**3GPP TSG-CT WG1 Meeting #134-eC1-221380**

**E-Meeting, 17th – 25th February 2022 (was C1-220353)**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **24.301** | **CR** | **3667** | **rev** | **1** | **Current version:** | **17.5.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:*** | The handling of paging cause support indicator in EPS | | | | | | | | | |
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| ***Source to WG:*** | vivo | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | MUSIM | | | | |  | ***Date:*** | | | 2022-02-05 |
|  |  | | | |  | |  | | |  |
| ***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)* | |
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| ***Reason for change:*** | | SA2 has agreed how the UE distinguishes the paging from a network that does not support paging cause feature and paging which is not triggered by voice service is defined by RAN2. However the UE AS layer is not able to distinguish the above two cases.  This paper tries to resolve an issue which the UE AS layer can not distinguish between the paging from a network that does not support the paging cause feature and the paging which is not triggered by voice service when the RAN is shared.  RAN2 has introduced paging with service indication, including voice and non-voice services, by extending the paging message.  There exists a RAN sharing scenario where two CNs have different deployments for paging cause feature as following:  • CN1 supports paging cause feature;  • CN2 does not support paging cause feature;  The RAN supports paging cause feature so that it can provide the paging cause support indicator for the UE of the CN1. The paging information is broadcasted per BS which means the pagingRecordList-v17xy field is present in the paging message as long as one CN supports the paging cause feature. The CN2 does not support paging cause feature. So the pagingCause field is not present but pagingRecordList-v17xy is present in the paging message.  The above case may cause an issue that the UE AS of CN2 can not distinguish between the paging from a network that does not support the paging cause feature and the paging for non-voice service.  In order to resolve the above issue, the paging cause support indicator from the network shall be allowed to indicate to lower layers. | | | | | | | | |
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| ***Summary of change:*** | | The interaction on paging cause indicator between the AS layer and the NAS layer is specified. | | | | | | | | |
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| ***Consequences if not approved:*** | | The Multi-USIM UE can not distinguish the paging from a network that does not support the paging cause feature and paging related to non-voice service. | | | | | | | | |
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| ***Clauses affected:*** | | 5.5.1.2.4, 5.5.3.2.4 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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

##### 5.5.1.2.4 Attach accepted by the network

During an attach for emergency bearer services, if not restricted by local regulations, the MME shall not check for mobility and access restrictions, regional restrictions, subscription restrictions, or perform CSG access control when processing the ATTACH REQUEST message. The network shall not apply subscribed APN based congestion control during an attach procedure for emergency bearer services.

During an attach for access to RLOS, the MME shall not check for access restrictions, regional restrictions and subscription restrictions when processing the ATTACH REQUEST message.

If the attach request is accepted by the network, the MME shall send an ATTACH ACCEPT message to the UE and start timer T3450.

If the attach request included the PDN CONNECTIVITY REQUEST message in the ESM message container information element to request PDN connectivity, the MME when accepting the attach request shall:

- send the ATTACH ACCEPT message together with an ESM DUMMY MESSAGE contained in the ESM message container information element and discard the ESM message container information element included in the attach request if:

- the UE indicated support of EMM-REGISTERED without PDN connection in the UE network capability IE of the ATTACH REQUEST message;

- the MME supports EMM-REGISTERED without PDN connection and PDN connection is restricted according to the user's subscription data;

- the attach type is not set to "EPS emergency attach" or "EPS RLOS attach"; and

- the request type of the UE requested PDN connection is not set to "handover of emergency bearer services", "emergency" or "RLOS";

- otherwise, send the ATTACH ACCEPT message together with an ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message contained in the ESM message container information element to activate the default bearer (see clause 6.4.1). In WB-S1 mode, the network may also initiate the activation of dedicated bearers towards the UE by invoking the dedicated EPS bearer context activation procedure (see clause 6.4.2). In NB-S1 mode the network shall not initiate the activation of dedicated bearers.

If EMM-REGISTERED without PDN connection is supported by the UE and the MME, and the UE included an ESM DUMMY MESSAGE in the ESM message container information element of the ATTACH REQUEST message, the MME shall send the ATTACH ACCEPT message together with an ESM DUMMY MESSAGE contained in the ESM message container information element.

If the attach request is accepted by the network, the MME shall delete the stored UE radio capability information or the UE radio capability ID, if any.

In NB-S1 mode, if the attach 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 ATTACH ACCEPT message to indicate that support of emergency bearer services in NB-S1 mode is not available.

