**3GPP TSG-CT WG1 Meeting #133-eC1-21xxxx**

**E-meeting, 11-19 November 2021**

|  |
| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **24.301** | **CR** | **3646** | **rev** | **1** | **Current version:** | **17.4.1** |  |
|  |
| *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)*.* |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

|  |
| --- |
|  |
| ***Title:***  | Network to accept or reject the paging restriction requested by MUSIM capable UE in EPS |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell, Samsung |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | MUSIM |  | ***Date:*** | 2021-10-26 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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 canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)...Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | According to stage-2 CR 3664 (S2-2108150), the network can accept or reject the paging restriction requested by MUSIM capable UE, and the network can indicate this decision to the UE. Both UE and Network need to comply to the paging restriction decision to stay in sync.The corresponding requirements need to be captured in the stage-3 spec. |
|  |  |
| ***Summary of change:*** | Indicating that, the network can accept or reject the paging restriction requested by MUSIM capable UE, and the network can indicate this decision to the UE. This is applicable to both Service Request procedure and TAU procedure.Also some clarifications are added to the text for the network behaviour in clause 5.5.3.2.4, clarifying that the network shall initiate the release of the NAS signalling and store the paging restriction ONLY IF it supports those features, where it is possible that the UE requests using those features without waiting to learn if the network supports them or not. This can happen where the MUSIM UE can request the network to release the NAS signalling connection and include paging restriction during mobility TAU even before detecting whether the network supports the NAS signalling connection release or paging restriction in the new tracking area, provided that the network has already indicated support for NAS signalling connection release and paging restriction in the current stored Tracking Area List (see stage-2 CR 3665 (S2-2108153) ). |
|  |  |
| ***Consequences if not approved:*** | UE and Network will go out of sync, where there will be no possibility to indicate the paging restriction acceptance/rejection decision to the UE. |
|  |  |
| ***Clauses affected:*** | 5.5.3.2.4, 5.6.1.4.1, 5.6.1.4.2, 8.2.26.1, 8.2.26.X (new), 8.2.34.1, 8.2.34.Z (new), 9.9.3.Y (new) |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 23.401 CR 3664 (S2-2108150)TS 23.401 CR 3665 (S2-2108153)  |
| ***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 clause 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] clause 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 clause 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 clause 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 clause 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 clause 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], clause 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, except for the case when the TRACKING AREA UPDATE REQUEST message includes the UE request type IE and the Request type is set to "NAS signalling connection release". 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, except for the case when the TRACKING AREA UPDATE REQUEST message includes the UE request type IE and the Request type is set to "NAS signalling connection release".

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 the MME determines the UE’s N1 mode capability for 3GPP access changes from " N1 mode not supported " to " N1 mode supported " and the network decides to enable the transfer of a PDN connection not supporting interworking to 5GS from S1 mode to N1 mode, the MME may upon completion of the tracking area updating procedure initiate an EPS bearer context deactivation procedure to deactivate the default EPS bearer context of the PDN connection by including ESM cause #39 "reactivation requested" in the DEACTIVATE EPS BEARER CONTEXT REQUEST message (see subclause 6.4.4.2).

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.

If the UE supporting MUSIM does not include the Paging restriction IE in the TRACKING AREA UPDATE REQUEST message, the MME shall delete any stored paging restriction preferences for the UE and stop restricting paging.

If the MUSIM capable UE has included a Requested IMSI offset IE in the TRACKING AREA UPDATE REQUEST message and if the MME supports paging timing collision control, the MME shall include the Negotiated IMSI offset IE in the TRACKING AREA UPDATE ACCEPT message, and the MME shall set the IMSI offset value to:

- A value that is different than what the UE has provided, if the MME has a different value; or

- A value that is same as what the UE has provided, if the MME does not have a different value;

and the MME shall store the IMSI offset value and use it in calculating an alternative IMSI as specified in 3GPP TS 23.401 [10] that is used for deriving the paging occasion as specified in 3GPP TS 36.304 [21].

If the MUSIM capable UE has not included a Requested IMSI offset IE in the TRACKING AREA UPDATE REQUEST message, the MME shall erase any stored alternative IMSI for that UE, if available.

