**3GPP TSG-CT WG1 Meeting #127-eC1-207050**

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

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **24.008** | **CR** | **3245** | **rev** | **-** | **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 definition of EHPLMN and “PLMN equivalent to HPLMN” |
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| ***Source to WG:*** | ZTE |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5GProtoc17 |  | ***Date:*** | 2020-11-2 |
|  |  |  |  |  |
| ***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:*** | In the last meeting, we discussed and reached a conclusion that “a PLMN equivalent to the HPLMN” is not necessarily an EHPLMN (can see dicussion about C1-205841 in CT1 e-meeting reflector).In TS 23.122, the definition of EHPLMN is:“**EHPLMN:** Any of the PLMN entries contained in the Equivalent HPLMN list.**Equivalent HPLMN list:** To allow provision for multiple HPLMN codes, PLMN codes that are present within this list shall replace the HPLMN code derived from the IMSI for PLMN selection purposes. This list is stored on the USIM and is known as the EHPLMN list. The EHPLMN list may also contain the HPLMN code derived from the IMSI. If the HPLMN code derived from the IMSI is not present in the EHPLMN list then it shall be treated as a Visited PLMN for PLMN selection purposes.”In TS 24.501 clause 5.3.14, it specifies equivalent PLMNs as following:“The UE shall store a list of **equivalent PLMNs**. These PLMNs shall be regarded by the UE as equivalent to each other for PLMN selection and cell selection/re-selection. The same list is used by 5GMM, EMM, GMM and MM (see 3GPP TS 24.301 [15] and 3GPP TS 24.008 [12]) except for the case when the UE operates in dual-registration mode (see subclause 4.8.3).The UE shall update or delete this list at the end of each registration procedure. The stored list consists of a list of equivalent PLMNs as downloaded by the network plus the PLMN code of the registered PLMN that downloaded the list. When the UE is switched off, the UE shall keep the stored list so that it can be used for PLMN selection after switch on. The UE shall delete the stored list if the USIM is removed or when the UE registered for emergency services enters the state 5GMM-DEREGISTERED. The maximum number of possible entries in the stored list is 16.”Based on above, we can conclude that:1. "EHPLMN" is stored in the Equivalent HPLMN list on the USIM;
2. "PLMN equivalent to the HPLMN" is a PLMN received in "Equivalent PLMNs" IE when the UE is registered in the HPLMN;
3. Both "PLMN equivalent to the HPLMN" and EHPLMN are for PLMN seletion purposes.

In TS 24.501, the description “HPLMN, a PLMN equivalent to the HPLMN, or EHPLMN” has already existed, for example in subclause 5.5.1.2.5:“If 5GMM cause #76 is received from:1) a CAG cell, and if the UE receives a "CAG information list" in the CAG information list IE included in the REGISTRATION REJECT message, the UE shall:i) replace the "CAG information list" stored in the UE with the received CAG information list IE when received in the HPLMN, a PLMN equivalent to the HPLMN, or EHPLMN;” |
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| ***Summary of change:*** | It proposes to update the description:HPLMN or EHPLMN 🡪 HPLMN, a PLMN equivalent to the HPLMN, or EHPLMN |
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| ***Consequences if not approved:*** | May lead to wrong UE side behavior when the PLMN is a PLMN equivalent to the HPLMN but not in the Equivalent HPLMN list on the USIM. |
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| ***Clauses affected:*** | 4.1.1.6A, 4.7.1.10, 4.7.2.9, 6.1.3.1.3.3, 6.1.3.2.2.3, 6.1.3.3.3.3, 6.1.3.8.2.3, 6.1.3.13 |
|  |  |
|  | **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 \* \* \* \*

#### 4.1.1.6A Specific requirements for the MS when receiving non-integrity protected reject messages

This subclause specifies the requirements for an MS that is not configured to use timer T3245 (see 3GPP TS 24.368 [135] or 3GPP TS 31.102 [112]) and receives a LOCATION UPDATING REJECT, CM SERVICE REJECT, ABORT, ATTACH REJECT, ROUTING AREA UPDATE REJECT or SERVICE REJECT message without integrity protection with specific MM or GMM causes.

NOTE 1: Additional MS requirements for this case, requirements for other MM or GMM causes, and requirements for the case when the MS receives a successfully integrity checked reject message are specified in subclauses 4.4.4.7, 4.5.1.1, 4.7.3.1.4, 4.7.3.2.4, 4.7.5.1.4, 4.7.5.2.4 and 4.7.13.4.

The present subclause is applicable to A/Gb mode and Iu mode. In A/Gb mode,

- for the CS domain, as integrity protection is not supported, all messages received by the MS are considered to be received "before the network has activated the integrity protection"; and

- for the PS domain, if integrity protection is not required (see subclause 4.7.1.2a.), all messages received by the MS are considered to be received "before the network has activated the integrity protection".

The MS may maintain a list of PLMN-specific attempt counters and a list of PLMN-specific PS-attempt counters. The maximum number of possible entries in each list is implementation dependent.

Additionally, the MS 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.

The MS may also maintain a list of "forbidden location areas for non-GPRS services" and a list of "forbidden location areas for GPRS services". If the MS is in a location area which is included in the list of "forbidden location areas for non-GPRS services", the MS shall not initiate any MM procedure. If the MS is in a location area which is included in the list of "forbidden location areas for GPRS services", the MS shall not initiate any GMM, SM, SMS or SS procedure for GPRS services.

