**3GPP TSG-CT WG1 Meeting #127-eC1-207049**

**Electronic meeting, 13-20 November 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **24.301** | **CR** | **3467** | **rev** | **1** | **Current version:** | **17.0.0** |  |
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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:***  | Clarification on the EHPLMN list |
|  |  |
| ***Source to WG:*** | ZTE |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5GProtoc17 |  | ***Date:*** | 2020-11-18 |
|  |  |  |  |  |
| ***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 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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)* |
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| ***Reason for change:*** | The following statement exists in both 24.501 and 24.301, e.g., in 24.501 sc 4.5.2 and 24.301 sc D.1:*“in their HPLMN (if the EHPLMN list is not present or is empty) or EHPLMN (if the EHPLMN list is present)”*It proposes to add "(if the EHPLMN list is present)" wherever EHPLMN exists for three resons:1. To stress that only when the EHPLMN list is present, EHPLMN is applied. Otherwise if the EHPLMN list is not present or is empty, HPLMN is applied.
2. To make it clear that EHPLMN is the term referring to the term defined in 23.122, not the abbreviation of “a PLMN equivalent to the HPLMN”.
3. To keep consistency throughout the spec.
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| ***Summary of change:*** | Add "(if the EHPLMN list is present)" whenever EHPLMN exists. |
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| ***Consequences if not approved:*** | Inaccurate and non-consistent spec.EHPLMN may be misinterpreted as the abbreviation of “a PLMN equivalent to the HPLMN”. |
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| ***Clauses affected:*** | 5.3.7b, 5.3.11, 6.3.6, 6.3.10, 6.5.1.4.3, 6.5.3.4.3, 6.5.4.4.3 |
|  |  |
|  | **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 \* \* \* \*

### 5.3.7b Specific requirements for UE when receiving non-integrity protected reject messages

This subclause specifies the requirements for a UE that is not configured to use timer T3245 (see 3GPP TS 24.368 [15A] or 3GPP TS 31.102 [17]) and receives an ATTACH REJECT, TRACKING AREA UPDATE REJECT or SERVICE REJECT message without integrity protection with specific EMM causes.

NOTE 1: Additional UE requirements for this case, requirements for other EMM causes, and requirements for the case when the UE receives an integrity protected reject message are specified in subclauses 5.5.1, 5.5.3 and 5.6.1.

The UE may maintain a list of PLMN-specific attempt counters and a list of PLMN-specific PS-attempt counters (see 3GPP TS 24.008 [13]). The maximum number of possible entries in each list is implementation dependent.

Additionally, the UE may maintain one counter for "SIM/USIM considered invalid for non-GPRS services" events and one counter for "SIM/USIM considered invalid for GPRS services" events (see 3GPP TS 24.008 [13]).

If the UE receives an ATTACH REJECT, TRACKING AREA UPDATE REJECT or SERVICE REJECT message without integrity protection with EMM cause value #3, #6, #7, #8, #11, #12, #13, #14, #15, #31 or #35 before the network has established secure exchange of NAS messages for the NAS signalling connection, the UE shall start timer T3247 (see 3GPP TS 24.008 [13]) with a random value uniformly drawn from the range between 30 minutes and 60 minutes, if the timer is not running, and take the following actions:

1) if the EMM cause value received is #3, #6, #7 or #8, and

a) if the UE maintains a counter for "SIM/USIM considered invalid for GPRS services" events and the counter has a value less than a UE implementation-specific maximum value, the UE shall:

i) set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and eKSI;

- delete the list of equivalent PLMNs;

- increment the counter for "SIM/USIM considered invalid for GPRS services" events;

- if the EMM cause value received is #3, #6 or #8, and if the UE maintains a counter for "SIM/USIM considered invalid for non-GPRS services" and the counter has a value less than a UE implementation-specific maximum value, increment the counter;

- if an attach or tracking area updating procedure was performed, reset the attach attempt counter or the tracking area updating attempt counter, respectively;

- if A/Gb mode or Iu mode is supported by the UE, handle the GMM parameters GPRS attach attempt counter or routing area updating attempt counter, GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number as specified in 3GPP TS 24.008 [13] for the case when the GPRS attach or routing area updating procedure is rejected with the GMM cause of the same value in a NAS message without integrity protection;

- If the UE is operating in single-registration mode, the UE shall in addition handle the 5GMM parameters 5GMM state, 5GS update status, 5G-GUTI, TAI list, ngKSI as specified in 3GPP TS 24.501 [54] for the case when the registration request procedure performed over 3GPP access is rejected with the 5GMM cause with the same value in a NAS message without integrity protection.

- store the current TAI in the list of "forbidden tracking areas for roaming", memorize the current TAI was stored in the list of "forbidden tracking areas for roaming" for non-integrity protected NAS reject message and enter the state EMM-DEREGISTERED.LIMITED-SERVICE; and

- search for a suitable cell in another tracking area or in another location area according to 3GPP TS 36.304 [21]; or

ii) proceed as specified in subclauses 5.5.1, 5.5.3 and 5.6.1;

- increment the counter for "SIM/USIM considered invalid for GPRS services" events; and

- if the EMM cause value received is #3, #6 or #8, and if the UE maintains a counter for "SIM/USIM considered invalid for non-GPRS services" and the counter has a value less than a UE implementation specific maximum value, increment the counter; and

b) else the UE shall proceed as specified in subclauses  5.5.1, 5.5.3 and 5.6.1;

2) if the EMM cause value received is #12, #13 or #15, the UE shall additionally proceed as specified in subclauses 5.5.1, 5.5.3 and 5.6.1;

3) if the EMM cause value received is #11, #14 or #35 and the UE is in its HPLMN or EHPLMN (if the EHPLMN list is present),

- the UE shall set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3) and shall delete any GUTI, last visited registered TAI, TAI list and eKSI. The UE shall delete the list of equivalent PLMNs. Additionally, if an attach or tracking area updating procedure was performed, the UE shall reset the attach attempt counter or the tracking area updating attempt counter, respectively.

- if A/Gb mode or Iu mode is supported by the UE, the UE shall in addition handle the GMM parameters GMM state, GPRS update status, P-TMSI, P-TMSI signature, RAI, GPRS ciphering key sequence number and GPRS attach attempt counter or routing area updating attempt counter as specified in 3GPP TS 24.008 [13] for the case when the procedure is rejected with the GMM cause with the same value in a NAS message without integrity protection;

- If the UE is operating in single-registration mode, the UE shall in addition handle the 5GMM parameters 5GMM state, 5GS update status, 5G-GUTI, TAI list, ngKSI as specified in 3GPP TS 24.501 [54] for the case when the registration request procedure performed over 3GPP access is rejected with the 5GMM cause with the same value in a NAS message without integrity protection.

