S1 mode, if the UE has set the RACS bit to "RACS supported" in the UE network capability IE of the TRACKING AREA UPDATE REQUEST message and the TRACKING AREA UPDATE ACCEPT message includes:

- a UE radio capability ID deletion indication IE set to "Network-assigned UE radio capability IDs deletion requested", the UE shall:

a) delete any network-assigned UE radio capability IDs associated with the registered PLMN stored at the UE;

b) send a TRACKING AREA UPDATE COMPLETE message to the network to acknowledge the received UE radio capability ID deletion indication IE; and

c) after the completion of the ongoing tracking area updating procedure, initiate a tracking area updating procedure as specified in subclause 5.5.3 over the existing NAS signalling connection except if there is a pending service request procedure as response to paging for CS fallback; and

- a UE radio capability ID IE, the UE shall:

a) store the UE radio capability ID as specified in annex C; and

b) send a TRACKING AREA UPDATE COMPLETE message to the network to acknowledge the received UE radio capability ID IE.

*\*\*\* 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 any one of the UE network capability information, the MS network capability information or the N1 UE network capability information;

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;

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; or

zg) when the UE needs to use the WUS assistance, stop to use the WUS assistance, or change the conditions for using the WUS assistance.

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. If the TRACKING AREA UPDATE ACCEPT message includes a UE radio capability ID deletion indication IE set to "Network-assigned UE radio capability IDs deletion requested", the UE shall proceed sending the EXTENDED SERVICE REQUEST message.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 \*\*\**

#### 5.6.1.6 Abnormal cases in the UE

The following abnormal cases can be identified:

a) Access barred because of access class barring, EAB, ACDC or NAS signalling connection establishment rejected by the network without "Extended wait time" received from lower layers

In WB-S1 mode, if the service request procedure is started in response to a paging request from the network, access class barring, EAB or ACDC is not applicable.

In NB-S1 mode, if the service request procedure is started in response to a paging request from the network, access barring is not applicable.

If the trigger for the service request procedure is the response to a paging request from the network and the NAS signalling connection establishment is rejected by the network, the service request procedure shall not be started. The UE stays in the current serving cell and applies normal cell reselection process. During an implementation dependent time period, the service request procedure may be started when access for "terminating calls" is granted or upon a cell change.

If the service request was initiated for CS fallback and the access is barred for "mobile originating CS fallback" (see 3GPP TS 36.331 [22]) and the lower layer indicates "the barring is due to CSFB specific access barring information", the service request procedure shall not be started. The UE stays in the current serving cell and applies normal cell reselection process. The service request procedure may be started if it is still necessary, i.e. when access for "mobile originating CS fallback" is granted or because of a cell change.

If the service request was initiated for CS fallback and a CS fallback cancellation request was not received and the access is barred for "mobile originating CS fallback" (see 3GPP TS 36.331 [22]) and the lower layer does not indicate "the barring is due to CSFB specific access barring information", the UE shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer.

If the service request was initiated for 1xCS fallback and the access is barred for "originating calls" (see 3GPP TS 36.331 [22]), the UE shall select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS procedures.

If the lower layer indicated the access was barred because of access class barring for "originating calls" (see 3GPP TS 36.331 [22]) and if:

- the service request is initiated due to a request from upper layers for user plane radio resources, and the MO MMTEL voice call is started, the MO MMTEL video call is started or the MO SMSoIP is started;

- the service request is initiated due to a mobile originated SMS over NAS or SMS over S102; or

- the service request is initiated due to a request from upper layers for user plane radio resources, ACDC is applicable to the request and the UE supports ACDC.

then the service request procedure shall be started. The call type used shall be per annex D of this document.

NOTE 1: If more than one of MO MMTEL voice call is started, MO MMTEL video call is started or MO SMSoIP is started conditions are satisfied, it is left to UE implementation to determine the call type based on annex D of this document.

If access is barred for a certain ACDC category (see 3GPP TS 36.331 [22]), and if the upper layers request user plane radio resources for a higher ACDC category and the UE supports ACDC, then the service request procedure shall be started.