If the UE supporting MUSIM , requests the release of the NAS signalling connection, by setting Request type to "NAS signalling connection release" in the UE request type IE in the TRACKING AREA UPDATE REQUEST message, and the MME supports the NAS signalling connection release, the MME shall initiate the release of the NAS signalling connection after the completion of the tracking area updating procedure. If the UE requests restriction of paging by including the Paging restriction IE in the TRACKING AREA UPDATE REQUEST message and the MME supports the paging restriction, the MME:

- if accepts the paging restriction, shall include the Additional request result IE in the TRACKING AREA UPDATE ACCEPT message and set the Paging restriction decision to "paging restriction is accepted". The MME shall store the paging restriction preferences of the UE and enforce these restrictions in the paging procedure as described in clause 5.6.2; or

- if rejects the paging restriction, shall include the Additional request result IE in the TRACKING AREA UPDATE ACCEPT message and set the Paging restriction decision to "paging restriction is rejected", and shall discard the received paging restriction. The MME shall delete any stored paging restriction for the UE and stop restricting paging.

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 clause 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], clause 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.

If a Negotiated IMSI offset IE is included in the TRACKING AREA UPDATE ACCEPT message, the MUSIM capable UE shall forward the IMSI offset value to lower layers. If a Negotiated IMSI offset IE is not included in the TRACKING AREA UPDATE ACCEPT message, the MUSIM capable UE shall indicate to lower layers to erase any IMSI offset value, if available.

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], clause 7.2a and clause 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 or a Negotiated IMSI offset IE, the UE shall return a TRACKING AREA UPDATE COMPLETE message to the MME to acknowledge the received GUTI or the received Negotiated IMSI offset IE.

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 clause 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 clause 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 clause 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 clause 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 clause 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 clause 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 clause 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 \*\*\*\*\*

##### 5.6.1.4.1 UE is not using EPS services with control plane CIoT EPS optimization

If EMM-REGISTERED without PDN connection is supported by the UE and the MME and the MME has no active EPS bearer contexts for the UE, for cases a, b, c and o in clause 5.6.1.1, upon receipt of the SERVICE REQUEST message or the EXTENDED SERVICE REQUEST message for packet services, after completion of the EMM common procedures according to clause 5.6.1.3, if any, the MME shall send a SERVICE ACCEPT message.

If EMM-REGISTERED without PDN connection is supported by the UE and the MME and the UE has no active EPS bearer contexts, for cases a, b, c and o in clause 5.6.1.1, the UE shall treat the receipt of a SERVICE ACCEPT message as successful completion of the procedure. Otherwise, for cases a, b, c, h, k, l and o in clause 5.6.1.1, the UE shall treat the indication from the lower layers that the user plane radio bearer is set up as successful completion of the procedure. The UE shall reset the service request attempt counter, stop the timer T3417 and enter the state EMM-REGISTERED.

If the service type information element in the EXTENDED SERVICE REQUEST message indicates "mobile terminating CS fallback or 1xCS fallback" and the CSFB response IE, if included, indicates "CS fallback accepted by the UE", or if the service type information element in the EXTENDED SERVICE REQUEST message indicates "mobile originating CS fallback or 1xCS fallback" or "mobile originating CS fallback emergency call or 1xCS fallback emergency call", the network initiates CS fallback or 1xCS fallback procedures.

If the EPS bearer context status IE is included in the EXTENDED SERVICE REQUEST message, the network shall deactivate all those EPS bearer contexts locally (without peer-to-peer signalling between the network and the UE) which are active on the network side but are indicated by the UE as being inactive. If a default EPS bearer context is marked as inactive in the EPS bearer context status IE included in the EXTENDED SERVICE 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 SERVICE REQUEST message or the EXTENDED SERVICE REQUEST message for packet services, was sent in a CSG cell and the CSG subscription has expired or was removed for a UE, but the UE has a PDN connection for emergency bearer services established, the network shall accept the SERVICE REQUEST message or the EXTENDED SERVICE REQUEST message for packet services and deactivate all non-emergency EPS bearers locally. The emergency EPS bearers shall not be deactivated.