- the UE shall store the current TAI in the list of "forbidden tracking areas for roaming", memorize the current TAI was stored in the list of "forbidden tracking areas for roaming" for non-integrity protected NAS reject message and enter the state EMM-DEREGISTERED.LIMITED-SERVICE; and

- the UE shall search for a suitable cell in another tracking area or in another location area in the same PLMN according to 3GPP TS 36.304 [21];

4) if the EMM cause value received is #11 or #35 and the UE is not in its HPLMN or EHPLMN (if the EHPLMN list is present), in addition to the UE requirements specified in subclause 5.5.1, 5.5.3 and 5.6.1,

 if the UE maintains a list of PLMN-specific attempt counters and the PLMN-specific attempt counter for the PLMN sending the reject message has a value less than a UE implementation-specific maximum value, the UE shall increment the PLMN-specific attempt counter for the PLMN; and

5) if the EMM cause value received is #14 and the UE is not roaming in its HPLMN or EHPLMN (if the EHPLMN list is present), in addition to the UE requirements specified in subclause5.5.1, 5.5.3 and 5.6.1,

 if the UE maintains a list of PLMN-specific PS-attempt counter and the PLMN-specific PS-attempt counter of the PLMN sending the reject message has a value less than a UE implementation-specific maximum value, the UE shall increment the PS-attempt counter of the PLMN.

6) if the EMM cause value received is #31 for a UE that has indicated support for CIoT optimizations, the UE may discard the message or alternatively the UE should:

- set the EPS update status to EU3 ROAMING NOT ALLOWED (and shall store it according to subclause 5.1.3.3);

- store the current TAI in the list of "forbidden tracking areas for roaming", memorize the current TAI was stored in the list of "forbidden tracking areas for roaming" for non-integrity protected NAS reject message; and

- search for a suitable cell in another tracking area according to 3GPP TS 36.304 [21].

Upon expiry of timer T3247, the UE shall

- remove all tracking areas from the list of "forbidden tracking areas for regional provision of service" and the list of "forbidden tracking areas for roaming", which were stored in these lists for non-integrity protected NAS reject message;

- set the USIM to valid for EPS services, if

- the UE does not maintain a counter for "SIM/USIM considered invalid for GPRS services" events; or

- the UE maintains a counter for "SIM/USIM considered invalid for GPRS services" events and this counter has a value less than a UE implementation-specific maximum value;

- set the USIM to valid for non-EPS services, if

- the UE does not maintain a counter for "SIM/USIM considered invalid for non-GPRS services" events; or

- the UE maintains a counter for "SIM/USIM considered invalid for non-GPRS services" events and this counter has a value less than a UE implementation-specific maximum value;

- if the UE maintains a list of PLMN-specific attempt counters, for each PLMN-specific attempt counter that has a value greater than zero and less than a UE implementation-specific maximum value, remove the respective PLMN from the forbidden PLMN list;

- if the UE maintains a list of PLMN-specific PS-attempt counters, for each PLMN-specific PS-attempt counter that has a value greater than zero and less than a UE implementation-specifc maximum value, remove the respective PLMN from the "forbidden PLMNs for GPRS service" list. If the resulting "forbidden PLMNs for GPRS service" list is empty, the UE shall re-enable the E-UTRA capability (see subclause 4.5);

- if the UE is supporting A/Gb mode or Iu mode, handle the list of "forbidden location areas for regional provision of service" and the list of "forbidden location areas for roaming" as specified in 3GPP TS 24.008 [13] for the case when timer T3247 expires;

- if the UE is supporting A/Gb mode or Iu mode and maintains a list of "forbidden location areas for non-GPRS services" and a list of "forbidden location areas for GPRS services", handle these lists as specified in 3GPP TS 24.008 [13] for the case when timer T3247 expires; and

- initiate an EPS attach procedure or tracking area updating procedure, if still needed, dependent on EMM state and EPS update status, or perform PLMN selection according to 3GPP TS 23.122 [6].

If the UE maintains a list of PLMN-specific attempt counters and PLMN-specific PS-attempt counters, when the UE is switched off, the UE shall, for each PLMN-specific attempt counter that has a value greater than zero and less than the UE implementation-specific maximum value, remove the respective PLMN from the forbidden PLMN list. When the USIM is removed, the UE should perform this action.

The PLMN-specific attempt counter and the PLMN-specific PS-attempt counter shall be reset when the UICC containing the USIM is removed or the PLMN is added to a list of "forbidden PLMNs" in the USIM as specified in 3GPP TS 23.122 [6].

NOTE 2: If the respective PLMN was stored in the extension of the "forbidden PLMNs" list, then according to 3GPP TS 23.122 [6] the UE will delete the contents of this extension when the USIM is removed.

\* \* \* Next Change \* \* \* \*

### 5.3.11 Power saving mode

The UE can request the use of power saving mode (PSM) during an attach or tracking area updating procedure (see 3GPP TS 23.682 [11A] and 3GPP TS 23.401 [10]). The UE shall not request the use of PSM during:

- an attach for emergency bearer services procedure;

- an attach procedure for initiating a PDN connection for emergency bearer services with attach type not set to "EPS emergency attach";

- a tracking area updating procedure for initiating a PDN connection for emergency bearer services;

- a tracking area updating procedure when the UE has a PDN connection established for emergency bearer services; or

- an attach for access to RLOS.

The network accepts the use of PSM by providing a specific value for timer T3324 when accepting the attach or tracking area updating procedure. The UE may use PSM only if the network has provided the T3324 value IE during the last attach or tracking area updating procedure with a value different from "deactivated".

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

Upon expiry of the timer T3324 or if the T3324 value provided by the network is zero, the UE may deactivate the AS layer and activate PSM by entering the state EMM-REGISTERED.NO-CELL-AVAILABLE if:

a) the UE is not attached for emergency bearer services;

b) the UE has no PDN connection for emergency bearer services;

c) the UE is in EMM-IDLE mode;

d) in the EMM-REGISTERED.NORMAL-SERVICE state; and

e) the UE is not attached for access to RLOS.

If conditions a, b, c and e are fulfilled, but the UE is in a state other than EMM-REGISTERED.NORMAL-SERVICE when timer T3324 expires, the UE may activate PSM when the MS returns to state EMM-REGISTERED.NORMAL-SERVICE.

A UE that has already been allocated timer T3324 with a value different from "deactivated" and the timer T3324 has expired, may activate PSM if it receives an "Extended wait time" from lower layers.

When PSM is activated all NAS timers are stopped and associated procedures aborted except for T3412, T3346, T3396, T3447, any backoff timers, and the timer T controlling the periodic search for HPLMN or EHPLMN (if the EHPLMN list is present) or higher prioritized PLMNs (see 3GPP TS 23.122 [6]).

If the UE is attached for emergency bearer services or has a PDN connection for emergency bearer services, the UE shall not activate PSM.

If the UE is attached for access to RLOS, the UE shall not activate PSM.

The UE may deactivate PSM and activate the AS layer at any time. Upon deactivating PSM, the UE may initiate EMM procedures (e.g. for the transfer of mobile originated signalling or user data).

\* \* \* Next Change \* \* \* \*

### 6.3.6 Handling of network rejection not due to APN based congestion control

The network may include a back-off timer value in an EPS session management reject message to regulate the time interval at which the UE may retry the same procedure. For ESM cause values other than #26 "insufficient resources", the network may also include the re-attempt indicator to indicate whether the UE is allowed to re-attempt the corresponding session management procedure for the same APN in A/Gb or Iu mode or N1 mode after inter-system change.

NOTE 1: If the network includes this back-off timer value, then the UE is blocked from sending another ESM request for the same procedure for the same PLMN and APN combination for the specified duration. Therefore, the operator needs to exercise caution in determining the use of this timer value.