If an access request for an uncategorized application is barred due to ACDC (see 3GPP TS 36.331 [22]), and if the upper layers request user plane radio resources for a certain ACDC category and the UE supports ACDC, then the service request procedure shall be started.

Otherwise:

- In WB-S1 mode, if access is barred for "originating calls" (see 3GPP TS 36.331 [22]), the service request procedure shall not be started. The UE stays in the current serving cell and applies normal cell reselection process. The service request procedure may be started if it is still necessary when access for "originating calls" is granted or because of a cell change.

- In NB-S1 mode, if access is barred for "originating calls" (see 3GPP TS 36.331 [22]), the service request procedure shall not be started. The UE stays in the current serving cell and applies normal cell reselection process. Further UE behaviour is implementation specific, e.g. the service request procedure is started again after an implementation dependent time; or

In NB-S1 mode, if access is barred for "originating calls" (see 3GPP TS 36.331 [22]), and a request for an exceptional event is received from the upper layers, then the service request procedure shall be started.

NOTE 2: In NB-S1 mode, the EMM layer cannot receive the access barring alleviation indication from the lower layers (see 3GPP TS 36.331 [22]).

b) Lower layer failure or release of the NAS signalling connection without "Extended wait time", without "Extended wait time CP data", and without redirection indication received from lower layers before the service request procedure is completed (see subclause 5.6.1.4) or before SERVICE REJECT message is received

If the service request was initiated for CS fallback and a CS fallback cancellation request was not received, the UE shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer, and the UE shall also set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE.

If the service request was initiated for CS fallback and a CS fallback cancellation request was received, the UE shall set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE.

If the service request was initiated for 1xCS fallback, the UE shall either:

- attempt to select cdma2000® 1x radio access technology and proceed with appropriate cdma2000® 1x CS procedures. If the UE fails to select cdma2000® 1x radio access technology, the UE shall set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE; or

- set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE, and perform cell selection according to 3GPP TS 36.304 [21].

If the service request was not initiated for CS fallback or 1xCS fallback, the UE shall enter state EMM-REGISTERED.

The UE shall abort the service request procedure, stop timer T3417, T3417ext or T3417ext-mt and locally release any resources allocated for the service request procedure.

c) T3417 expired

The UE shall enter the state EMM-REGISTERED.

If the UE triggered the service request procedure in EMM-IDLE mode in order to obtain packet services, then the EMM sublayer shall increment the service request attempt counter, abort the procedure and release locally any resources allocated for the service request procedure. The service request counter shall not be incremented, if:

- the service request procedure is initiated to establish a PDN connection for emergency bearer services;

- the UE has a PDN connection for emergency bearer services established;

- the UE is a UE configured to use AC11 – 15 in selected PLMN;

- the service request is initiated in response to paging from the network; or

- the UE in NB-S1 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 [15A] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [17]).

If the service request attempt counter is greater than or equal to 5, the UE shall start timer T3325 (see 3GPP TS 24.008 [13]). Additionally if the service request was initiated for an "originating MMTEL voice" call type or an "originating MMTEL video" call type, a notification that the service request was not accepted and that timer T3325 is running shall be provided to the upper layers.

NOTE 3: This can result in the upper layers requesting establishment of a CS voice call (if not already attempted in the CS domain), or other implementation specific mechanisms (see 3GPP TS 24.173 [13E]).

The UE shall not attempt service request until expiry of timer T3325 unless:

- the service request is initiated in response to paging from the network;

- the UE is a UE configured to use AC11 – 15 in selected PLMN;

- the service request is initiated to establish a PDN connection for emergency bearer services;

- the UE has a PDN connection for emergency bearer services established;

- the UE is registered in a new PLMN; or

- the UE in NB-S1 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 [15A] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [17]).

If the service request for "originating MMTEL voice" call type was triggered while T3325 is running, a notification that the service request was not accepted and that timer T3325 is running shall be provided to the upper layers.

NOTE 4: This can result in the upper layers requesting establishment of a CS voice call (if not already attempted in the CS domain), or other implementation specific mechanisms (see 3GPP TS 24.173 [13E]).