For cases d in clause 5.6.1.1, and for case e in clause 5.6.1.1 when the CSFB response was set to "CS fallback accepted by the UE", the UE shall treat the indication from the lower layers that the inter-system change from S1 mode to A/Gb or Iu mode is completed as successful completion of the procedure. The EMM sublayer in the UE shall indicate to the MM sublayer that the CS fallback procedure has succeeded. The UE shall stop the timer T3417ext or T3417ext-mt, respectively, and enter the state EMM-REGISTERED.NO-CELL-AVAILABLE.

If the service request procedure was initiated in EMM-IDLE mode and an EXTENDED SERVICE REQUEST message was sent in a CSG cell and the CSG subscription has expired or was removed for the UE, the network need not perform CSG access control if the service type information element indicates "mobile originating CS fallback emergency call or 1xCS fallback emergency call".

For cases f and g in clause 5.6.1.1:

- if the UE receives the indication from the lower layers that the signalling connection is released with the redirection indication to cdma2000® 1x access network or the indication from the lower layers that a change to cdma2000® 1x access network for 1xCS fallback has started (see 3GPP TS 36.331 [22]), the UE shall consider the service request procedure successfully completed, stop timer T3417 and enter the state EMM-REGISTERED.NO-CELL-AVAILABLE;

- if the UE receives the dual Rx/Tx redirection indication from the lower layers (see 3GPP TS 36.331 [22]), the UE shall select cdma2000® 1x access network for 1xCS fallback, consider the service request procedure successfully completed, stop timer T3417 and enter the state EMM-REGISTERED.NORMAL-SERVICE; and

- if the UE receives a cdma2000® signalling message indicating 1xCS fallback rejection by cdma2000® 1x access network, the UE shall abort the service request procedure, stop timer T3417 and enter the state EMM-REGISTERED.NORMAL-SERVICE.

For cases i and j in clause 5.6.1.1, if the UE receives the indication from the lower layers that the signalling connection is released, the UE shall consider the service request procedure successfully completed, stop timer T3417 and enter the state EMM-REGISTERED.NO-CELL-AVAILABLE.

For cases p and q in clause 5.6.1.1, when the UE supporting MUSIM in the EXTENDED SERVICE REQUEST message sets the Request type to "NAS signalling connection release" or to "Rejection of paging" in the UE request type IE, the UE shall treat the receipt of SERVICE ACCEPT message as the successful completion of the procedure and the UE shall reset the service request attempt counter, stop timer T3417 and enter the state EMM-REGISTERED.

If the SERVICE REQUEST message or an EXTENDED SERVICE REQUEST message for packet services was used, the UE shall locally deactivate the EPS bearer contexts that do not have a user plane radio bearer established upon successful completion of the service request procedure, except for the case when the UE supporting MUSIM in the EXTENDED SERVICE REQUEST message sets the Request type to "NAS signalling connection release" or to "Rejection of paging" in the UE request type IE.

If the EXTENDED SERVICE REQUEST message is for CS fallback or 1xCS fallback and radio bearer establishment takes place during the procedure, the UE shall locally deactivate the EPS bearer contexts that do not have a user plane radio bearer established upon receiving a lower layer indication of radio bearer establishment. The UE does not perform local deactivation of EPS bearer contexts upon receiving an indication of inter-system change from lower layers.

If the EXTENDED SERVICE REQUEST message is for CS fallback or 1xCS fallback and radio bearer establishment does not take place during the procedure, the UE does not perform local deactivation of the EPS bearer context. The UE does not perform local deactivation of EPS bearer contexts upon receiving an indication of inter-system change from lower layers.

If a service request 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 service request, 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 service request by the lower layer;

then the MME shall locally deactivate all EPS bearer contexts associated with any LIPA PDN connection. Furthermore, if no active EPS bearer contexts remain for the UE, the MME shall not accept the service request as specified in clause 5.6.1.5.

If a service request is received from a UE with a SIPTO at the local network PDN connection, and if the PDN connection is a:

1) 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 service request, and the LHN-ID value 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 service request by the lower layer; or

2) 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 service request, 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 service request by the lower layer;

then, the MME takes one of the following actions:

- if all the remaining PDN connections are SIPTO at the local network PDN connections, the MME shall not accept the service request as specified in clause 5.6.1.5; and

- if a PDN connection remains that is not SIPTO at the local network PDN connection and the network decides to set up the S1 and radio bearers, the MME shall upon completion of the setup of the S1 bearers 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 clause 6.4.4.2).