NOTE 2: If the re-attempt indicator is not provided by the network, a UE registered in its HPLMN or in an EHPLMN (if the EHPLMN list is present) can use the configured SM\_RetryAtRATChange value specified in the NAS configuration MO or in the USIM NASCONFIG file to derive the re-attempt indicator as specified in subclauses 6.5.1.4.3, 6.5.3.4.3, and 6.5.4.4.3.

If re-attempt in A/Gb or Iu mode or N1 mode is allowed, the UE shall consider the back-off timer to be applicable only to the EPS session management in S1 mode for the rejected EPS session management procedure and the given PLMN and APN combination. If re-attempt in A/Gb and Iu mode and N1 mode is not allowed, the UE shall consider the back-off timer to be applicable to all three NAS protocols, i.e. applicable to the EPS session management in S1 mode for the rejected EPS session management procedure, to the GPRS session management in A/Gb and Iu mode for the corresponding session management procedure and the given PLMN and APN combination and to the 5GS session management in N1 mode for the corresponding session management procedure and the given PLMN and APN combination.

NOTE 3: In the present subclause the terms APN and DNN are referring to the same parameter.

The APN of the PLMN and APN combination associated with the back-off timer is the APN provided by the UE when the PDN connection is established. If no APN is included in the PDN CONNECTIVITY REQUEST or, when applicable, in the ESM INFORMATION RESPONSE message, then the back-off timer is associated with the combination of the PLMN and no APN. For this purpose the UE shall memorize the APN provided to the network during the PDN connection establishment. The back-off timer associated with the combination of a PLMN with no APN will never be started due to any ESM procedure related to an emergency PDN connection. If the back-off timer associated with the combination of a PLMN with no APN is running, it does not affect the ability of the UE to request an emergency PDN connection.

The network may additionally indicate in the re-attempt indicator that a command to back-off is applicable not only for the PLMN in which the UE received the EPS session management reject message, but for each PLMN included in the equivalent PLMN list at the time when the EPS session management reject message was received.

If the back-off timer is running or is deactivated for a given PLMN and APN combination, and the UE is a UE configured to use AC11 – 15 in selected PLMN, then the UE is allowed to initiate an attach procedure or any EPS session management procedure for this PLMN and APN combination.

\* \* \* Next Change \* \* \* \*

### 6.3.10 Handling of 3GPP PS data off

A UE, which supports 3GPP PS data off (see 3GPP TS 23.401 [10]), can be configured with up to two lists of 3GPP PS data off exempt services as specified in 3GPP TS 24.368 [15A] or in the EF3GPPPSDATAOFF USIM file as specified in 3GPP TS 31.102 [17]:

- a list of 3GPP PS data off exempt services to be used in the HPLMN or EHPLMN (if the EHPLMN list is present); and

- a list of 3GPP PS data off exempt services to be used in the VPLMN.

If only the list of 3GPP PS data off exempt services to be used in the HPLMN or EHPLMN (if the EHPLMN list is present) is configured at the UE, this list shall be also used in the VPLMN.

If the UE supports 3GPP PS data off, the UE shall provide the 3GPP PS data off UE status in the protocol configuration options IE during attach, UE-requested PDN connectivity, and UE-requested bearer resource modification procedure (see subclause 5.5.1, 6.5.1, and 6.5.4).

NOTE 1: The sending of the 3GPP PS data off UE status to the network happens also when the user activates or deactivates 3GPP PS data off while connected via WLAN access only, and then handover to 3GPP access occur.

The network informs the UE about the support of 3GPP PS data off during the activation of the default bearer of a PDN connection (see subclause 6.4.1). If 3GPP PS data off support is not indicated in the protocol configuration options IE in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message, the UE shall not indicate any change of 3GPP PS data off UE status for the PDN connection established by the default EPS bearer context activation procedure; otherwise the UE shall indicate change of the 3GPP PS data off UE status for the PDN connection by using the UE-requested bearer resource modification procedure as specified in subclause 6.5.4. If the network does not provide indication of support of 3GPP PS data off during default EPS bearer context activation procedure of the PDN connection, the UE behaviour for non-exempt service requests from the network is implementation dependent.

When the 3GPP PS data off UE status is "activated":

a) the UE does not send uplink IP packets except:

- for those services indicated in the list of 3GPP PS data off exempt services to be used in the HPLMN or EHPLMN (if the EHPLMN list is present) as specified in 3GPP TS 24.368 [15A] when the UE is in its HPLMN or EHPLMN (if the EHPLMN list is present);

- for those services indicated in the list of 3GPP PS data off exempt services to be used in the HPLMN or EHPLMN (if the EHPLMN list is present) when the UE is in the VPLMN, if only the list of 3GPP PS data off exempt services to be used in the HPLMN or EHPLMN (if the EHPLMN list is present) is configured to the UE as specified in 3GPP TS 24.368 [15A];

- for those services indicated in the list of 3GPP PS data off exempt services to be used in the VPLMN when the UE is in the VPLMN, if the list of 3GPP PS data off exempt services to be used in the VPLMN is configured to the UE as specified in 3GPP TS 24.368 [15A];

- for those services indicated in the EF3GPPPSDATAOFF USIM file as specified in 3GPP TS 31.102 [17];

- any uplink traffic due to procedures specified in 3GPP TS 24.229 [13D]; and

- any uplink traffic due to procedures specified in 3GPP TS 24.623 [50]; and

b) the UE does not send uplink non-IP or Ethernet user data packets.

Otherwise the UE sends uplink user data packets without restriction.

NOTE 2: If the UE supports 3GPP PS data off, uplink IP packets are filtered as specified in 3GPP TS 24.229 [13D] in L.3.1.5.

\* \* \* Next Change \* \* \* \*

##### 6.5.1.4.3 Handling of network rejection due to ESM cause other than ESM cause #26

If the ESM cause value is different from #26 "insufficient resources", #50 "PDN type IPv4 only allowed", #51 "PDN type IPv6 only allowed", #54 "PDN connection does not exist", #57 "PDN type IPv4v6 only allowed", #58 "PDN type non IP only allowed", #61 "PDN type Ethernet only allowed", #65 "maximum number of EPS bearers reached", and #66 "requested APN not supported in current RAT and PLMN combination", and the Back-off timer value IE is included, the UE shall behave as follows:

1) if the PDN CONNECTIVITY REQUEST message was sent standalone, the UE shall take different actions depending on the timer value received in the Back-off timer value IE (if the UE is a UE configured to use AC11 – 15 in selected PLMN, exceptions are specified in subclause 6.3.6):

i) if the timer value indicates neither zero nor deactivated, the UE shall start the back-off timer with the value provided in the Back-off timer value IE for the PDN connectivity procedure and PLMN and APN combination and

- shall not send another PDN CONNECTIVITY REQUEST message in the PLMN for the same APN that was sent by the UE, until the back-off timer expires, the UE is switched off or the USIM is removed; and

- shall not send another PDN CONNECTIVITY REQUEST message in the PLMN without an APN and with request type different from "emergency" and from "handover of emergency bearer services" if no APN was included in the PDN CONNECTIVITY REQUEST message, until the back-off timer expires, the UE is switched off or the USIM is removed;

ii) if the timer value indicates that this timer is deactivated, the UE:

- shall not send another PDN CONNECTIVITY REQUEST message in the PLMN for the same APN until the UE is switched off or the USIM is removed; and