NOTE 5: The NAS signalling connection can also be released if the UE deems that the network has failed the authentication check as specified in subclause 5.4.2.7.

If the UE triggered the service request procedure in order to obtain services other than packet services from EMM-IDLE mode, then the EMM sublayer shall abort the procedure and release locally any resources allocated for the service request procedure.

If the UE triggered the service request procedure in EMM-CONNECTED mode, the EMM sublayer shall abort the procedure and consider the service request procedure with "active" flag set or the 1xCS fallback procedure as failed. The UE shall stay in EMM-CONNECTED mode.

d) T3417ext or T3417ext-mt expired

If a CS fallback cancellation request was not received, the UE shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer, and the UE shall also set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE.

If a CS fallback cancellation request was received the UE shall set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE.

e) SERVICE REJECT received, other EMM cause values than those treated in subclause 5.6.1.5, and cases of EMM cause values #22, #25 and #31 if considered as abnormal cases according to subclause 5.6.1.5.

If the service request was initiated for CS fallback and a CS fallback cancellation request was not received, the UE shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer, and the UE shall also set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE.

If the service request was initiated for CS fallback and a CS fallback cancellation request was received, the UE shall set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE.

If the service request was initiated for 1xCS fallback, the UE shall select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS procedures.

If the service request was initiated for 1xCS fallback and the UE has dual Rx/Tx configuration and supports enhanced 1xCS fallback, then upon entering EMM-IDLE mode the UE shall perform tracking area updating procedure.

If the service request was not initiated for CS fallback or 1xCS fallback, the UE shall enter state EMM-REGISTERED.

The UE shall abort the service request procedure, stop timer T3417, T3417ext or T3417ext-mt and locally release any resources allocated for the service request procedure.

f) Tracking area updating procedure is triggered

The UE shall abort the service request procedure, stop timer T3417, T3417ext or T3417ext-mt if running and perform the tracking area updating procedure. The "active" flag shall be set in the TRACKING AREA UPDATE REQUEST message. If the service request was initiated for CS fallback or 1xCS fallback, and the CS fallback cancellation request was not received, 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. If the TRACKING AREA UPDATE ACCEPT message includes a UE radio capability ID deletion indication IE set to "Network-assigned UE radio capability IDs deletion requested", the UE shall not initiate a new tracking area update procedure, but shall proceed sending the EXTENDED SERVICE REQUEST message by using the existing NAS signalling connection after the completion of the tracking area updating procedure.

g) Switch off

If the UE is in state EMM-SERVICE-REQUEST-INITIATED at switch off, the detach procedure shall be performed.

h) Detach procedure collision

EPS detach containing detach type "re-attach required":

If the UE receives a DETACH REQUEST message from the network in state EMM-SERVICE-REQUEST-INITIATED, the UE shall take the following actions:

- If the service request was initiated for CS fallback, the UE shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM, CC and GMM specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer;

- If the service request was initiated for 1xCS fallback, the UE shall attempt to select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS procedures; or

- If the service request was not initiated for CS fallback or 1xCS fallback, the detach procedure shall be progressed and the service request procedure shall be aborted.

EPS detach containing detach type "re-attach not required":

If the UE receives a DETACH REQUEST message from the network in state EMM-SERVICE-REQUEST-INITIATED, the UE shall take the following actions:

- If the DETACH REQUEST message contains an EMM cause other than #2 "IMSI unknown in HSS" or no EMM cause IE, the detach procedure shall be progressed and the service request procedure shall be aborted. Additionally, if the service request was initiated for CS fallback or 1xCS fallback, but not for CS fallback for emergency call or 1xCS fallback for emergency call, the EMM sublayer shall indicate to the MM sublayer or the cdma2000® upper layers that the CS fallback or 1xCS fallback procedure has failed; or

If the DETACH REQUEST message contains EMM cause #2 "IMSI unknown in HSS", the UE will follow the procedure as described below for the detach type "IMSI detach".