NOTE: For some cases of CS fallback or 1x CS fallback the network can decide not to set up any S1 and radio bearers.

If the UE supporting MUSIM does not include the Paging restriction IE in the EXTENDED SERVICE REQUEST message, the MME shall delete any stored paging restriction preferences for the UE and stop restricting paging.

For cases p and q in clause 5.6.1.1 when the UE supporting MUSIM sets the Request type to "NAS signalling connection release" or to "Rejection of paging" in the UE request type IE in the EXTENDED SERVICE REQUEST message and if the UE requests restriction of paging by including the Paging restriction IE, the MME:

- if accepts the paging restriction, shall include the Additional request result IE in the SERVICE ACCEPT message and set the Paging restriction decision to "paging restriction is accepted". The MME shall store the paging restriction preferences of the UE and enforce these restrictions in the paging procedure as described in clause 5.6.2; or

- if rejects the paging restriction, shall include the Additional request result IE in the SERVICE ACCEPT message and set the Paging restriction decision to "paging restriction is rejected", and shall discard the received paging restriction. The MME shall delete any stored paging restriction for the UE and stop restricting paging.

When the E-UTRAN fails to establish radio bearers for one or more EPS bearer contexts, then the MME shall locally deactivate the EPS bearer contexts corresponding to the failed radio bearers based on the lower layer indication from the E‑UTRAN, without notifying the UE.

If the UE is not using EPS services with control plane CIoT EPS optimization, the network shall consider the service request procedure successfully completed in the following cases:

- when it receives an indication from the lower layer that the user plane is setup, if radio bearer establishment is required;

- otherwise when it receives an indication from the lower layer that the UE has been redirected to the other RAT (GERAN or UTRAN in CS fallback, or cdma2000® 1x access network for 1xCS fallback).

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

##### 5.6.1.4.2 UE is using EPS services with control plane CIoT EPS optimization

For case a in clause 5.6.1.1, upon receipt of the CONTROL PLANE SERVICE REQUEST message with Control plane service type indicating "mobile terminating request", after completion of the EMM common procedures according to clause 5.6.1.3:

1) if the MME needs to perform an EPS bearer context status synchronization

- for an EPS bearer context associated with Control plane only indication; or

- for an EPS bearer context not associated with Control plane only indication, there is no downlink user data pending to be delivered via the user plane, and the UE did not set the "active" flag in the Control plane service type IE to 1; or

2) if the control plane data back-off time for the UE is stored in MME and the MME decides to deactivate congestion control for transport of user data via the control plane,

then the MME shall send a SERVICE ACCEPT message.

Furthermore the MME may:

1) initiate the transport of user data via the control plane procedure or any other NAS signalling procedure;

2) if supported by the UE and required by the network, initiate the setup of the user plane radio bearer(s); or

3) send a NAS signalling message not related to an EMM common procedure to the UE if downlink signalling is pending.

For case b in clause 5.6.1.1, upon receipt of the CONTROL PLANE SERVICE REQUEST message with Control plane service type indicating "mobile originating request", after completion of the EMM common procedures according to clause 5.6.1.3, if any, if the MME needs to perform an EPS bearer context status synchronization

- for an EPS bearer context associated with Control plane only indication; or

- for an EPS bearer context not associated with Control plane only indication, there is no downlink user data pending to be delivered via the user plane, and the UE did not set the "active" flag in the Control plane service type IE to 1,

then the MME shall send a SERVICE ACCEPT message.

Furthermore, the MME may:

1) initiate release of the NAS signalling connection upon receipt of an indication from the ESM layer (see clause 6.6.4.2), unless the MME has additional downlink user data or signalling pending;

2) initiate the setup of the user plane radio bearer(s), if downlink user data is pending to be delivered via the user plane or the UE has set the "active" flag in the Control plane service type IE to 1;

3) send an ESM DATA TRANSPORT message to the UE, if downlink user data is pending to be delivered via the control plane;

4) send a NAS signalling message not related to an EMM common procedure to the UE if downlink signalling is pending; or

5) send a SERVICE ACCEPT message to complete the service request procedure, if no NAS security mode control procedure was initiated, the MME did not send a SERVICE ACCEPT message as specified above to perform an EPS bearer context status synchronization, and the MME did not initiate any of the procedures specified in item 1 to 4 above.