- shall not send another PDN CONNECTIVITY REQUEST message in the PLMN without an APN and with request type different from "emergency" and from "handover of emergency bearer services" if no APN was included in the PDN CONNECTIVITY REQUEST message, until the UE is switched off or the USIM is removed; and

iii) if the timer value indicates zero, the UE:

- may send another PDN CONNECTIVITY REQUEST message in the PLMN for the same APN; and

- may send another PDN CONNECTIVITY REQUEST message in the PLMN without an APN; and

2) if the PDN CONNECTIVITY REQUEST message was sent together with an ATTACH REQUEST, the UE shall take different actions depending on the timer value received in the Back-off timer value IE and on the integrity protection of the ATTACH REJECT message (if the UE is a UE configured to use AC11 – 15 in selected PLMN, exceptions are specified in subclause 6.3.6):

i) if the ATTACH REJECT message is not integrity protected, the UE shall start the back-off timer with a random value from a default range specified in table 11.2.3(see 3GPP TS 24.008 [13]), and:

a) shall not initiate a new attach procedure or send another PDN CONNECTIVITY REQUEST message in the PLMN with the same APN that was sent by the UE, until the back-off timer expires, the UE is switched off or the USIM is removed; and

b) shall not initiate a new attach procedure or send another PDN CONNECTIVITY REQUEST message in the PLMN without an APN and with request type different from "emergency" and from "handover of emergency bearer services", if the UE did not provide any APN during the attach procedure and the request type was different from "emergency", until the back-off timer expires, the UE is switched off or the USIM is removed; and

ii) if the ATTACH REJECT message is integrity protected, the UE shall proceed as follows:

a) if the timer value indicates neither zero nor deactivated, the UE shall start the back-off timer with the value provided in the Back-off timer value IE for the PDN connectivity procedure and PLMN and APN combination and:

- shall not initiate a new attach procedure or send another PDN CONNECTIVITY REQUEST message in the PLMN with the same APN that was sent by the UE, until the back-off timer expires, the UE is switched off or the USIM is removed; and

- shall not initiate a new attach procedure or send another PDN CONNECTIVITY REQUEST message in the PLMN without an APN and with request type different from "emergency" and from "handover of emergency bearer services", if the UE did not provide any APN during the attach procedure and the request type was different from "emergency" and from "handover of emergency bearer services", until the back-off timer expires, the UE is switched off or the USIM is removed;

b) if the timer value indicates that this timer is deactivated, the UE:

- shall not initiate a new attach procedure or send another PDN CONNECTIVITY REQUEST message in the PLMN with the same APN that was sent by the UE, until the UE is switched off or the USIM is removed; and

- shall not initiate a new attach procedure or send another PDN CONNECTIVITY REQUEST message in the PLMN without an APN and with request type different from "emergency" and from "handover of emergency bearer services", if the UE did not provide any APN during the attach procedure and the request type was different from "emergency" and from "handover of emergency bearer services", until the UE is switched off or the USIM is removed; and

c) if the timer value indicates that this timer is zero, the UE shall proceed as specified in subclause 5.5.1.2.6 item d.

If the Back-off timer value IE is not included and the PDN CONNECTIVITY REQUEST was sent standalone, then the UE shall ignore the Re-attempt indicator IE provided by the network in PDN CONNECTIVITY REJECT, if any.

1) Additionally, if the ESM cause value is #8 "operator determined barring", #27 "missing or unknown APN", #32 "service option not supported", or #33 "requested service option not subscribed", the UE shall proceed as follows:

- if the UE is registered in the HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), the UE shall behave as described above in the present subclause, using the configured SM\_RetryWaitTime value as specified in 3GPP TS 24.368 [15A] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [17], if available, as back-off timer value; and

- otherwise, if the UE is not registered in its HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), or if the SM\_RetryWaitTime value is not configured, the UE shall behave as described above in the present subclause, using the default value of 12 minutes for the back-off timer.

2) For ESM cause values different from #8 "operator determined barring", #27 "missing or unknown APN", #32 "service option not supported", or #33 "requested service option not subscribed", the UE behaviour regarding the start of a back-off timer is unspecified.

The UE shall not stop any back-off timer upon a PLMN change or inter-system change. If the network indicates that a back-off timer for the PDN connectivity procedure and PLMN and APN combination is deactivated, then it remains deactivated upon a PLMN change or inter-system change.

NOTE 1: This means the back-off timer can still be running or be deactivated for the given ESM procedure and PLMN and APN combination when the UE returns to the PLMN or when it performs inter-system change back from A/Gb or Iu mode or N1 mode to S1 mode. Thus the UE can still be prevented from sending another PDN CONNECTIVITY REQUEST message in the PLMN for the same APN.

If the Back-off timer value IE is not included and the PDN CONNECTIVITY REQUEST was sent together with an ATTACH REQUEST, the UE shall ignore the Re-attempt indicator IE provided by the network in PDN CONNECTIVITY REJECT, if any, and proceed as specified in subclause 5.5.1.2.6, item d.

If the back-off timer is started upon receipt of a PDN CONNECTIVITY REJECT (i.e. the timer value was provided by the network, a configured value is available or the default value is used as explained above) or the back-off timer is deactivated, the UE behaves as follows:

1) after a PLMN change the UE may send a PDN CONNECTIVITY REQUEST message for the same APN in the new PLMN, if the back-off timer is not running and is not deactivated for the PDN connectivity procedure and the combination of new PLMN and APN;

 Furthermore as an implementation option, for the ESM cause values #8 "operator determined barring", #27 "missing or unknown APN", #32 "service option not supported" or #33 "requested service option not subscribed", if the network does not include a Re-attempt indicator IE, the UE may decide not to automatically send another PDN CONNECTIVITY REQUEST message for the same APN that was sent by the UE using the same PDN type, or the UE may decide not to automatically send another PDN CONNECTIVITY REQUEST message included in an ATTACH REQUEST message without an APN using the same PDN type if the UE did not provide any APN in the PDN connectivity procedure, if the UE is registered to a new PLMN which is in the list of equivalent PLMNs.

2) if the network does not include the Re-attempt indicator IE to indicate whether re-attempt in A/Gb or Iu mode or N1 mode is allowed, or the UE ignores the Re-attempt indicator IE, e.g. because the Back-off timer value IE is not included, then:

- if the UE is registered in its HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), the UE shall apply the configured SM\_RetryAtRATChange value as specified in 3GPP TS 24.368 [15A] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [17], if available, to determine whether the UE may attempt a PDP context activation procedure for the same PLMN and APN combination in A/Gb or Iu mode or a PDU session establishment procedure for the same PLMN and APN combination in N1 mode; and

- if the UE is not registered in its HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), or if the NAS configuration MO as specified in 3GPP TS 24.368 [15A] is not available and the value for inter-system change is not configured in the USIM file NASCONFIG, then the UE behaviour regarding a PDP context activation procedure for the same PLMN and APN combination in A/Gb or Iu mode and a PDU session establishment procedure for the same PLMN and APN combination in N1 mode are unspecified; and

3) if the network includes the Re-attempt indicator IE indicating that re-attempt in an equivalent PLMN is not allowed, then depending on the timer value received in the Back-off timer value IE, for each combination of a PLMN from the equivalent PLMN list and the APN the UE shall start a back-off timer for the PDN connectivity procedure with the value provided by the network, or deactivate the respective back-off timer as follows:

- if the Re-attempt indicator IE additionally indicates that re-attempt in A/Gb or Iu mode or N1 mode is allowed, the UE shall start or deactivate the back-off timer for S1 mode only; and

- otherwise the UE shall start or deactivate the back-off timer for A/Gb, Iu, S1 and N1 mode.