EPS detach containing detach type "IMSI detach":

If the UE receives a DETACH REQUEST message from the network in state EMM-SERVICE-REQUEST-INITIATED, the UE shall take the following actions:

- if the service request was initiated for SMS over NAS or CS fallback, but not for CS fallback for emergency call, the UE shall abort the service request procedure and progress the detach procedure; or

- otherwise the UE shall progress both procedures.

i) Transmission failure of SERVICE REQUEST, CONTROL PLANE SERVICE REQUEST or EXTENDED SERVICE REQUEST message indication with TAI change from lower layers

If the current TAI is not in the TAI list, the service request procedure shall be aborted to perform the tracking area updating procedure. The "active" flag shall be set in the TRACKING AREA UPDATE REQUEST message. If the service request was initiated for CS fallback or 1xCS fallback, and the CS fallback cancellation request was not received, 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.

If the current TAI is still part of the TAI list, the UE shall restart the service request procedure.

j) Transmission failure of SERVICE REQUEST, CONTROL PLANE SERVICE REQUEST or EXTENDED SERVICE REQUEST message indication without TAI change from lower layers

The UE shall restart the service request procedure.

k) Default or dedicated bearer set up failure

If the lower layers indicate a failure to set up a radio bearer, the UE shall locally deactivate the EPS bearer as described in subclause 6.4.4.6.

l) "Extended wait time" from the lower layers

The UE shall abort the service request procedure, enter state EMM-REGISTERED, and stop timer T3417, T3417ext or T3417ext-mt if still running.

If the EXTENDED SERVICE REQUEST or CONTROL PLANE SERVICE REQUEST message contained the low priority indicator set to "MS is configured for NAS signalling low priority", the UE shall start timer T3346 with the "Extended wait time" value.

If the SERVICE REQUEST message was sent by a UE configured for NAS signalling low priority, the UE shall start timer T3346 with the "Extended wait time" value.

If the EXTENDED SERVICE REQUEST or CONTROL PLANE SERVICE REQUEST message did not contain the low priority indicator set to "MS is configured for NAS signalling low priority" or if the SERVICE REQUEST message was sent by a UE not configured for NAS signalling low priority, the UE is operating in NB-S1 mode and the UE is not a UE configured to use AC11 – 15 in selected PLMN, then the UE shall start timer T3346 with the "Extended wait time" value.

In other cases the UE shall ignore the "Extended wait time".

The UE stays in the current serving cell and applies normal cell reselection process. The service request procedure is started, if still necessary, when timer T3346 expires or is stopped.

If the service request was initiated for CS fallback and a CS fallback cancellation request was not received, the UE in CS/PS mode 1 of operation shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer.

NOTE 5: If the UE disables the E-UTRA capability, then subsequent mobile terminating calls could fail.

If the service request was initiated for CS fallback for emergency call and a CS fallback cancellation request was not received, the UE may attempt to select GERAN or UTRAN radio access technology. It then proceeds with appropriate MM and CC specific procedures. The EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer.

If the service request was initiated for 1xCS fallback, the UE shall select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS procedures.

If the service request was initiated for 1xCS fallback for emergency call, the UE may select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS procedures.

If the service request was initiated due to a request from the SMS entity to send an SMS and timer T3246 is not running, the UE, if operating in CS/PS mode 1 of operation, may select GERAN or UTRAN radio access technology. It then proceeds with the appropriate MM procedure.

NOTE 6: If the UE disables the E-UTRA capability, then subsequent mobile terminating calls could fail.

la) "Extended wait time CP data" from the lower layers

The UE shall abort the service request procedure for transfer of user data via the control plane, enter state EMM-REGISTERED, and stop timer T3417 if still running.

If the UE is operating in NB-S1 mode and supports the timer T3448, the UE shall start the timer T3448 with the "Extended wait time CP data" value. If the UE is operating in NB-S1 mode and does not support the timer T3448, the UE shall start the timer T3346 with the "Extended wait time CP data" value.

In other cases the UE shall ignore the "Extended wait time CP data".