NOTE 1: The MME can initiate the setup of the user plane radio bearer(s) if the MME decides to activate the congestion control for transport of user data via the control plane.

For case m in clause 5.6.1.1, upon receipt of the CONTROL PLANE SERVICE REQUEST message with Control plane service type indicating "mobile originating request" and the "active" flag in the Control plane service type IE set to 1:

1) if the MME accepts the request, the MME shall initiate the setup of the user plane radio bearer(s) for all active EPS bearer contexts of SGi PDN connections that are established without control plane only indication.

2) if the MME does not accept the request, the MME shall send a SERVICE ACCEPT message to complete the service request procedure.

NOTE 2: The MME takes into account the maximum number of user plane radio bearers supported by the UE, in addition to local policies and the UE's preferred CIoT network behaviour when deciding whether to accept the request to establish user plane bearer(s) as described in clause 5.3.15. If the MME accepts the request, all SGi PDN connections are considered as established without Control plane only indication.

NOTE 3: In this release of the specification, a UE in NB-S1 mode can support a maximum of 2 user plane radio bearers (see clause 6.5.0).

For case c in clause 5.6.1.1, upon receipt of the CONTROL PLANE SERVICE REQUEST message with Control plane service type indicating "mobile originating request" and without an ESM message container IE, after completion of the EMM common procedures according to clause 5.6.1.3, if any, the MME proceeds as follows:

If the MME needs to perform an EPS bearer context status synchronization

- for an EPS bearer context associated with Control plane only indication; or

- for an EPS bearer context not associated with Control plane only indication, and there is no downlink user data pending to be delivered via the user plane,

then the MME shall send a SERVICE ACCEPT message.

Furthermore, the MME may:

1) initiate the setup of the user plane radio bearer(s), if downlink user data is pending to be delivered via the user plane;

2) send an ESM DATA TRANSPORT message to the UE, if downlink user data is pending to be delivered via the control plane;

3) send a NAS signalling message not related to an EMM common procedure to the UE, if downlink signalling is pending; or

4) send a SERVICE ACCEPT message to complete the service request procedure, if no NAS security mode control procedure was initiated, the MME did not send a SERVICE ACCEPT message as specified above to perform an EPS bearer context status synchronization, and the MME did not initiate any of the procedures specified in item 1 to 3 above.

If the UE supporting MUSIM does not include the Paging restriction IE in the CONTROL PLANE SERVICE REQUEST message, the MME shall delete any stored paging restriction preferences for the UE and stop restricting paging.

For cases p and q in clause 5.6.1.1 when the UE supporting MUSIM sets the Request type to "NAS signalling connection release" or to "Rejection of paging" in the UE request type IE in the CONTROL PLANE SERVICE REQUEST message and if the UE requests restriction of paging by including the Paging restriction IE, the MME:

- if accepts the paging restriction, shall include the Additional request result IE in the SERVICE ACCEPT message and set the Paging restriction decision to "paging restriction is accepted". The MME shall store the paging restriction preferences of the UE, enforce these restrictions in the paging procedure as described in clause 5.6.2; or

- if rejects the paging restriction, shall include the Additional request result IE in the SERVICE ACCEPT message and set the Paging restriction decision to "paging restriction is rejected", and shall discard the received paging restriction. The MME shall delete any stored paging restriction for the UE and stop restricting paging.

In NB-S1 mode, for cases a, b, c and m in clause 5.6.1.1, if the MME needs to initiate the setup of user plane radio bearer(s), the MME shall check if the UE can support the establishment of additional user plane radio bearer based on the multiple DRB support indicated by UE in the UE network capability IE.

For cases a, b and c in clause 5.6.1.1, if the EPS bearer context status IE is included in the CONTROL PLANE SERVICE REQUEST message, the network shall deactivate all those EPS bearer contexts locally (without peer-to-peer signalling between the network and the UE) which are active on the network side but are indicated by the UE as being inactive. If a default EPS bearer context is marked as inactive in the EPS bearer context status IE included in the CONTROL PLANE SERVICE REQUEST message, and this default bearer is not associated with the last 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 CONTROL PLANE SERVICE REQUEST and the MME decides to respond with a SERVICE ACCEPT message, the MME shall include an EPS bearer context status IE, indicating which EPS bearer contexts are active in the MME, except for the case when no EPS bearer context exists on the network side.