If the back-off timer for a PLMN and APN combination was started or deactivated in A/Gb or Iu mode upon receipt of an ACTIVATE PDP CONTEXT REJECT message (see 3GPP TS 24.008 [13]) and the network indicated that re-attempt in S1 mode is allowed, then this back-off timer does not prevent the UE from sending a PDN CONNECTIVITY REQUEST message in this PLMN for the same APN after inter-system change to S1 mode. If the network indicated that re-attempt in S1 mode is not allowed, the UE shall not send any PDN CONNECTIVITY REQUEST message in this PLMN for the same APN after inter-system change to S1 mode until the timer expires, the UE is switched off or the USIM is removed.

If a back-off timer for a PLMN and APN combination, in combination with any S-NSSAI or without S-NSSAI (see 3GPP TS 24.501 [54]) was started or deactivated in N1 mode upon receipt of a PDU SESSION ESTABLISHMENT REJECT message (see 3GPP TS 24.501 [54]) and the network indicated that re-attempt in S1 mode is allowed, then this back-off timer does not prevent the UE from sending a PDN CONNECTIVITY REQUEST message in this PLMN for the same APN after inter-system change to S1 mode. If the network indicated that re-attempt in S1 mode is not allowed, the UE shall not send any PDN CONNECTIVITY REQUEST message in this PLMN for the same APN after inter-system change to S1 mode until the timer expires, the UE is switched off or the USIM is removed. If more than one back-off timers for the same PLMN and APN combination was started in N1 mode with an indication from the network that re-attempt in S1 mode is not allowed and no back-off timer for the same PLMN and APN combination was deactivated in N1 mode, the UE shall not send any PDN CONNECTIVITY REQUEST message in this PLMN for the same APN after inter-system change to S1 mode until all timers have expired. If at least one back-off timer for the same PLMN and APN combination was deactivated in N1 mode, the UE shall not send any PDN CONNECTIVITY REQUEST message in this PLMN for the same APN until the UE is switched off or the USIM is removed.

NOTE 2: The back-off timer is used to describe a logical model of the required UE behaviour. This model does not imply any specific implementation, e.g. as a timer or timestamp.

NOTE 3: Reference to back-off timer in this section can either refer to use of timer T3396 or to use of a different packet system specific timer within the UE. Whether the UE uses T3396 as a back-off timer or it uses different packet system specific timers as back-off timers is left up to UE implementation. This back-off timer is stopped when the UE is switched off or the USIM is removed.

When the back-off timer is running or the timer is deactivated, the UE is allowed to initiate an attach procedure or PDN connectivity procedure if the procedure is for emergency bearer services.

If the ESM cause value is #50 "PDN type IPv4 only allowed", #51 "PDN type IPv6 only allowed", #57 "PDN type IPv4v6 only allowed", #58 "PDN type non IP only allowed" or #61 "PDN type Ethernet only allowed", the UE shall ignore the Back-off timer value IE provided by the network, if any. The UE shall not automatically send another PDN CONNECTIVITY REQUEST message for the same APN that was sent by the UE using the same PDN type until any of the following conditions is fulfilled:

- the UE is registered to a new PLMN, and either the network did not include a Re-attempt indicator IE in the PDN CONNECTIVITY REJECT message or the Re-attempt indicator IE included in the message indicated that re-attempt in an equivalent PLMN is allowed;

- the UE is registered to a new PLMN which was not in the list of equivalent PLMNs at the time when the PDN CONNECTIVITY REJECT message was received;

- the PDN type which is used to access to the APN is changed;

- the UE is switched off; or

- the USIM is removed.

For the ESM cause values #50 "PDN type IPv4 only allowed", #51 "PDN type IPv6 only allowed", #57 "PDN type IPv4v6 only allowed", #58 "PDN type non IP only allowed" and #61 "PDN type Ethernet only allowed", the UE shall ignore the value of the RATC bit in the Re-attempt indicator IE provided by the network, if any.

NOTE 4: For the ESM cause values #50 "PDN type IPv4 only allowed", #51 "PDN type IPv6 only allowed", #57 "PDN type IPv4v6 only allowed", #58 "PDN type non IP only allowed" and #61 "PDN type Ethernet only allowed", re-attempt in A/Gb, Iu, or N1 mode for the same APN (or no APN, if no APN was indicated by the UE) using the same PDN type is not allowed.

Furthermore as an implementation option, for the SM cause values #50 "PDN type IPv4 only allowed", #51 "PDN type IPv6 only allowed", #57 "PDN type IPv4v6 only allowed", #58 "PDN type non IP only allowed" and #61 "PDN type Ethernet only allowed", if the network does not include a Re-attempt indicator IE the UE may decide not to automatically send another PDN CONNECTIVITY REQUEST message for the same APN that was sent by the UE using the same PDN type, if the UE is registered to a new PLMN which is in the list of equivalent PLMNs.

NOTE 5: Request to send another PDN CONNECTIVITY REQUEST message with a specific PDN type has to come from upper layers.

If the ESM cause value is #65 "maximum number of EPS bearers reached", the UE shall determine the PLMN's maximum number of EPS bearer contexts in S1 mode (see subclause 6.5.0) as the number of active EPS bearer contexts it has. The UE shall ignore the Back-off timer value IE and Re-attempt indicator IE provided by the network, if any.

NOTE 6: In some situations, when attempting to establish multiple EPS bearer contexts, the number of active EPS bearer contexts that the UE has when ESM cause #65 is received is not equal to the maximum number of EPS bearer contexts reached in the network.

NOTE 7: When the network supports emergency bearer services, it is not expected that ESM cause #65 is returned by the network when the UE requests a PDN connection for emergency bearer services.

The PLMN's maximum number of EPS bearer contexts in S1 mode applies to the PLMN in which the ESM cause #65 "maximum number of EPS bearers reached" is received. When the UE is switched off, when the USIM is removed, or when there is a change in the value indicated by the network in the 15 bearers bit of the EPS network feature support IE, the UE shall clear all previous determinations representing PLMNs maximum number of EPS bearer contexts in S1 mode. Upon successful registration with a new PLMN, the UE may clear previous determinations representing any PLMN's maximum number(s) of EPS bearer contexts in S1 mode.