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

NOTE 1: 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 2: 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].

If the UE specific DRX parameter was included in the DRX Parameter IE in the ATTACH REQUEST message, the MME 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 ATTACH REQUEST message, the MME shall provide to the UE the Negotiated DRX parameter in NB-S1 mode IE in the ATTACH 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 3: In NB-S1 mode, if a DRX parameter was included in the Negotiated DRX parameter in NB-S1 mode IE in the ATTACH 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 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 ATTACH ACCEPT message, then the UE uses the cell specific DRX value in NB-S1 mode (see 3GPP TS 36.304 [21]).

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 attach request for EPS services and "SMS only", the MME shall indicate "SMS only" in the Additional update result IE and shall set the EPS attach result IE to "EPS only" in the ATTACH ACCEPT message.

The MME shall include the extended DRX parameters IE in the ATTACH ACCEPT message only if the extended DRX parameters IE was included in the ATTACH 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 ATTACH 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]).

The MME shall assign and include the TAI list the UE is registered to in the ATTACH 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. The UE, upon receiving an ATTACH ACCEPT message, shall delete its old TAI list and store the received TAI list.

NOTE 5: When assigning the TAI list, the MME can take into account the eNodeB's capability of support of CIoT EPS optimization.

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

The MME shall include the T3324 value IE in the ATTACH ACCEPT message only if the T3324 value IE was included in the ATTACH 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 T3412 extended value IE in the ATTACH 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 ATTACH ACCEPT message.

NOTE 6: Besides the value requested by the UE, the MME can take local configuration or subscription data provided by the HSS into account when selecting a value for T3412 (3GPP TS 23.401 [10] clause 4.3.17.3).

If the UE indicates support for EMM-REGISTERED without PDN connection in the ATTACH REQUEST message and the MME supports EMM-REGISTERED without PDN connection, the MME shall indicate support for EMM-REGISTERED without PDN connection in the EPS network feature support IE of the ATTACH 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 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 attach request, the MME shall indicate "control plane CIoT EPS optimization supported" in the EPS network feature support IE.

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 7: 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 ATTACH ACCEPT message.

If the UE indicates support for restriction on use of enhanced coverage in the ATTACH 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 ATTACH ACCEPT message.

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 ATTACH ACCEPT message.

If the UE indicates support for dual connectivity with NR in the ATTACH 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 ATTACH ACCEPT message.

If the UE indicates support for N1 mode in the ATTACH 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 ATTACH ACCEPT message.

If the UE requests ciphering keys for ciphered broadcast assistance data in the ATTACH 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 ATTACH ACCEPT message.

If the UE indicates support of the NAS signalling connection release in the ATTACH REQUEST message and the network decides to accept the NAS signalling connection release, then the MME shall set the NAS signalling connection release bit to "NAS signalling connection release supported" in the EPS network feature support IE of the ATTACH ACCEPT message.

If the UE indicates support of the paging indication for voice services in the ATTACH REQUEST message and the network decides to accept the paging indication for voice services, then the MME shall set the paging indication for voice services bit to "paging indication for voice services supported" in the EPS network feature support IE of the ATTACH ACCEPT message.

NOTE 8: If the MME includes the EPS network feature support IE in the ATTACH ACCEPT message with paging cause bit set to "paging cause supported", the UE shall indicate the paging cause support indicator to the lower layers. If the MME includes the EPS network feature support IE in the ATTACH ACCEPT message with paging cause bit set to "paging cause not supported", the UE shall indicate to the lower layers to erase any paging cause support indicator, if available.

If the UE indicates support of the reject paging request in the ATTACH REQUEST message and the network decides to accept the reject paging request, then the MME shall set the reject paging request bit to "reject paging request supported" in the EPS network feature support IE of the ATTACH ACCEPT message.

If the UE indicates support of the paging restriction in the ATTACH REQUEST message, and the MME sets:

- the reject paging request bit to "reject paging request supported";

- the NAS signalling connection release bit to "NAS signalling connection release supported"; or

- both of them;

in the EPS network feature support IE of the ATTACH ACCEPT message, and the network decides to accept the paging restriction, then the MME shall set the paging restriction bit to "paging restriction supported" in the EPS network feature support IE of the ATTACH ACCEPT message.

If the UE indicates support of the paging timing collision control in the ATTACH REQUEST message and the network decides to accept the paging timing collision control, then the MME shall set the paging timing collision control bit to "paging timing collision control supported" in the EPS network feature support IE of the ATTACH ACCEPT message.