The UE stays in the current serving cell and applies normal cell reselection process. The service request procedure for transfer of user data via the control plane is started, if still necessary, when the timer T3448 expires or is stopped.

m) Timer T3346 is running

The UE shall not start the service request procedure unless:

- the UE receives a paging;

- the UE is a UE configured to use AC11 – 15 in selected PLMN;

- the UE has a PDN connection for emergency bearer services established or is establishing a PDN connection for emergency bearer services;

- the UE is requested by the upper layer for a CS fallback for emergency call or a 1xCS fallback for emergency call;

- the UE has a PDN connection established without the NAS signalling low priority indication or is establishing a PDN connection without the NAS signalling low priority indication and if the timer T3346 was started due to rejection of a NAS request message (e.g. ATTACH REQUEST, TRACKING AREA UPDATE REQUEST, EXTENDED SERVICE REQUEST or CONTROL PLANE SERVICE REQUEST) which contained the low priority indicator set to "MS is configured for NAS signalling low priority"; or

- the UE in NB-S1 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 [15A] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [17]); and

- timer T3346 was not started when NAS signalling connection was established with RRC establishment cause set to "MO exception data".

If the UE is in EMM-IDLE mode, the UE stays in the current serving cell and applies normal cell reselection process. The service request procedure is started, if still necessary, when timer T3346 expires or is stopped.

Upon upper layer's request for a mobile originated CS fallback which is not for emergency call, the UE in CS/PS mode 1 of operation shall attempt to select GERAN or UTRAN radio access technology. If the UE finds a suitable GERAN or UTRAN cell, it then proceeds with the appropriate MM and CC specific procedures and the EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer. Otherwise the EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer.

NOTE 7: If the UE disables the E-UTRA capability, then subsequent mobile terminating calls could fail.

Upon upper layer's request for a CS fallback for emergency call, the UE may select GERAN or UTRAN radio access technology. It then proceeds with appropriate MM and CC specific procedures. The EMM sublayer shall not indicate the abort of the service request procedure to the MM sublayer.

Upon a request from the SMS entity to send an SMS and timer T3246 is not running, the UE, if operating in CS/PS mode 1 of operation, may select GERAN or UTRAN radio access technology. It then proceeds with the appropriate MM procedure.

NOTE 8: If the UE disables the E-UTRA capability, then subsequent mobile terminating calls could fail.

Upon upper layer's request for a mobile originated 1x CS fallback which is not for emergency call, the UE shall select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS call procedures.

Upon upper layer's request for a 1xCS fallback for emergency call, the UE may select cdma2000® 1x radio access technology. The UE then proceeds with appropriate cdma2000® 1x CS call procedures.

If the service request procedure was triggered for an MO MMTEL voice call is started, a notification that the service request procedure was not initiated due to congestion shall be provided to the upper layers.

NOTE 9: This can result in the upper layers requesting establishment of the originating voice call on an alternative manner e.g. requesting establishment of a CS voice call (see 3GPP TS 24.173 [13E]).

n) Failure to find a suitable GERAN or UTRAN cell, after release of the NAS signalling connection without "Extended wait time" and with redirection indication received from lower layers when the service request was initiated for CS fallback

The EMM sublayer shall indicate the abort of the service request procedure to the MM sublayer, and the UE shall also set the EPS update status to EU2 NOT UPDATED and enter the state EMM-REGISTERED.ATTEMPTING-TO-UPDATE.

The UE shall abort the service request procedure, stop timer T3417ext or T3417ext-mt and locally release any resources allocated for the service request procedure.

o) Timer T3448 is running

The UE in EMM-IDLE mode shall not initiate the service request procedure for transport of user data via the control plane unless:

- the UE is a UE configured to use AC11 – 15 in selected PLMN;

- the UE which is only using EPS services with control plane CIoT EPS optimization received a paging; or

- the UE in NB-S1 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 [15A] or the USIM file EFNASCONFIG in 3GPP TS 31.102 [17]).

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

p) Timer T3447 is running

The UE shall not start any service request procedure unless:

- the UE receives a paging;

- the UE is a UE configured to use AC11 – 15 in selected PLMN;

- the UE has a PDN connection for emergency bearer services established or is establishing a PDN connection for emergency bearer services.

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

*\*\*\* end of changes \*\*\**