If the ESM cause value is #66 "requested APN not supported in current RAT and PLMN combination", the UE shall take different actions depending on the Back-off timer value IE and the Re-attempt indicator IE optionally included:

1) If the PDN CONNECTIVITY REQUEST message was sent standalone, the Back-off timer value IE is not included, and either the Re-attempt indicator IE is not included or the Re-attempt indicator IE is included indicating that re-attempt in an equivalent PLMN is allowed, the UE shall not send another PDN CONNECTIVITY REQUEST message for the same APN in the current PLMN in S1 mode until the UE is switched off or the USIM is removed;

2) if the PDN CONNECTIVITY REQUEST message was sent standalone, the Back-off timer value IE is not included, and the Re-attempt indicator IE is included and indicates that re-attempt in an equivalent PLMN is not allowed, the UE shall not send a PDN CONNECTIVITY REQUEST message for the same APN in any PLMN in the list of equivalent PLMNs in S1 mode until the UE is switched off or the USIM is removed;

3) if the PDN CONNECTIVITY REQUEST message was sent standalone and the Back-off timer value IE is included, the UE shall take different actions depending on the timer value received in the Back-off timer value IE (if the UE is a UE configured to use AC11 – 15 in selected PLMN, exceptions are specified in subclause 6.3.6):

i) if the timer value indicates neither zero nor deactivated, the UE shall start the back-off timer with the value provided in the Back-off timer value IE for the PLMN and APN combination and shall not send another PDN CONNECTIVITY REQUEST for the same APN in the current PLMN in S1 mode until the back-off timer expires, the UE is switched off or the USIM is removed;

ii) if the timer value indicates that this timer is deactivated, the UE shall not send another PDN CONNECTIVITY REQUEST message for the same APN in the current PLMN in S1 mode until the UE is switched off or the USIM is removed; and

iii) if the timer value indicates that this timer is zero, the UE may send a PDN CONNECTIVITY REQUEST message for the same APN in the current PLMN; and

4) if the PDN CONNECTIVITY REQUEST message was sent together with an ATTACH REQUEST, the UE shall take different actions depending on the integrity protection of the ATTACH REJECT message (if the UE is a UE configured to use AC11 – 15 in selected PLMN, exceptions are specified in subclause 6.3.6):

i) if the ATTACH REJECT message is not integrity protected, regardless whether the Back-off timer IE is included, the UE shall start the back-off timer with a random value from a default range specified in table 11.2.3(see 3GPP TS 24.008 [13]), and shall not initiate a new attach procedure or send another PDN CONNECTIVITY REQUEST message in the current PLMN in S1 mode with the same APN that was sent by the UE, until the back-off timer expires, the UE is switched off or the USIM is removed; and

ii) if the ATTACH REJECT message is integrity protected, the UE shall proceed as follows:

a) if the Back-off timer value IE is included and the timer value indicates neither zero nor deactivated, the UE shall start the back-off timer with the value provided in the Back-off timer value IE for the PDN connectivity procedure and PLMN and APN combination and shall not initiate a new attach procedure or send another PDN CONNECTIVITY REQUEST message in the current PLMN in S1 mode with the same APN that was sent by the UE, until the back-off timer expires, the UE is switched off or the USIM is removed;

b) if the Back-off timer value IE is included and the timer value indicates that this timer is deactivated, the UE shall not initiate a new attach procedure or send another PDN CONNECTIVITY REQUEST message in the current PLMN in S1 mode with the same APN that was sent by the UE, until the UE is switched off or the USIM is removed;

c) if the Back-off timer value IE is included and the timer value indicates that this timer is zero, the UE shall proceed as specified in subclause 5.5.1.2.6 item d;

d) if the Back-off timer value IE is not included, and either the Re-attempt indicator IE is not included or the Re-attempt indicator IE is included indicating that re-attempt in an equivalent PLMN is allowed, the UE shall not initiate a new attach procedure or send another PDN CONNECTIVITY REQUEST message for the same APN in the current PLMN in S1 mode until the UE is switched off or the USIM is removed; and

e) if the Back-off timer value IE is not included, and the Re-attempt indicator IE is included and indicates that re-attempt in an equivalent PLMN is not allowed, the UE shall not initiate a new attach procedure or send a PDN CONNECTIVITY REQUEST message for the same APN in any PLMN in the list of equivalent PLMNs in S1 mode until the UE is switched off or the USIM is removed.

NOTE 8: Receiving ESM cause value #66 during an attach procedure without APN is not expected and the UE behaviour is implementation specific.

If the network includes the Re-attempt indicator IE indicating that re-attempt in an equivalent PLMN is not allowed, then

- for cases 3.i, 4.i and 4.ii.a the UE shall additionally start a back-off timer with the value provided in the Back-off timer value IE for the PDN connectivity procedure for each combination of a PLMN from the equivalent PLMN list and the APN; and

- for cases 3.ii and 4.ii.b the UE shall deactivate the respective back-off timers for the PDN connectivity procedure for each combination of a PLMN from the equivalent PLMN list and the APN.

For the ESM cause value #66 "requested APN not supported in current RAT and PLMN combination" the UE shall ignore the value of the RATC bit in the Re-attempt indicator IE provided by the network, if any.

As an implementation option, for cases 1, 3.i, 3.ii, 4.iv, 4.v.a and 4.v.b, if the Re-attempt indicator IE is not included, the UE may decide not to automatically send another PDN CONNECTIVITY REQUEST message for the same APN in a PLMN which is in the list of equivalent PLMNs.

If the ESM cause value is #54 "PDN connection does not exist", the UE shall ignore the Back-off timer value IE and Re-attempt indicator IE provided by the network, if any, and take different actions as follows:

- if the PDN CONNECTIVITY REQUEST message was sent standalone, the UE shall set the request type to "initial request" in the subsequent PDN CONNECTIVITY REQUEST message to establish a PDN connectivity to the same APN;

- if the PDN CONNECTIVITY REQUEST message was sent together with an ATTACH REQUEST message, the UE shall set the request type to "initial request" in the PDN CONNECTIVITY REQUEST message which is included in the subsequent ATTACH REQUEST message to establish a PDN connectivity to the same APN.

NOTE 9: User interaction is necessary in some cases when the UE cannot re-activate the EPS bearer context(s) automatically.

\* \* \* Next Change \* \* \* \*

##### 6.5.3.4.3 Handling of network rejection due to ESM cause other than ESM cause #26

If the ESM cause value is different from #26 "insufficient resources" and #65 "maximum number of EPS bearers reached", and the Back-off timer value IE is included, the UE shall behave as follows depending on the timer value received in the Back-off timer value IE (if the UE is a UE configured to use AC11 – 15 in selected PLMN, exceptions are specified in subclause 6.3.6):

- if the timer value indicates neither zero nor deactivated, the UE shall start the back-off timer with the value provided in the Back-off timer value IE for the bearer resource allocation procedure and PLMN and APN combination and not send another BEARER RESOURCE ALLOCATION REQUEST message in the PLMN for the same APN until the back-off timer expires, the UE is switched off or the USIM is removed;

- if the timer value indicates that this timer is deactivated, the UE shall not send another BEARER RESOURCE ALLOCATION REQUEST message in the PLMN for the same APN until the UE is switched off or the USIM is removed; and

- if the timer value indicates zero, the UE may send another BEARER RESOURCE ALLOCATION REQUEST message in the PLMN for the same APN.

If the Back-off timer value IE is not included, then the UE shall ignore the Re-attempt Indicator IE provided by the network, if any.

1) Additionally, if the ESM cause value is #32 "service option not supported", or #33 "requested service option not subscribed", the UE shall proceed as follows:

- if the UE is registered in the HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), the UE shall behave as described above in the present subclause, using the configured SM\_RetryWaitTime value as specified in 3GPP TS 24.368 [15A] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [17], if available, as back-off timer value; and

- otherwise, if the UE is not registered in its HPLMN or a PLMN that is within the EHPLMN list (if the EHPLMN list is present) or the SM\_RetryWaitTime value is not configured, the UE shall behave as described above in the present subclause, using the default value of 12 minutes for the back-off timer.