If the MUSIM capable UE has included a Requested IMSI offset IE in the ATTACH REQUEST message and if the MME supports paging timing collision control, the MME shall include the Negotiated IMSI offset IE in the ATTACH 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 ATTACH REQUEST message, the MME shall erase any stored alternative IMSI for that UE, if available.

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 ATTACH ACCEPT message.

The MME may include the T3447 value IE set to the service gap time value in the ATTACH ACCEPT message if:

- the UE has indicated support for service gap control; and

- a service gap time value is available in the EMM context.

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 ATTACH 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 ATTACH ACCEPT message.

Upon receiving the ATTACH ACCEPT message, the UE shall stop timer T3410.

The GUTI reallocation may be part of the attach procedure. When the ATTACH REQUEST message includes the IMSI or IMEI, or the MME considers the GUTI provided by the UE is invalid, or the GUTI provided by the UE was assigned by another MME, the MME shall allocate a new GUTI to the UE. The MME shall include in the ATTACH ACCEPT message the new assigned GUTI together with the assigned TAI list. In this case the MME shall enter state EMM-COMMON-PROCEDURE-INITIATED as described in clause 5.4.1.

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 ATTACH ACCEPT message contains a GUTI, the UE shall use this GUTI as the new temporary identity. The UE shall delete its old GUTI and store the new assigned GUTI. If no GUTI has been included by the MME in the ATTACH ACCEPT message, the old GUTI, if any available, shall be kept.

If A/Gb mode or Iu mode is supported in the UE, the UE shall set its TIN to "GUTI" when receiving the ATTACH ACCEPT message.

If the ATTACH ACCEPT message contains the T3412 extended value IE, then the UE shall use the value in T3412 extended value IE as periodic tracking area update timer (T3412). If the ATTACH ACCEPT message does not contain T3412 extended value IE, then the UE shall use the value in T3412 value IE as periodic tracking area update timer (T3412).

If the ATTACH ACCEPT message contains the T3324 value IE, then the UE shall use the included timer value for T3324 as specified in 3GPP TS 24.008 [13], clause 4.7.2.8.

If the ATTACH 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 the ATTACH ACCEPT message contains Negotiated IMSI offset IE, the MUSIM capable UE shall forward the IMSI offset value to lower layers. If the ATTACH ACCEPT message does not contain Negotiated IMSI offset IE, 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 ATTACH 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 the attach procedure is neither for emergency bearer services nor for access to RLOS, 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". 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 ATTACH ACCEPT message. If the ATTACH ACCEPT message does not contain a list, then the UE shall delete the stored list.

If the attach procedure is neither for emergency bearer services nor 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 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. 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 ATTACH 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 9: 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 ATTACH 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 ATTACH ACCEPT message, the UE shall set the network policy 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 attach procedure due to manual CSG selection and receives an ATTACH ACCEPT message; and the UE sent the ATTACH REQUEST message in a CSG cell, the UE shall check if the CSG ID and associated PLMN identity of the cell 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.

When the UE receives the ATTACH ACCEPT message combined with the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, and if the UE has requested PDN connectivity the UE shall forward the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to the ESM sublayer. Upon receipt of an indication from the ESM sublayer that the default EPS bearer context has been activated, the UE shall send an ATTACH COMPLETE message together with an ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT message contained in the ESM message container information element to the network.

Additionally, the UE shall reset the attach attempt counter, enter state EMM-REGISTERED, and set the EPS update status to EU1 UPDATED.

If EMM-REGISTERED without PDN connection is supported by the UE and the MME, and the UE receives the ATTACH ACCEPT message combined with an ESM DUMMY MESSAGE, the UE shall send an ATTACH COMPLETE message together with an ESM DUMMY MESSAGE contained in the ESM message container information element to the network.

If the UE receives the ATTACH 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.

When the UE receives any ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST messages during the attach procedure, and if the UE has requested PDN connectivity the UE shall forward the ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST message(s) to the ESM sublayer. The UE shall send a response to the ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST message(s) after successful completion of the attach procedure.

If the attach procedure was initiated in S101 mode, the lower layers are informed about the successful completion of the procedure.

Upon receiving an ATTACH COMPLETE message, the MME shall stop timer T3450, enter state EMM-REGISTERED and consider the GUTI sent in the ATTACH ACCEPT message as valid.