If the MME needs to initiate an EPS bearer context status synchronization, the MME may include an EPS bearer context status IE in the SERVICE ACCEPT message also if no EPS bearer context status IE was included in the CONTROL PLANE SERVICE REQUEST message.

If the MME sends a SERVICE ACCEPT message upon receipt of the CONTROL PLANE SERVICE REQUEST message piggybacked with the ESM DATA TRANSPORT message:

- if the Release assistance indication IE is set to "No further uplink and no further downlink data transmission subsequent to the uplink data transmission is expected" in the message;

- if the UE has indicated support for the control plane data back-off timer; and

- if 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 SERVICE ACCEPT message.

If the MME sends a SERVICE ACCEPT message and decides to deactivate congestion control for transport of user data via the control plane then the MME shall delete the stored control plane data back-off time for the UE and the MME shall not include timer T3448 value IE in SERVICE ACCEPT message.

For cases a, b, c and m in clause 5.6.1.1, if the EPS bearer context status IE is included in the CONTROL PLANE SERVICE REQUEST message or the MME needs to initiate an EPS bearer context status synchronization, the MME shall consider the service request procedure successfully completed when it sends the SERVICE ACCEPT message. If the EPS bearer context status IE is not included in the CONTROL PLANE SERVICE REQUEST message and the MME does not need to initiate an EPS bearer context status synchronization, the MME shall consider the service request procedure successfully completed in the following cases:

- when it successfully completes a NAS security mode control procedure;

- when it receives an indication from the lower layer that the user plane is setup, if radio bearer establishment is required;

- upon receipt of the CONTROL PLANE SERVICE REQUEST message and completion of the EMM common procedures, if any, if the CONTROL PLANE SERVICE REQUEST message was successfully integrity checked and the ESM message container or NAS message container in the CONTROL PLANE SERVICE REQUEST message, if applicable, was successfully deciphered, radio bearer establishment is not required, and the MME has downlink user data or signalling not related to an EMM common procedure pending; and

- with the transmission of a SERVICE ACCEPT message or with the decision to initiate release of the NAS signalling connection, if the CONTROL PLANE SERVICE REQUEST message was successfully integrity checked and the ESM message container or NAS message container in the CONTROL PLANE SERVICE REQUEST message, if applicable, was successfully deciphered, radio bearer establishment is not required, and the MME does not have any downlink user data or signalling pending.

If the MME considers the service request procedure successfully completed the MME shall:

1) forward the contents of the ESM message container IE, if any, to the ESM layer; and

2) forward the contents of the NAS message container IE, if any.

For cases a, b and c in clause 5.6.1.1, the UE shall treat the receipt of any of the following as successful completion of the procedure:

- a SECURITY MODE COMMAND message;

- a security protected EMM message different from a SERVICE REJECT message and not related to an EMM common procedure;

- a security protected ESM message; and

- receipt of the indication from the lower layers that the user plane radio bearers are set up.

Upon successful completion of the procedure, the UE shall reset the service request attempt counter, stop the timer T3417 and enter the state EMM-REGISTERED.

NOTE 4: The security protected EMM message can be e.g. a SERVICE ACCEPT message and the ESM message an ESM DATA TRANSPORT message.

For case m in clause 5.6.1.1, the UE shall treat the indication from the lower layers that the user plane radio bearers are set up as successful completion of the procedure. The UE shall treat the receipt of a SERVICE ACCEPT message as completion of the procedure without the establishment of the user plane radio bearers. For both cases, the UE shall reset the service request attempt counter, stop the timer T3417 and enter the state EMM-REGISTERED.

For case b in clause 5.6.1.1, the UE shall also treat the indication from the lower layers that the RRC connection has been released as successful completion of the procedure. The UE shall reset the service request attempt counter, stop the timer T3417 and enter the state EMM-REGISTERED.

For cases a, c and m in clause 5.6.1.1, the UE shall treat the indication from the lower layers that the RRC connection has been released as an abnormal case and shall follow the procedure described in clause 5.6.1.6, item b.