2) For ESM cause values different from #32 "service option not supported", or #33 "requested service option not subscribed", the UE behaviour regarding the start of a back-off timer is unspecified.

The UE shall not stop any back-off timer upon a PLMN change or inter-system change. If the network indicates that a back-off timer for the bearer resource allocation procedure and PLMN and APN combination is deactivated, then it remains deactivated upon a PLMN change or inter-system change.

NOTE 1: This means the back-off timer can still be running or be deactivated for the given ESM procedure and PLMN and APN combination when the UE returns to the PLMN or when it performs inter-system change back from A/Gb or Iu mode or N1 mode to S1 mode. Thus the UE can still be prevented from sending another BEARER RESOURCE ALLOCATION REQUEST message in the PLMN for the same APN.

If the back-off timer is started upon receipt of BEARER RESOURCE ALLOCATION REJECT (i.e. the timer value was provided by the network, a configured value is available or the default value is used as explained above) or the back-off timer is deactivated, the UE behaves as follows:

1) after a PLMN change the UE may send a BEARER RESOURCE ALLOCATION REQUEST message for the same APN in the new PLMN, if the back-off timer is not running and is not deactivated for the bearer resource allocation procedure and the combination of new PLMN and APN;

 Furthermore as an implementation option, for the ESM cause values #32 "service option not supported" or #33 "requested service option not subscribed", if the network does not include a Re-attempt indicator IE, the UE may decide not to automatically send another BEARER RESOURCE ALLOCATION REQUEST message for the same APN that was sent by the UE, if the UE is registered to a new PLMN which is in the list of equivalent PLMNs.

2) if the network does not include the Re-attempt indicator IE to indicate whether re-attempt in A/Gb or Iu mode or N1 mode is allowed, or the UE ignores the Re-attempt indicator IE, e.g. because the Back-off timer value IE is not included, then:

- if the UE is registered in its HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), the UE shall apply the configured SM\_RetryAtRATChange value as specified in 3GPP TS 24.368 [15A] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [17], if available, to determine whether the UE may attempt a secondary PDP context activation procedure for the same PLMN and APN combination in A/Gb or Iu mode or a PDU session modification procedure for the same PLMN and APN combination in N1 mode; and

- if the UE is not registered in its HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), or if the NAS configuration MO as specified in 3GPP TS 24.368 [15A] is not available and the value for inter-system change is not configured in the USIM file NASCONFIG, then the UE behaviour regarding a secondary PDP context activation procedure for the same PLMN and APN combination in A/Gb or Iu mode and a PDU session modification procedure for the same PLMN and APN combination in N1 mode are unspecified; and

3) if the network includes the Re-attempt indicator IE indicating that re-attempt in an equivalent PLMN is not allowed, then depending on the timer value received in the Back-off timer value IE, for each combination of a PLMN from the equivalent PLMN list and the APN the UE shall start a back-off timer for the bearer resource allocation procedure with the value provided by the network, or deactivate the respective back-off timer as follows:

- if the Re-attempt indicator IE additionally indicates that re-attempt in A/Gb or Iu mode or N1 mode is allowed, the UE shall start or deactivate the back-off timer for S1 mode only; and

- otherwise the UE shall start or deactivate the back-off timer for A/Gb, Iu, S1 and N1 mode.

If the back-off timer for a PLMN and APN combination was started or deactivated in A/Gb or Iu mode upon receipt of an ACTIVATE SECONDARY PDP CONTEXT REJECT message (see 3GPP TS 24.008 [13]) and the network indicated that re-attempt in S1 mode is allowed, then this back-off timer does not prevent the UE from sending a BEARER RESOURCE ALLOCATION REQUEST message in this PLMN for the same APN after inter-system change to S1 mode. If the network indicated that re-attempt in S1 mode is not allowed, the UE shall not send any BEARER RESOURCE ALLOCATION REQUEST message in this PLMN for the same APN after inter-system change to S1 mode until the timer expires, the UE is switched off or the USIM is removed.

If a back-off timer for a PLMN and APN combination, in combination with any S-NSSAI or without S-NSSAI (see 3GPP TS 24.501 [54]) was started or deactivated in N1 mode upon receipt of a PDU SESSION MODIFICATION REJECT message (see 3GPP TS 24.501 [54]) and the network indicated that re-attempt in S1 mode is allowed, then this back-off timer does not prevent the UE from sending a BEARER RESOURCE ALLOCATION REQUEST message in this PLMN for the same APN after inter-system change to S1 mode. If the network indicated that re-attempt in S1 mode is not allowed, the UE shall not send any BEARER RESOURCE ALLOCATION REQUEST message in this PLMN for the same APN after inter-system change to S1 mode until the timer expires, the UE is switched off or the USIM is removed. If more than one back-off timer for the same PLMN and APN combination was started in N1 mode with an indication from the network that re-attempt in S1 mode is not allowed and no back-off timer for the same PLMN and APN combination was deactivated in N1 mode, the UE shall not send any BEARER RESOURCE ALLOCATION REQUEST message in this PLMN for the same APN after inter-system change to S1 mode until all timers have expired. If at least one back-off timer for the same PLMN and APN combination was deactivated in N1 mode, the UE shall not send any BEARER RESOURCE ALLOCATION REQUEST message in this PLMN for the same APN until the UE is switched off or the USIM is removed.

NOTE 2: The back-off timer is used to describe a logical model of the required UE behaviour. This model does not imply any specific implementation, e.g. as a timer or timestamp.

NOTE 3: Reference to back-off timer in this section can either refer to use of timer T3396 or to use of a different packet system specific timer within the UE. Whether the UE uses T3396 as a back-off timer or it uses different packet system specific timers as back-off timers is left up to UE implementation. This back-off timer is stopped when the UE is switched off or the USIM is removed.

If the ESM cause value is #65 "maximum number of EPS bearers reached", the UE shall determine the PLMN's maximum number of EPS bearer contexts in S1 mode (see subclause 6.5.0) as the number of active EPS bearer contexts it has. The UE shall ignore the Back-off timer value IE and Re-attempt indicator IE provided by the network, if any.

NOTE 5: In some situations, when attempting to establish multiple EPS bearer contexts, the number of active EPS bearer contexts in the UE when cause #65 is received is not equal to the maximum number of EPS bearer contexts reached in the network.

The PLMN's maximum number of EPS bearer contexts in S1 mode applies to the PLMN in which the ESM cause #65 "maximum number of EPS bearers reached" is received. When the UE is switched off or when the USIM is removed, the UE shall clear all previous determinations representing any PLMN's maximum number of EPS bearer contexts in S1 mode. Upon successful registration with a new PLMN, the UE may clear previous determinations representing any PLMN's maximum number of EPS bearer contexts in S1 mode.

The further actions to be performed by the UE are implementation dependent as part of upper layers responsibility.