If the T3448 value IE is present in the received ATTACH 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 ATTACH 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 has indicated "service gap control supported" in the ATTACH REQUEST message and:

- the ATTACH 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 ATTACH 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.

In WB-S1 mode, if the UE has set the RACS bit to "RACS supported" in the UE network capability IE of the ATTACH REQUEST message, the MME may include a UE radio capability ID IE or a UE radio capability ID deletion indication IE in the ATTACH ACCEPT message.

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

- a UE radio capability ID deletion indication IE set to "Network-assigned UE radio capability IDs deletion requested", the UE shall delete any network-assigned UE radio capability IDs associated with the registered PLMN stored at the UE, then the UE shall, after the completion of the ongoing attach procedure, initiate a tracking area updating procedure as specified in clause 5.5.3 over the existing NAS signalling connection; and

- a UE radio capability ID IE, the UE shall store the UE radio capability ID as specified in annex C.

\* \* \* Next 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. If the MME includes the GUTI IE or the Negotiated IMSI offset IE in the TRACKING AREA UPDATE ACCEPT message, the MME shall start timer T3450 and enter state EMM-COMMON-PROCEDURE-INITIATED as described in clause 5.4.1. If the MME does not include the Negotiated IMSI offset IE in the TRACKING AREA UPDATE ACCEPT message and the MME has stored alternative IMSI for the UE, 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 clause 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 indicates support of the NAS signalling connection release in the TRACKING AREA UPDATE REQUEST message and the network decides to accept the NAS signalling connection release, then the MME shall set the NAS signalling connection release bit to "NAS signalling connection release supported" in the EPS network feature support IE of the TRACKING AREA UPDATE ACCEPT message.

If the UE indicates support of the paging indication for voice services in the TRACKING AREA UPDATE REQUEST message and the network decides to accept the paging indication for voice services, then the MME shall set the paging indication for voice services bit to "paging indication for voice services supported" in the EPS network feature support IE of the TRACKING AREA UPDATE ACCEPT message.

NOTE 7: If the MME includes the EPS network feature support IE in the ATTACH ACCEPT message with paging cause bit set to "paging cause supported", the UE shall indicate the paging cause support indicator to the lower layers. If the MME includes the EPS network feature support IE in the ATTACH ACCEPT message with paging cause bit set to "paging cause not supported", the UE shall indicate to the lower layers to erase any paging cause support indicator, if available.

If the UE indicates support of the reject paging request in the TRACKING AREA UPDATE REQUEST message and the network decides to accept the reject paging request, then the MME shall set the reject paging request bit to "reject paging request supported" in the EPS network feature support IE of the TRACKING AREA UPDATE ACCEPT message.

If the UE indicates support of the paging restriction in the TRACKING AREA UPDATE REQUEST message, and the MME sets:

- the reject paging request bit to "reject paging request supported";

- the NAS signalling connection release bit to "NAS signalling connection release supported"; or

- both of them;

in the EPS network feature support IE of the TRACKING AREA UPDATE ACCEPT message, and the network decides to accept the paging restriction, then the MME shall set the paging restriction bit to "paging restriction supported" in the EPS network feature support IE of the TRACKING AREA UPDATE ACCEPT message.

If the UE indicates support of the paging timing collision control in the TRACKING AREA UPDATE REQUEST message and the network decides to accept the paging timing collision control, then the MME shall set the paging timing collision control bit to "paging timing collision control 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 restrictions 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 with the EPS update type IE not indicating "periodic updating" and if the MME supports paging timing collision control, the MME shall include the Negotiated IMSI offset IE and assign a new GUTI 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 with the EPS update type IE not indicating "periodic updating" and the MME has stored an alternative IMSI for that UE, the MME shall erase the alternative IMSI and assign a new GUTI in the TRACKING AREA UPDATE ACCEPT message.

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 EPS 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 restrictions 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 EPS 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 and the EPS update type IE included in the TRACKING AREA UPDATE REQUEST message does not indicate "periodic updating", 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 8: 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 has a negotiated IMSI offset value stored at the lower layers and the TRACKING AREA UPDATE ACCEPT message does not contain the Negotiated IMSI offset IE, the UE shall return a TRACKING AREA UPDATE COMPLETE message to the MME, and the MME shall erase the stored alternative IMSI for the UE upon receiving the TRACKING AREA UPDATE COMPLETE message.

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, the Negotiated IMSI offset, or both, if sent in the TRACKING AREA UPDATE ACCEPT message, shall be considered as valid.

NOTE 9: 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 10: 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 11: 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.

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