For cases p and q in clause 5.6.1.1, when the UE supporting MUSIM in the CONTROL PLANE SERVICE REQUEST message sets the Request type to "NAS signalling connection release" or to "Rejection of paging" in the UE request type IE, the UE shall treat the receipt of SERVICE ACCEPT message as the successful completion of the procedure and the UE shall reset the service request attempt counter, stop timer T3417, enter the state EMM-REGISTERED and not deactivate EPS bearer contexts locally.

For case o in clause 5.6.1.1, the UE shall treat the receipt of SERVICE ACCEPT message as the successful completion of the procedure. The UE shall reset the service request attempt counter, stop timer T3417 and enter the state EMM-REGISTERED.

For cases a, b and c in clause 5.6.1.1,

- if the MME needs to initiate an EPS bearer context status synchronization, the UE can receive a SERVICE ACCEPT message even after it received a SECURITY MODE COMMAND message or an indication from the lower layers that the user plane radio bearers are set up and determined successful completion of the service request procedure. Upon receipt of the SECURITY MODE COMMAND message or an indication from the lower layers that the user plane radio bearers are set up, the UE shall start timer T3449. If the UE receives a security protected ESM message or a security protected EMM message not related to an EMM common procedure, the UE shall stop the timer T3449. If the UE receives a SERVICE ACCEPT message while the timer T3449 is running, the UE shall treat the SERVICE ACCEPT message and stop the timer T3449. If the UE is not in state EMM-SERVICE-REQUEST-INITIATED and timer T3449 is not running, the receipt of the SERVICE ACCEPT message is considered as protocol error and the UE shall return EMM STATUS message as specified in clause 7.4; otherwise the UE shall treat the SERVICE ACCEPT message; and

- if the UE treats the SERVICE ACCEPT message and an EPS bearer context status IE is included in the 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 SERVICE 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 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 MME.

If the T3448 value IE is present in the received SERVICE ACCEPT message, the UE shall:

- stop timer T3448 if it is running;

- consider the transport of user data via the control plane as successful; 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 SERVICE 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 service request procedure by sending a CONTROL PLANE SERVICE REQUEST message and the SERVICE ACCEPT message does not include the T3448 value IE and if timer T3448 is running, then the UE shall stop timer T3448.

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

#### 8.2.26.1 Message definition

This message is sent by the network to the UE to provide the UE with EPS mobility management related data in response to a tracking area update request message. See table 8.2.26.1.