If the MS receives a LOCATION UPDATING REJECT message without integrity protection with MM cause value #2, #3, #6, #11, #12, #13 or #15 before the network has activated the integrity protection for the CS domain, the MS shall start timer T3247 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 MM cause value received is #3 or #6, and

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

i) delete any LAI, TMSI and ciphering key sequence number stored in the SIM/USIM, reset the location update attempt counter, and set the update status to ROAMING NOT ALLOWED (and store it in the SIM/USIM according to subclause 4.1.2.2);

 delete the list of equivalent PLMNs;

 in Iu mode, increment the counter for "SIM/USIM considered invalid for non-GPRS services" events, if not already incremented over the same RRC connection;

 in A/Gb mode, increment the counter for "SIM/USIM considered invalid for non-GPRS services" events;

 store the current LAI in the list of "forbidden location areas for roaming"; and

 search for a suitable cell in another location area or a tracking area according to 3GPP TS 43.022 [82] and 3GPP TS 25.304 [98] or 3GPP TS 36.304 [121]; or

ii) proceed as specified in subclause 4.4.4.7 and;

 in Iu mode, increment the counter for "SIM/USIM considered invalid for non-GPRS services" events, if not already incremented over the same RRC connection;

 in A/Gb mode, increment the counter for "SIM/USIM considered invalid for non-GPRS services" events; and

b) else the MS shall proceed as specified in subclause 4.4.4.7;

2) if the MM cause value received is #2, and

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

i) delete any LAI, TMSI and ciphering key sequence number stored in the SIM/USIM, reset the location update attempt counter, and set the update status to ROAMING NOT ALLOWED (and store it in the SIM/USIM according to subclause 4.1.2.2);

 delete the list of equivalent PLMNs;

 in Iu mode, increment the counter for "SIM/USIM considered invalid for non-GPRS services" events, if not already incremented over the same RRC connection;

 in A/Gb mode, increment the counter for "SIM/USIM considered invalid for non-GPRS services" events;

 if the MS maintains a list of "forbidden location areas for non-GPRS services" and a list of "forbidden location areas for GPRS services", proceed as follows:

 if the current LAI is already included in the list of "forbidden location areas for GPRS services" or the MS is not operating in MS operation mode A or B, store the current LAI in the list of "forbidden location areas for roaming"; otherwise store the current LAI in the list of "forbidden location areas for non-GPRS services"; and

 attempt to select a suitable cell according to 3GPP TS 43.022 [82] and 3GPP TS 25.304 [98] or 3GPP TS 36.304 [121], different from the cell where the LOCATION UPDATING REJECT was received; or

NOTE 2: The cell on which the reject was received could still be a suitable cell.

ii) proceed as specified in subclause 4.4.4.7 and;

 in Iu mode, increment the counter for "SIM/USIM considered invalid for non-GPRS services" events, if not already incremented over the same RRC connection;

 in A/Gb mode, increment the counter for "SIM/USIM considered invalid for non-GPRS services" events; and

b) else the MS shall proceed as specified in subclause 4.4.4.7;

3) if the MM cause value received is #12, #13 or #15, the MS shall additionally proceed as specified in subclause 4.4.4.7;

4) if the MM cause value received is #11 and the MS is in its HPLMN, in a PLMN equivalent to the HPLMN, or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present):

 the MS shall delete any LAI, TMSI and ciphering key sequence number stored in the SIM/USIM, reset the location update attempt counter, and set the update status to ROAMING NOT ALLOWED (and store it in the SIM/USIM according to subclause 4.1.2.2). Additionally, the MS shall store the current LAI in the list of "forbidden location areas for roaming"; and

 the MS shall search for a suitable cell in another location area or a tracking area according to 3GPP TS 43.022 [82] and 3GPP TS 25.304 [98] or 3GPP TS 36.304 [121]; and

5) if the MM cause value received is #11 and if the MS is not in its HPLMN, in a PLMN equivalent to the HPLMN, or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), in addition to the MS requirements specified in subclause 4.4.4.7,

- if the MS 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 an MS implementation-specific maximum value, the MS shall increment the PLMN-specific attempt counter for the PLMN.

If the MS receives a CM SERVICE REJECT or ABORT message with MM cause value #6 without integrity protection before the network has activated the integrity protection for the CS domain, the MS shall start timer T3247 with a random value uniformly drawn from the range between 30 minutes and 60 minutes, if the timer is not running, and

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

i) proceed as specified in subclauses 4.5.1.1 or 4.3.5.2 respectively with the exception that the MS shall not consider the SIM/USIM as invalid for non-GPRS services and;

 delete the list of equivalent PLMNs;

 in Iu mode, increment the counter for "SIM/USIM considered invalid for non-GPRS services" events, if not already incremented over the same RRC connection;

 in A/Gb mode, increment the counter for "SIM/USIM considered invalid for non-GPRS services" events;

 reset the location update attempt counter;

 store the current LAI in the list of "forbidden location areas for roaming"; and

 search for a suitable cell in another location area or a tracking area according to 3GPP TS 43.022 [82] and 3GPP TS 25.304 [98] or 3GPP TS 36.304 [121]; or

ii) proceed as specified in subclauses 4.5.1.1 or 4.3.5.2 respectively and;

 in Iu mode, increment the counter for "SIM/USIM considered invalid for non-GPRS services" events, if not already incremented over the same RRC connection;

 in A/Gb mode, increment the counter for "SIM/USIM considered invalid for non-GPRS services" events; and

b) else the MS shall proceed as specified in subclause 4.5.1.1 or 4.3.5.2 respectively.