\* \* \* Next Change \* \* \* \*

##### 6.5.4.4.3 Handling of network rejection due to ESM cause other than ESM cause #26

If the ESM cause value is not #26 "insufficient resources", and the Back-off timer value IE is included, the UE shall behave as follows depending on the timer value received in the Back-off timer value IE (if the UE is a UE configured to use AC11 – 15 in selected PLMN, exceptions are specified in subclause 6.3.6):

- if the timer value indicates neither zero nor deactivated, the UE shall start the back-off timer with the value provided in the Back-off timer value IE for the bearer resource modification procedure and PLMN and APN combination and not send another BEARER RESOURCE MODIFICATION REQUEST message with exception of those identified in subclause 6.5.4.1, in the PLMN for the same APN until the back-off timer expires, the UE is switched off or the USIM is removed;

- if the timer value indicates that this timer is deactivated, the UE shall not send another BEARER RESOURCE MODIFICATION REQUEST message with exception of those identified in subclause 6.5.4.1, in the PLMN for the same APN until the UE is switched off or the USIM is removed; and

- if the timer value indicates zero, the UE may send another BEARER RESOURCE MODIFICATION REQUEST message in the PLMN for the same APN.

If the Back-off timer value IE is not included, then the UE shall ignore the Re-attempt indicator IE provided by the network, if any.

1) Additionally, if the ESM cause value is #32 "service option not supported", or #33 "requested service option not subscribed", the UE shall proceed as follows:

- if the UE is registered in the HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), the UE shall behave as described above in the present subclause, using the configured SM\_RetryWaitTime value as specified in 3GPP TS 24.368 [15A] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [17], if available, as back-off timer value; and

- otherwise, if the UE is not registered in its HPLMN or a PLMN that is within the EHPLMN list (if the EHPLMN list is present) or the SM\_RetryWaitTime value is not configured, the UE shall behave as described above in the present subclause, using the default value of 12 minutes for the back-off timer.

2) For ESM cause values different from #32 "service option not supported", or #33 "requested service option not subscribed", the UE behaviour regarding the start of a back-off timer is unspecified.

The UE shall not stop any back-off timer upon a PLMN change or inter-system change. If the network indicates that a back-off timer for the bearer resource modification procedure and PLMN and APN combination is deactivated, then it remains deactivated upon a PLMN change or inter-system change.

NOTE 1: This means the back-off timer can still be running or be deactivated for the given ESM procedure and PLMN and APN combination when the UE returns to the PLMN or when it performs inter-system change back from A/Gb or Iu mode or N1 mode to S1 mode. Thus the UE can still be prevented from sending another BEARER RESOURCE MODIFICATION REQUEST message with exception of those identified in subclause 6.5.4.1, in the PLMN for the same APN.

If the back-off timer is started upon receipt of BEARER RESOURCE MODIFICATION REJECT (i.e. the timer value was provided by the network, a configured value is available or the default value is used as explained above) or the back-off timer is deactivated, the UE behaves as follows:

1) after a PLMN change the UE may send a BEARER RESOURCE MODIFICATION REQUEST message for the same APN in the new PLMN, if the back-off timer is not running and is not deactivated for the bearer resource modification procedure and the combination of new PLMN and APN;

 Furthermore as an implementation option, for the ESM cause values #32 "service option not supported" or #33 "requested service option not subscribed", if the network does not include a Re-attempt indicator IE, the UE may decide not to automatically send another BEARER RESOURCE MODIFICATION REQUEST message for the same APN that was sent by the UE, if the UE is registered to a new PLMN which is in the list of equivalent PLMNs.

2) if the network does not include the Re-attempt indicator IE to indicate whether re-attempt in A/Gb or Iu mode or N1 mode is allowed, or the UE ignores the Re-attempt indicator IE, e.g. because the Back-off timer value IE is not included, then:

- if the UE is registered in its HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), the UE shall apply the configured SM\_RetryAtRATChange value as specified in 3GPP TS 24.368 [15A] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [17], if available, to determine whether the UE may attempt a PDP context modification procedure for the same PLMN and APN combination in A/Gb or Iu mode or a PDU session modification procedure for the same PLMN and APN combination in N1 mode; and

- if the UE is not registered in its HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), or if the NAS configuration MO as specified in 3GPP TS 24.368 [15A] is not available and the value for inter-system change is not configured in the USIM file NASCONFIG, then the UE behaviour regarding a PDP context modification procedure for the same PLMN and APN combination in A/Gb or Iu mode and a PDU session modification procedure for the same PLMN and APN combination in N1 mode are unspecified; and

3) if the network includes the Re-attempt indicator IE indicating that re-attempt in an equivalent PLMN is not allowed, then depending on the timer value received in the Back-off timer value IE, for each combination of a PLMN from the equivalent PLMN list and the APN the UE shall start a back-off timer for the bearer resource modification procedure with the value provided by the network, or deactivate the respective back-off timer as follows:

- if the Re-attempt indicator IE additionally indicates that re-attempt in A/Gb or Iu mode or N1 mode is allowed, the UE shall start or deactivate the back-off timer for S1 mode only; and

- otherwise the UE shall start or deactivate the back-off timer for A/Gb, Iu, S1 and N1 mode.

If the back-off timer for a PLMN and APN combination was started or deactivated upon receipt of an MODIFY PDP CONTEXT REJECT message (see 3GPP TS 24.008 [13]) and the network indicated that re-attempt in S1 mode is allowed, then this back-off timer does not prevent the UE from sending a BEARER RESOURCE MODIFICATION REQUEST message in this PLMN for the same APN after inter-system change to S1 mode. If the network indicated that re-attempt in S1 mode is not allowed, the UE shall not send any BEARER RESOURCE MODIFICATION REQUEST message in this PLMN for the same APN after inter-system change to S1 mode until the timer expires, the UE is switched off or the USIM is removed.

If a back-off timers for a PLMN and APN combination, in combination with any S-NSSAI or without S-NSSAI (see 3GPP TS 24.501 [54]) was started or deactivated in N1 mode upon receipt of a PDU SESSION MODIFICATION REJECT message (see 3GPP TS 24.501 [54]) and the network indicated that re-attempt in S1 mode is allowed, then this back-off timer does not prevent the UE from sending a BEARER RESOURCE MODIFICATION REQUEST message in this PLMN for the same APN after inter-system change to S1 mode. If the network indicated that re-attempt in S1 mode is not allowed, the UE shall not send any BEARER RESOURCE MODIFICATION REQUEST message in this PLMN for the same APN after inter-system change to S1 mode until the timer expires, the UE is switched off or the USIM is removed. If more than one back-off timer for the same PLMN and APN combination was started in N1 mode with an indication from the network that re-attempt in S1 mode is not allowed and no back-off timer for the same PLMN and APN combination was deactivated in N1 mode, the UE shall not send any BEARER RESOURCE MODIFICATION REQUEST message in this PLMN for the same APN after inter-system change to S1 mode until all timers have expired. If at least one back-off timer for the same PLMN and APN combination was deactivated in N1 mode, the UE shall not send any BEARER RESOURCE MODIFICATION REQUEST message in this PLMN for the same APN until the UE is switched off or the USIM is removed.

NOTE 2: The back-off timer is used to describe a logical model of the required UE behaviour. This model does not imply any specific implementation, e.g. as a timer or timestamp.

NOTE 3: Reference to back-off timer in this section can either refer to use of timer T3396 or to use of a different packet system specific timer within the UE. Whether the UE uses T3396 as a back-off timer or it uses different packet system specific timers as back-off timers is left up to UE implementation. This back-off timer is stopped when the UE is switched off or the USIM is removed.

The further actions to be performed by the UE are implementation dependent as part of upper layers responsibility.

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