Message type: TRACKING AREA UPDATE ACCEPT

Significance: dual

Direction: network to UE

Table 8.2.26.1: TRACKING AREA UPDATE ACCEPT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator9.2 | M | V | 1/2 |
|  | Security header type | Security header type9.3.1 | M | V | 1/2 |
|  | Tracking area update accept message identity | Message type9.8 | M | V | 1 |
|  | EPS update result | EPS update result9.9.3.13 | M | V | 1/2 |
|  | Spare half octet | Spare half octet9.9.2.9 | M | V | 1/2 |
| 5A | T3412 value | GPRS timer9.9.3.16 | O | TV | 2 |
| 50 | GUTI | EPS mobile identity9.9.3.12 | O | TLV | 13 |
| 54 | TAI list | Tracking area identity list9.9.3.33 | O | TLV | 8-98 |
| 57 | EPS bearer context status | EPS bearer context status9.9.2.1 | O | TLV | 4 |
| 13 | Location area identification | Location area identification9.9.2.2 | O | TV | 6 |
| 23 | MS identity | Mobile identity9.9.2.3 | O | TLV | 7-10 |
| 53 | EMM cause | EMM cause9.9.3.9 | O | TV | 2 |
| 17 | T3402 value | GPRS timer9.9.3.16 | O | TV | 2 |
| 59 | T3423 value | GPRS timer9.9.3.16 | O | TV | 2 |
| 4A | Equivalent PLMNs | PLMN list9.9.2.8 | O | TLV | 5-47 |
| 34 | Emergency number list | Emergency number list9.9.3.37 | O | TLV | 5-50 |
| 64 | EPS network feature support | EPS network feature support9.9.3.12A | O | TLV | 3-4 |
| F- | Additional update result | Additional update result9.9.3.0A | O | TV | 1 |
| 5E | T3412 extended value | GPRS timer 39.9.3.16B | O | TLV | 3 |
| 6A | T3324 value | GPRS timer 29.9.3.16A | O | TLV | 3 |
| 6E | Extended DRX parameters | Extended DRX parameters9.9.3.46 | O | TLV | 3 |
| 68 | Header compression configuration status | Header compression configuration status9.9.4.27 | O | TLV | 4 |
| 65 | DCN-ID | DCN-ID9.9.3.48 | O | TLV | 4 |
| E- | SMS services status | SMS services status9.9.3.4B | O | TV | 1 |
| D- | Non-3GPP NW policies | Non-3GPP NW provided policies9.9.3.49 | O | TV | 1 |
| 6B | T3448 value | GPRS timer 29.9.3.16A | O | TLV | 3 |
| C- | Network policy | Network policy9.9.3.52 | O | TV | 1 |
| 6C | T3447 value | GPRS timer 39.9.3.16B | O | TLV | 3 |
| 7A | Extended emergency number list | Extended emergency number list9.9.3.37A | O | TLV-E | 7-65538 |
| 7C | Ciphering key data | Ciphering key data9.9.3.56 | O | TLV-E | 35-2291 |
| 66 | UE radio capability ID | UE radio capability ID9.9.3.60 | O | TLV | 3-n |
| B- | UE radio capability ID deletion indication | UE radio capability ID deletion indication9.9.3.61 | O | TV | 1 |
| 35 | Negotiated WUS assistance information | WUS assistance information9.9.3.62 | O | TLV | 3-n |
| 36 | Negotiated DRX parameter in NB-S1 mode | NB-S1 DRX parameter9.9.3.63 | O | TLV | 3 |
| 38 | Negotiated IMSI offset | IMSI offset9.9.3.64 | O | TLV | 4 |
| XZ | Additional request result | Additional request result9.9.3.Y | O | TLV | 3 |

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

#### 8.2.26.X Additional request result

The network may include this IE to inform the UE about the result of additional request.

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

#### 8.2.34.1 Message definition

This message is sent by the network in response to the SERVICE REQUEST message, the EXTENDED SERVICE REQUEST message or the CONTROL PLANE SERVICE REQUEST message. See table 8.2.34.1.

Message type: SERVICE ACCEPT

Significance: dual

Direction: network to UE

Table 8.2.34.1: SERVICE ACCEPT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | Protocol discriminator | Protocol discriminator9.2 | M | V | 1/2 |
|  | Security header type | Security header type9.3.1 | M | V | 1/2 |
|  | Service accept message identity | Message type9.8 | M | V | 1 |
| 57 | EPS bearer context status | EPS bearer context status9.9.2.1 | O | TLV | 4 |
| 6B | T3448 value | GPRS timer 29.9.3.16A | O | TLV | 3 |
| XZ | Additional request result | Additional request result9.9.3.Y | O | TLV | 3 |

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

#### 8.2.34.Z Additional request result

The network may include this IE to inform the UE about the result of additional request.

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

#### 9.9.3.Y Additional request result

The purpose of the Additional request result information element is to inform the UE about the result of additional request.

The Additional request result information element is coded as shown in figure 9.9.3.Y.1 and table 9.9.3.Y.1.

The Additional request result is a type 4 information element with a length of 3 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Additional request result IEI | octet 1 |
| Length of Additional request result contents | octet 2 |
| 0 Spare | 0 Spare | 0 Spare | 0 Spare | 0 Spare | 0 Spare | PRD | octet 3 |

Figure 9.9.3.Y.1: Additional request result information element

Table 9.9.3.Y.1: Additional request result information element

|  |
| --- |
| Paging restriction decision (PRD) (bits 2 to 1 of octet 3) |
| Bits |
| 2 | 1 |  |
| 0 | 0 | no additional information |
| 0 | 1 | paging restriction is accepted |
| 1 | 0 | paging restriction is rejected |
|  |
| All other values are reserved. |
| Bits 3 to 8 of octet 3 are spare and shall be coded as zero. |

\*\*\*\*\* End of changes \*\*\*\*\*