If the MS receives an ATTACH REJECT or ROUTING AREA UPDATE REJECT message without integrity protection with GMM cause value #3, #6, #7, #8, #11, #12, #13, #14 or #15 before the network has activated the integrity protection for the PS domain, the MS shall start timer T3247 with a random value uniformly drawn from the range between 30 minutes and 60 minutes, if the timer is not running, and shall take the following actions:

6) if the GMM cause value received is #3, #6, or #8, and

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

i) set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number;

 delete the list of equivalent PLMNs;

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

 if the MS maintains a counter for "SIM/USIM considered invalid for non-GPRS services" events and the counter has a value less than an MS implementation-specific maximum value, set the update status to U3 ROAMING NOT ALLOWED, delete any TMSI, LAI and ciphering key sequence number. If the MS is operating in MS operation mode A and an RR connection exists, the MS shall abort the RR connection, unless an emergency call is ongoing. In Iu mode, the MS shall increment the counter for "SIM/USIM considered invalid for non-GPRS services" events, if not already incremented over the same RRC connection. In A/Gb mode, the MS shall increment the counter for "SIM/USIM considered invalid for non-GPRS services" events;

 if a GPRS attach or routing area updating procedure was performed, reset the GPRS attach attempt counter or the routing area updating attempt counter, respectively;

 if S1 mode is supported by the MS, handle the EMM parameters attach attempt counter or tracking area updating attempt counter, EMM state, EPS update status, GUTI, last visited registered TAI, TAI list and KSI as specified in 3GPP TS 24.301 [120] for the case when an EPS attach or tracking area update procedure is rejected with the EMM cause of the same value in a NAS message without integrity protection;

 store the current LAI in the list of "forbidden location areas for roaming" and enter the state GMM-DEREGISTERED.LIMITED-SERVICE; and

 search for a suitable cell in another location area or a tracking area according to 3GPP TS 43.022 [82] and 3GPP TS 25.304 [98] or 3GPP TS 36.304 [121]; or

ii) proceed as specified in subclauses 4.7.3.1.4, 4.7.3.2.4, 4.7.5.1.4, 4.7.5.2.4 and 4.7.13.4;

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

 if the MS maintains a counter for "SIM/USIM considered invalid for non-GPRS services" events and the counter has a value less than an MS implementation-specific maximum value:

 in Iu mode, increment the counter for "SIM/USIM considered invalid for non-GPRS services" events, if not already incremented over the same RRC connection

 in A/Gb mode, increment the counter for "SIM/USIM considered invalid for non-GPRS services" events; and

b) else the MS shall proceed as specified in subclause 4.7.3.1.4, 4.7.3.2.4, 4.7.5.1.4, 4.7.5.2.4 and 4.7.13.4;

7) if the GMM cause value received is #7, and

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

i) set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number;

 delete the list of equivalent PLMNs;

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

- if a GPRS attach or routing area updating procedure was performed, reset the GPRS attach attempt counter or the routing area updating attempt counter, respectively;

 if S1 mode is supported by the MS, handle the EMM parameters attach attempt counter or tracking area updating attempt counter, EMM state, EPS update status, GUTI, last visited registered TAI, TAI list and KSI as specified in 3GPP TS 24.301 [120] for the case when an EPS attach or tracking area update procedure is rejected with the EMM cause of the same value in a NAS message without integrity protection;

 enter the state GMM-DEREGISTERED.LIMITED-SERVICE;

 if the MS maintains a list of "forbidden location areas for non-GPRS services" and a list of "forbidden location areas for GPRS services", proceed as follows:

 if the current LAI is already included in the list of "forbidden location areas for non-GPRS services" or the MS is operating in MS operation mode C, store the current LAI in the list of "forbidden location areas for roaming"; otherwise store the current LAI in the list of "forbidden location areas for GPRS services"; and

 attempt to select a suitable cell according to 3GPP TS 43.022 [82] and 3GPP TS 25.304 [98] or 3GPP TS 36.304 [121], different from the cell where the ATTACH REJECT or ROUTING AREA UPDATING REJECT was received; or

NOTE 3: The cell on which the reject was received could still be a suitable cell.

ii) proceed as specified in subclauses 4.7.3.1.4, 4.7.3.2.4, 4.7.5.1.4, 4.7.5.2.4 and 4.7.13.4; and

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

b) else the MS shall proceed as specified in subclause 4.7.3.1.4, 4.7.3.2.4, 4.7.5.1.4, 4.7.5.2.4 and 4.7.13.4;

8) if the GMM cause value received is #12, #13 or #15, the MS shall additionally proceed as specified in subclauses 4.7.3.1.4, 4.7.3.2.4, 4.7.5.1.4, 4.7.5.2.4 and 4.7.13.4;

9) if the GMM cause value received is #11 or #14 and the MS is in its HPLMN, in a PLMN equivalent to the HPLMN, or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present):

- the MS shall set the GPRS update status to GU3 ROAMING NOT ALLOWED (and shall store it according to subclause 4.1.3.2) and shall delete any RAI, P-TMSI, P-TMSI signature and GPRS ciphering key sequence number. The MS shall delete the list of equivalent PLMNs. Additionally, if a GPRS attach or the routing area updating procedure was performed, the MS shall reset the GPRS attach attempt counter or the routing area updating attempt counter respectively;

- for GMM cause value #11, the MS shall store the current LAI in the list of "forbidden location areas for roaming", and enter the state GMM-DEREGISTERED.LIMITED-SERVICE;

- for GMM cause value #14, the MS shall enter the state GMM-DEREGISTERED.LIMITED-SERVICE. If the MS maintains a list of "forbidden location areas for non-GPRS services" and a list of "forbidden location areas for GPRS services", proceed as follows:

 if the current LAI is already included in the list of "forbidden location areas for non-GPRS services" or the MS is operating in MS operation mode C, store the current LAI in the list of "forbidden location areas for roaming"; otherwise store the current LAI in the list of "forbidden location areas for GPRS services";

- if S1 mode is supported in the MS, the MS shall handle the EMM parameters EMM state, EPS update status, GUTI, last visited registered TAI, TAI list, KSI and attach attempt counter or tracking area updating attempt counter as specified in 3GPP TS 24.301 [120] for the case when the procedure is rejected with the EMM cause with the same value without integrity protection; and

- the MS shall search for a suitable cell in another location area or in another tracking area according to 3GPP TS 43.022 [82] and 3GPP TS 25.304 [98] or 3GPP TS 36.304 [121].

10) if the GMM cause value received is #11 and the MS is not in its HPLMN, in a PLMN equivalent to the HPLMN, or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), the MS shall additionally proceed as specified in subclauses  4.7.3.1.4, 4.7.3.2.4, 4.7.5.1.4, 4.7.5.2.4 and 4.7.13.4:

- Furthermore, if the MS 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 an MS implementation-specific maximum value, the MS shall increment the PLMN-specific attempt counter for the PLMN.

11) if the GMM cause value received is #14 and the MS is not in its HPLMN, in a PLMN equivalent to the HPLMN, or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), the MS shall additionally proceed as specified in subclauses 4.7.3.1.4, 4.7.3.2.4, 4.7.5.1.4, and 4.7.5.2.4:

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

- If the MS maintains a list of "forbidden location areas for non-GPRS services" and a list of "forbidden location areas for GPRS services", proceed as follows:

 if the current LAI is already included in the list of "forbidden location areas for non-GPRS services" or the MS is operating in MS operation mode C, store the current LAI in the list of "forbidden location areas for roaming"; otherwise store the current LAI in the list of "forbidden location areas for GPRS services" and the MS shall enter the state GMM-DEREGISTERED.LIMITED-SERVICE.

If the MS receives a SERVICE REJECT message without integrity protection with GMM cause value #3, #6, #7, #8, #11, #12, #13 or #15 before the network has activated the integrity protection for the PS domain, the MS shall start timer T3247 with a random value uniformly drawn from the range between 30 minutes and 60 minutes, if the timer is not running, and proceed as specified under items 6, 7, 8, 9 and 10 above.

Upon expiry of timer T3247, the MS shall:

- erase the list of "forbidden location areas for regional provision of service" and the list of "forbidden location areas for roaming";

- set the SIM/USIM to valid for non-GPRS services, if

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

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

- set the SIM/USIM to valid for GPRS services, if

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

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

- erase the list of "forbidden location areas for non-GPRS services" and the list of "forbidden location areas for GPRS services", if the MS maintains these lists;

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

- if the MS 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 an MS implementation-specific 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 and the MS is supporting S1 mode, the MS re-enables the E-UTRA capability as specified in 3GPP TS 24.301 [120] for the case when timer T3247 expires;

- if the MS is supporting S1 mode, handle the list of "forbidden tracking areas for regional provision of service" and the list of "forbidden tracking areas for roaming" as specified in 3GPP TS 24.301 [120] for the case when timer T3247 expires; and

- initiate a location updating procedure, GPRS attach procedure or routing area updating procedure, if still needed, dependent on MM state and update status, and GMM state and GPRS update status, or perform a PLMN selection according to 3GPP TS 23.122 [14].

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

NOTE 4: If the respective PLMN was stored in the extension of the "forbidden PLMNs" list, then according to 3GPP TS 23.122 [14] the MS will delete the contents of this extension when the SIM/USIM is removed.

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

#### 4.7.1.10 Handling of 3GPP PS data off

An MS, which supports 3GPP PS data off (see 3GPP TS 23.060 [74]), can be configured with up to two lists of 3GPP PS data off exempt services as specified in 3GPP TS 24.368 [135] or in the EF3GPPPSDATAOFF USIM file as specified in 3GPP TS 31.102 [112]:

- a list of 3GPP PS data off exempt services to be used in the HPLMN, a PLMN equivalent to 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, a PLMN equivalent to the HPLMN, or EHPLMN (if the EHPLMN list is present) is configured at the MS, this list shall be also used in the VPLMN.

If the MS supports 3GPP PS data off, the MS shall provide the 3GPP PS data off UE status in the protocol configuration options IE during PDP context activation procedure (see subclause 6.1.3.1).

The network informs the MS about the support of 3GPP PS data off during PDP context activation procedure as specified in subclause 6.1.3.1. If 3GPP data off support is not indicated in the protocol configuration options IE in the ACTIVATE PDP CONTEXT ACCEPT message, the MS shall not indicate any change of 3GPP PS data off UE status for the PDN connection established by the PDP context activation procedure; otherwise the MS shall indicate change of the 3GPP PS data off UE status for the PDN connection by using the PDP context modification procedure as specified in subclause 6.1.3.3. If the network does not provide indication of support of 3GPP PS data off during PDP context activation procedure, the MS behaviour for non-exempt service requests from the network is implementation dependent.

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

a) the MS 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, a PLMN equivalent to the HPLMN, or EHPLMN (if the EHPLMN list is present) as specified in 3GPP TS 24.368 [135] when the MS is in its HPLMN, a PLMN equivalent to the 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, a PLMN equivalent to the HPLMN, or EHPLMN (if the EHPLMN list is present) when the MS is in the VPLMN, if only the list of 3GPP PS data off exempt services to be used in the HPLMN, a PLMN equivalent to the HPLMN, or EHPLMN (if the EHPLMN list is present) is configured to the MS as specified in 3GPP TS 24.368 [135];

- for those services indicated in the list of 3GPP PS data off exempt services to be used in the VPLMN when the MS is in the VPLMN, if the list of 3GPP PS data off exempt services to be used in the VPLMN is configured to the MS as specified in 3GPP TS 24.368 [135];

- for those services indicated in the EF3GPPPSDATAOFF USIM file as specified in 3GPP TS 31.102 [112]; and

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

b) the MS does not send uplink non-IP user data packets.

Otherwise the MS sends uplink user data packets without restriction.

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

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

#### 4.7.2.9 Power saving mode

The MS can request the use of power saving mode (PSM) during an attach or routing area updating procedures (see 3GPP TS 23.682 [133A] and 3GPP TS 23.060 [74]). The MS shall not request the use of PSM during:

- an attach for emergency bearer services procedure;

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

- a routing area updating procedure when the MS has a PDN connection established for emergency bearer services.

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

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

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

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

c) the MS is in PMM-IDLE mode (in Iu mode) or the READY timer is not running (in A/Gb mode);

d) the MS is in the GMM-REGISTERED.NORMAL-SERVICE state; and

e) no RR connection exists.

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

If conditions a, b, c and d are fulfilled, but an RR connection exists, the MS may activate PSM when the RR connection has been released.

An MS 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 timers T3312, T3346, T3396, any backoff timers, and the timer T controlling the periodic search for HPLMN, EHPLMN (if the EHPLMN list is present) or higher prioritized PLMNs (see 3GPP TS 23.122 [14]).

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

The MS may deactivate PSM at any time (e.g. for transfer of mobile originated signalling or user data, or to initiate a mobile originated circuit-switched transaction), by activating the AS layer before initiating the necessary GMM or MM procedures (if any).

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

###### 6.1.3.1.3.3 Handling of network rejection due to SM cause other than SM cause #26

If the SM cause value is different from #26 "insufficient resources", #50 "PDP type IPv4 only allowed", #51 "PDP type IPv6 only allowed", #57 "PDP type IPv4v6 only allowed", #58 "PDP type non IP only allowed", #65 "maximum number of PDP contexts reached", and #66 "requested APN not supported in current RAT and PLMN combination", and the Back-off timer value IE is included, the MS shall take different actions depending on the timer value received in the Back-off timer value IE (if the MS is an MS configured to use AC11 – 15 in selected PLMN, exceptions are specified in subclause 6.1.3.13):

i) if the timer value indicates neither zero nor deactivated, the MS shall start the back-off timer with the value provided in the Back-off timer value IE for the PDP context activation procedure and PLMN and APN combination and:

- shall not send another ACTIVATE PDP CONTEXT REQUEST message in the PLMN for the same APN that was sent by the MS, until the back-off timer expires, the MS is switched off or the SIM/USIM is removed; and

- shall not send another ACTIVATE PDP CONTEXT REQUEST message in the PLMN without an APN if the APN was not included in the ACTIVATE PDP CONTEXT REQUEST message, until the back-off timer expires, the MS is switched off or the SIM/USIM is removed;

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

- shall not send another ACTIVATE PDP CONTEXT REQUEST message in the PLMN for the same APN that was sent by the MS, until the MS is switched off or the SIM/USIM is removed; and

- shall not send another ACTIVATE PDP CONTEXT REQUEST message in the PLMN without an APN if the APN was not included in the ACTIVATE PDP CONTEXT REQUEST message, until the MS is switched off or the SIM/USIM is removed; and

iii) if the timer value indicates that this timer is zero, the MS:

- may send an ACTIVATE PDP CONTEXT REQUEST message in the PLMN for the same APN; and

- may send an ACTIVATE PDP CONTEXT REQUEST message in the PLMN without an APN if the APN was not included in the ACTIVATE PDP CONTEXT REQUEST message.

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

i) Additionally, if the SM 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 MS shall proceed as follows:

- if the MS is registered in its HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), the MS shall behave as described above in the present subclause, using the configured SM\_RetryWaitTime value as specified in 3GPP TS 24.368 [135] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [112], if available, as back-off timer value; and

- otherwise, if the MS 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 MS shall behave as described above in the present subclause using the default value of 12 minutes for the back-off timer.

ii) For SM 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 MS behaviour regarding the start of a back-off timer is unspecified.

The MS 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 PDP context activation 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 SM procedure and PLMN and APN combination when the MS returns to the PLMN or when it performs inter-system change back from S1 mode to A/Gb or Iu mode. Thus the MS can still be prevented from sending another ACTIVATE PDP CONTEXT REQUEST message in the PLMN for the same APN.

If the back-off timer is started upon receipt of an ACTIVATE PDP CONTEXT REJECT message (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 MS behaves as follows:

i) after a PLMN change the MS may send an ACTIVATE PDP CONTEXT REQUEST message for the same APN in the new PLMN, if the back-off timer is not running and is not deactivated for the PDP context activation procedure and the combination of new PLMN and APN;

 Furthermore as an implementation option, for the SM 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 MS may decide not to automatically send another ACTIVATE PDP CONTEXT REQUEST message for the same APN, if the MS registered to a new PLMN which is in the list of equivalent PLMNs.

ii) if the network does not include the Re-attempt indicator IE to indicate whether re-attempt in S1 mode is allowed, or the MS ignores the Re-attempt indicator IE, e.g. because the Back-off timer value IE is not included, then:

- if the MS is registered in its HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), the MS shall apply the configured SM\_RetryAtRATChange value as specified in 3GPP TS 24.368 [135] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [112], if available, to determine whether the MS may attempt a PDN connectivity procedure for the same PLMN and APN combination in S1 mode; and

- if the MS 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 [135] is not available and the value for inter-system change is not configured in the USIM file NASCONFIG, then the MS behaviour regarding a PDN connectivity procedure for the same PLMN and APN combination in S1 mode is unspecified; and

iii) 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 MS shall start a back-off timer for the PDP context activation 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 S1 mode is allowed, the MS shall start or deactivate the back-off timer for A/Gb and Iu mode only; and

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

If the back-off timer for a PLMN and APN combination was started or deactivated in S1 mode upon receipt of a PDN CONNECTIVITY REJECT message (see 3GPP TS 24.301 [120]) and the network indicated that re-attempt in A/Gb or Iu mode is allowed, then this back-off timer does not prevent the MS from sending an ACTIVATE PDP CONTEXT REQUEST message in this PLMN for the same APN in A/Gb or Iu mode. If the network indicated that re-attempt in A/Gb or Iu mode is not allowed, the MS shall not send any ACTIVATE PDP CONTEXT REQUEST message in this PLMN for the same APN in A/Gb or Iu mode until the back-off timer expires, the MS is switched off or the USIM is removed.

NOTE 2: The back-off timer is used to describe a logical model of the required MS 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 MS. Whether the MS uses T3396 as a back-off timer or it uses different packet system specific timers as back-off timers is left up to MS implementation. This back-off timer is stopped when the MS is switched off or the SIM/USIM is removed.

The MS may initiate a PDP context activation procedure for emergency bearer services even if the back-off timer is running.

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

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

- the MS is registered to a new PLMN which was not in the list of equivalent PLMNs at the time when the ACTIVATE PDP CONTEXT REJECT message was received;

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

- the MS is switched off; or

- the SIM/USIM is removed.

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

NOTE 4: For the SM cause values #50 "PDP type IPv4 only allowed", #51 "PDP type IPv6 only allowed", #57 "PDP type IPv4v6 only allowed" and #58 "PDP type non IP only allowed", re-attempt in S1 mode for the same APN (or no APN, if no APN was indicated by the MS) using the same PDP type is not allowed.

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

NOTE 5: Request to send another ACTIVATE PDP CONTEXT REQUEST message with a specific PDP type has to come from upper layers.

If the SM cause value is #65 "maximum number of PDP contexts reached", the MS shall determine the PLMN's maximum number of PDP contexts in A/Gb or Iu mode (see subclause 6.1.3.0) as the number of active PDP contexts it has. The MS 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 PDP contexts, the number of active PDP contexts that the MS has when SM cause #65 is received is not equal to the maximum number of PDP contexts reached in the network.

NOTE 7: When the network supports emergency bearer services, it is not expected that SM cause #65 is returned by the network when the MS requests a PDP context for emergency bearer services.

The PLMN's maximum number of PDP contexts in A/Gb or Iu mode applies to the PLMN in which the SM cause #65 "maximum number of PDP contexts reached" is received. When the MS is switched off or when the USIM is removed, the MS shall clear all previous determinations representing any PLMN's maximum number of PDP contexts in A/Gb or Iu mode (see subclause 6.1.3.0). Upon successful registration with a new PLMN, the MS may clear previous determinations representing any PLMN's maximum number of PDP contexts in A/Gb or Iu mode.

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

i) 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 MS shall not send an ACTIVATE PDP CONTEXT REQUEST message for the same APN in the current PLMN in A/Gb or Iu mode until the MS is switched off or the SIM/USIM is removed;

ii) 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 MS shall not send an ACTIVATE PDP CONTEXT REQUEST message for the same APN in any PLMN in the list of equivalent PLMNs in A/Gb or Iu mode until the MS is switched off or the SIM/USIM is removed; and

iii) if the Back-off timer value IE is included, the MS shall take different actions depending on the timer value received in the Back-off timer value IE:

a) if the timer value indicates neither zero nor deactivated, the MS 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 ACTIVATE PDP CONTEXT REQUEST for the same APN in the current PLMN in A/Gb or Iu mode until the back-off timer expires, the MS is switched off or the SIM/USIM is removed;

b) if the timer value indicates that this timer is deactivated, the MS shall not send another ACTIVATE PDP CONTEXT REQUEST message for the same APN in the current PLMN in A/Gb or Iu mode until the MS is switched off or the SIM/USIM is removed; and

c) if the timer value indicates that this timer is zero, the MS may send an ACTIVATE PDP CONTEXT REQUEST message in the PLMN for the same APN.

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

- for case a) the MS shall additionally start a back-off timer with the value provided in the Back-off timer value IE for the PDP context activation procedure for each combination of a PLMN from the equivalent PLMN list and the APN; and

- for case b) the MS shall deactivate the respective back-off timers for the PDP context activation procedure for each combination of a PLMN from the equivalent PLMN list and the APN.

For the SM cause value #66 "requested APN not supported in current RAT and PLMN combination" the MS 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 i), iii.a) and iii.b), if the Re-attempt indicator IE is not included, the MS may decide not to automatically send another ACTIVATE PDP CONTEXT REQUEST message for the same APN in a PLMN which is in the list of equivalent PLMNs.

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

###### 6.1.3.2.2.3 Handling of network rejection due to SM cause other than SM cause #26

If the SM cause value is different from #26 "insufficient resources" and #65 "maximum number of PDP contexts reached", and the Back-off timer value IE is included, the MS takes different actions depending on the timer value received in the Back-off timer value IE (if the MS is an MS configured to use AC11 – 15 in selected PLMN, exceptions are specified in subclause 6.1.3.13):

i) if the timer value indicates neither zero nor deactivated, the MS shall start the back-off timer with the value provided in the Back-off timer value IE for the secondary PDP context activation procedure and PLMN and APN combination and not send another ACTIVATE SECONDARY PDP CONTEXT REQUEST message in the PLMN for the same APN until the back-off timer expires, the MS is switched off or the SIM/USIM is removed;

ii) if the timer value indicates that this timer is deactivated, the MS shall not send another ACTIVATE SECONDARY PDP CONTEXT REQUEST message in the PLMN for the same APN until the MS is switched off or the SIM/USIM is removed; and

iii) if the timer value indicates that this timer is zero, the MS may send an ACTIVATE SECONDARY PDP CONTEXT REQUEST message in the PLMN for the same APN.

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

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

- if the MS is registered in its HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), the MS shall behave as described above in the present subclause, using the configured SM\_RetryWaitTime value as specified in 3GPP TS 24.368 [135] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [112], if available, as back-off timer value; and

- otherwise, if the MS 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 MS shall behave as described above in the present subclause using the default value of 12 minutes for the back-off timer.

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

The MS 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 secondary PDP context activation 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 SM procedure and PLMN and APN combination when the MS returns to the PLMN or when it performs inter-system change back from S1 mode to A/Gb or Iu mode. Thus the MS can still be prevented from sending another ACTIVATE SECONDARY PDP CONTEXT REQUEST message in the PLMN for the same APN.

If the back-off timer is started upon receipt of an ACTIVATE SECONDARY PDP CONTEXT REJECT message (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 MS behaves as follows:

i) after a PLMN change the MS may send an ACTIVATE SECONDARY PDP CONTEXT REQUEST message for the same APN in the new PLMN, if the back-off timer is not running and is not deactivated for the secondary PDP context activation procedure and the combination of new PLMN and APN;

 Furthermore as an implementation option, for the SM 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 MS may decide not to automatically send another ACTIVATE SECONDARY PDP CONTEXT REQUEST message for the same APN, if the MS registered to a new PLMN which is in the list of equivalent PLMNs.

ii) if the network does not include the Re-attempt indicator IE to indicate whether re-attempt in S1 mode is allowed, or the MS ignores the Re-attempt indicator IE, e.g. because the Back-off timer value IE is not included, then:

- if the MS is registered in its HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), the MS shall apply the configured SM\_RetryAtRATChange value as specified in 3GPP TS 24.368 [135] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [112], if available, to determine whether the MS may attempt a bearer resource allocation procedure for the same PLMN and APN combination in S1 mode; and

- if the MS 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 [135] is not available and the value for inter-system change is not configured in the USIM file NASCONFIG, then the MS behaviour regarding a bearer resource allocation procedure for the same PLMN and APN combination in S1 mode is unspecified; and

iii) 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 MS shall start a back-off timer for the secondary PDP context activation 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 S1 mode is allowed, the MS shall start or deactivate the back-off timer for A/Gb and Iu mode only; and

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

If the back-off timer for a PLMN and APN combination was started or deactivated in S1 mode upon receipt of a BEARER RESOURCE ALLOCATION REJECT message (see 3GPP TS 24.301 [120]) and the network indicated that re-attempt in A/Gb or Iu mode is allowed, then this back-off timer does not prevent the MS from sending an ACTIVATE SECONDARY PDP CONTEXT REQUEST message in this PLMN for the same APN in A/Gb or Iu mode. If the network indicated that re-attempt in A/Gb or Iu mode is not allowed, the MS shall not send any ACTIVATE SECONDARY PDP CONTEXT REQUEST message in this PLMN for the same APN in A/Gb or Iu mode, until the timer expires, the MS is switched off or the USIM is removed.

NOTE 2: The back-off timer is used to describe a logical model of the required MS 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 MS. Whether the MS uses T3396 as a back-off timer or it uses different packet system specific timers as back-off timers is left up to MS implementation. This back-off timer is stopped when the MS is switched off or the SIM/USIM is removed.

If the SM cause value is #65 "maximum number of PDP contexts reached", the MS shall determine the PLMN's maximum number of PDP contexts in A/Gb or Iu mode (see subclause 6.1.3.0) as the number of active PDP contexts it has. The MS shall ignore the Back-off timer value IE and Re-attempt indicator IE provided by the network, if any.

NOTE 4: In some situations, when attempting to establish multiple PDP contexts, the number of active PDP contexts that the MS has when cause #65 is received is not equal to the maximum number of PDP contexts reached in the network.

The PLMN's maximum number of PDP context in A/Gb or Iu mode applies to the PLMN in which the SM cause #65 "maximum number of PDP contexts reached" is received. When the MS is switched off or when the USIM is removed, the MS shall clear all previous determinations representing any PLMN's maximum number of PDP contexts in A/Gb or Iu mode (see subclause 6.1.3.0). Upon successful registration with a new PLMN, the MS may clear previous determinations representing any PLMN's maximum number of PDP contexts in A/Gb or Iu mode.

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

###### 6.1.3.3.3.3 Handling of network rejection due to SM cause other than SM cause #26

If the SM cause value is not #26 "insufficient resources" and the Back-off timer value IE is included, the MS takes different actions depending on the timer value received in the Back-off timer value IE (if the MS is an MS configured to use AC11 – 15 in selected PLMN, exceptions are specified in subclause 6.1.3.13):

i) if the timer value indicates neither zero nor deactivated, the MS shall start the back-off timer with the value provided in the Back-off timer value IE for the PDP context modification procedure and PLMN and APN combination and not send another MODIFY PDP CONTEXT REQUEST message with exception of those identified in subclause 6.1.3.3, in the PLMN for the same APN until the back-off timer expires, the MS is switched off or the SIM/USIM is removed;

ii) if the timer value indicates that this timer is deactivated, the MS shall not send another MODIFY PDP CONTEXT REQUEST message with exception of those identified in subclause 6.1.3.3, in the PLMN for the same APN until the MS is switched off or the SIM/USIM is removed; or

iii) if the timer value indicates that this timer is zero, the MS may send an MODIFY PDP CONTEXT REQUEST message in the PLMN for the same APN.

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

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

- if the MS is registered in its HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), the MS shall behave as described above in the present subclause, using the configured SM\_RetryWaitTime value as specified in 3GPP TS 24.368 [135] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [112], if available, as back-off timer value; and

- otherwise, if the MS 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 MS shall behave as described above in the present subclause, using the default value of 12 minutes for the back-off timer.

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

The MS 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 PDP context 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 SM procedure and PLMN and APN combination when the MS returns to the PLMN or when it performs inter-system change back from S1 mode to A/Gb or Iu mode. Thus the MS can still be prevented from sending another MODIFY PDP CONTEXT REQUEST message with exception of those identified in subclause 6.1.3.3, in the PLMN for the same APN.

If the back-off timer is started upon receipt of a MODIFY PDP CONTEXT REQUEST message (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 MS behaves as follows:

i) after a PLMN change the MS may send a MODIFY PDP CONTEXT REQUEST message for the same APN in the new PLMN, if the back-off timer is not running and is not deactivated for the PDP context modification procedure and the combination of new PLMN and APN;

 Furthermore as an implementation option, for the SM 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 MS may decide not to automatically send another MODIFY PDP CONTEXT REQUEST message for the same APN, if the MS registered to a new PLMN which is in the list of equivalent PLMNs.

ii) if the network does not include the Re-attempt indicator IE to indicate whether re-attempt in S1 mode is allowed, or the MS ignores the Re-attempt indicator IE, e.g. because the Back-off timer value IE is not included, then:

- if the MS is registered in its HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), the MS shall apply the configured SM\_RetryAtRATChange value as specified in 3GPP TS 24.368 [135] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [112], if available, to determine whether the MS may attempt a bearer resource modification procedure for the same PLMN and APN combination in S1 mode; and

- if the MS 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 [135] is not available and the value for inter-system change is not configured in the USIM file NASCONFIG, then the MS behaviour regarding a bearer resource modification procedure for the same PLMN and APN combination in S1 mode is unspecified; and

iii) 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 MS shall start a back-off timer for the PDP context 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 S1 mode is allowed, the MS shall start or deactivate the back-off timer for A/Gb and Iu mode only; and

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

If the back-off timer for a PLMN and APN combination was started or deactivated in S1 mode upon receipt of a BEARER RESOURCE MODIFICATION REJECT message (see 3GPP TS 24.301 [120]) and the network indicated that re-attempt in A/Gb or Iu mode is allowed, then this back-off timer does not prevent the MS from sending a MODIFY PDP CONTEXT REQUEST message in this PLMN for the same APN in A/Gb or Iu mode. If the network indicated that re-attempt in A/Gb or Iu mode is not allowed, the MS shall not send any MODIFY PDP CONTEXT REQUEST message in this PLMN for the same APN in A/Gb or Iu mode until the timer expires, the MS is switched off or the USIM is removed.

NOTE 2: The back-off timer is used to describe a logical model of the required MS 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 MS. Whether the MS uses T3396 as a back-off timer or it uses different packet system specific timers as back-off timers is left up to MS implementation. This back-off timer is stopped when the MS is switched off or the SIM/USIM is removed.

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

###### 6.1.3.8.2.3 Handling of network rejection due to SM cause other than SM cause #26

If the SM cause value is different from #26 "insufficient resources", and the Back-off timer value IE is included, the MS shall take different actions depending on the timer value received in the Back-off timer value IE:

i) if the timer value indicates neither zero nor deactivated, the MS shall start the back-off timer with the value provided in the Back-off timer value IE for the MBMS context activation procedure and PLMN and APN combination. The MS shall not send another ACTIVATE MBMS CONTEXT REQUEST message in the PLMN for the same APN that was sent by the MS until the back-off timer expires, the MS is switched off or the SIM/USIM is removed;

ii) if the timer value indicates that this timer is deactivated, the MS shall not send another ACTIVATE MBMS CONTEXT REQUEST message in the PLMN for the same APN that was sent by the MS until the MS is switched off or the SIM/USIM is removed; and

iii) if the timer value indicates that this timer is zero, the MS may send an ACTIVATE MBMS CONTEXT REQUEST message in the PLMN for the same APN.

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

i) Additionally, if the SM 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 MS shall proceed as follows:

- if the MS is registered in its HPLMN or in a PLMN that is within the EHPLMN list (if the EHPLMN list is present), the MS shall behave as described above in the present subclause, using the configured SM\_RetryWaitTime value as specified in 3GPP TS 24.368 [135] or in USIM file NASCONFIG as specified in 3GPP TS 31.102 [112], if available, as back-off timer value; and

- otherwise, if the MS 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 MS shall behave as described above in the present subclause using the default value of 12 minutes for the back-off timer.

ii) For SM 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 MS behaviour regarding the start of a back-off timer is unspecified.

The MS 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 MBMS context activation 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 SM procedure and PLMN and APN combination when the MS returns to the PLMN or when it performs inter-system change back from S1 mode to A/Gb or Iu mode. Thus the MS can still be prevented from sending another ACTIVATE MBMS CONTEXT REQUEST message in the PLMN for the same APN.

If the back-off timer is started upon receipt of an ACTIVATE MBMS CONTEXT REJECT message (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 MS behaves as follows:

i) after a PLMN change the MS may send an ACTIVATE MBMS CONTEXT REQUEST message for the same APN in the new PLMN, if the back-off timer is not running and is not deactivated for the MBMS context activation procedure and the combination of new PLMN and APN;

 Furthermore as an implementation option, for the SM 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 MS may decide not to automatically send another ACTIVATE MBMS CONTEXT REQUEST message for the same APN, if the MS registered to a new PLMN which is in the list of equivalent PLMNs.

ii) if the network includes the Re-attempt indicator IE, the MS shall ignore any indication provided in the IE regarding whether re-attempt in S1 mode is allowed. If the Re-attempt indicator IE indicates 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 MS shall start a back-off timer for the MBMS context activation procedure with the value provided by the network, or deactivate the respective back-off timer.

NOTE 2: The back-off timer is used to describe a logical model of the required MS 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 MS. Whether the MS uses T3396 as a back-off timer or it uses different packet system specific timers as back-off timers is left up to MS implementation. This back-off timer is stopped when the MS is switched off or the SIM/USIM is removed.

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

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

The network may include a back-off timer value in a session management reject message to regulate the time interval at which the MS may retry the same procedure. For SM cause values other than #26 "insufficient resources", the network may also include the re-attempt indicator to indicate whether the MS is allowed to re-attempt the corresponding EPS session management procedure for the same APN in S1 mode after inter-system change.

NOTE 1: If the network includes this back-off timer value, then the MS is blocked from sending another SM 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, an MS 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 6.1.3.1.3.3, 6.1.3.2.2.3, and 6.1.3.3.3.3.

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

The APN of the PLMN and APN combination associated with the back-off timer is the APN sent by the MS when the PDN connection is established. If no APN is included in the ACTIVATE PDP CONTEXT REQUEST message, then the back-off timer is associated with the combination of the PLMN and no APN. For this purpose the MS shall memorize the APN provided to the network during the PDP context activation. The back-off timer associated with the combination of a PLMN with no APN will never be started due to any SM 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 MS 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 MS received the session management reject message, but for each PLMN included in the equivalent PLMN list at the time when the 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 MS is an MS configured to use AC11 – 15 in selected PLMN, then the MS is allowed to initiate any GPRS session management procedure for this PLMN and APN combination.

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